



EDUCATIONAL TRANSFORMATION: **LEGAL REFORMS AND 21ST CENTURY GLOBAL PERSPECTIVES**



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Educational Transformation: Legal Reforms and 21st Century Global Perspectives

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Message

Greetings from the Centre for Educational Research at Madurai Kamaraj University!

Dear Colleagues, Scholars and Esteemed Participants,



On behalf of the Centre for Educational Research, Madurai Kamaraj University, I am delighted to extend my warm greetings to all those involved in the upcoming. International Conference on Educational Transformation: Legal Reforms and 21st-Century Global Perspectives. This multidisciplinary event, scheduled from **29th to 31st January 2026**, will be held in a hybrid format, providing a unique opportunity for global participation and discourse.

We are proud to be a partner in this prestigious conference, organized by **Mithra Dev Publications, Sivakasi**, in collaboration with esteemed institutions such as **V.M. Salgaocar College of Law, Miramar, Goa, Shinawatra University, Thailand, Thiagarajar College of Preceptors (Aided), and the Department of Education, Manonmaniam Sundaranar University, Tirunelveli.**

This conference presents an excellent platform for academics, researchers, and professionals to come together and discuss critical issues surrounding legal reforms and educational transformations in the context of the rapidly changing global landscape. The event aims to foster innovative ideas, enhance cross-border academic collaborations, and inspire meaningful discussions on how we can shape education to meet the needs of the 21st century.

As part of this distinguished gathering, the **Centre for Educational Research at Madurai Kamaraj University, Madurai** is committed to advancing research and offering valuable insights that can drive positive change in the fields of education and law. Our collective efforts will undoubtedly contribute to enhancing the quality of education and addressing the complex challenges posed by global trends.

We look forward to the enriching exchanges that will take place during the conference, and we are confident that it will serve as an avenue for future collaborations and academic progress. We invite you all to join us in this significant event as we work together to advance educational reform and foster a brighter future for global education. I eagerly anticipate your active participation and contributions to this global dialogue.

Warm regards,

R. Annadurai

Foreword from Organizing Secretary



Dr. A. Veliappan

It gives me immense pleasure and a profound sense of pride to pen this preface for the proceedings of the International Conference on Educational Transformation: Legal Reforms and 21st Century Global Perspectives (ICET 2026), organized by Mithra Dev Publications. This conference serves as a vital multidisciplinary platform for scholars and practitioners to navigate the complex intersection of pedagogy and legal frameworks in our rapidly evolving global landscape.

On behalf of the organizing committee, I extend a warm and heartfelt greeting to our distinguished collaborative partners, whose intellectual support and institutional prestige have been instrumental in the realization of this event. We are deeply honored to collaborate with V. M. Salgaocar College of Law, Goa, which graciously serves as our host venue; the Centre for Educational Research at Madurai Kamaraj University, Tamil Nadu; the Faculty of Liberal Arts at Shinawatra University, Thailand; the Department of Education at Manonmaniam Sundaranar University, Tirunelveli; and the Thiagarajar College of Preceptors (Aided), Madurai. This synergy between premier Indian and international institutions underscores our collective commitment to foster excellence in higher education and legal research.

In the 21st century, the field of education is undergoing a radical transformation, driven by digital innovation and the necessity for robust legal reforms. This volume encapsulates a diverse range of scholarly inquiries—from the impact of AI on personalized learning to the nuances of mental health, emotional intelligence, and constitutional rights in education. Each

paper presented here has been meticulously scrutinized to ensure its contributes meaningfully to the existing body of knowledge. As an Organizing Secretary, I would like to express my sincere gratitude to the contributing authors for their rigorous research and to the collaborative institutes for their unwavering partnership. It is our hope that this proceedings will serve as a definitive resource for educators, legal experts and policymakers in their quest to shape a more equitable and modernized educational future.

Best regards,

Dr. A. Veliappan

Head

Department of Education

Manonmaniam Sundaranar University

Tirunelveli, Tamil Nadu - 627 012. India

Message from the Organising Secretary



The *International Conference on “Educational Transformation: Legal Reforms and 21st Century Global Perspectives”*, held at Goa, India, represents a significant academic initiative aimed at re-examining and re-envisioning the future of Indian education in a rapidly changing global context. The conference brings together scholars, educators, legal experts, policymakers, and practitioners from India and abroad to engage in critical dialogue on the structural, legal, and pedagogical transformations necessary for building a resilient and inclusive education system.

Education in India stands at a historic crossroads, where tradition meets transformation. This conference is both timely and significant, as it seeks to critically examine the legal frameworks governing Indian education while simultaneously exploring innovative learning pathways aligned with the demands of the 21st century. In an era shaped by globalization, digital transformation, artificial intelligence, and evolving societal needs, reimagining education has become not merely desirable but imperative.

The focus on legal frameworks underscores the importance of policy, governance, and constitutional values in ensuring equity, access, and quality in education. At the same time, the emphasis on contemporary learning pathways highlights the need for learner-centric, skill-oriented, and technology-enabled pedagogies that foster critical thinking, creativity and lifelong learning.

I commend the organizers for bringing together eminent academicians, researchers, policymakers, legal experts, and practitioners from across the globe. Such an interdisciplinary and international dialogue will undoubtedly contribute valuable insights and actionable strategies for strengthening India’s educational ecosystem.

I am confident that the deliberations, research presentations, and collaborative discussions during this conference will inspire meaningful reforms, enrich scholarly discourse, and pave the way for an inclusive, innovative, and legally robust education system in India.

I extend my heartfelt congratulations to the organizing committee and wish the conference every success. May this academic endeavour leave a lasting impact on educational policy, practice and research, both nationally and internationally.

Dr. S. Prakash,

Principal,

Thiagarajar College of Preceptors (Aided),

Madurai, Tamil Nadu, India.

Preface from the Conference Secretary



Education is the cornerstone of societal progress, and in an era marked by rapid global transformation, the role of legal education in shaping informed, ethical, and responsible citizens has become more crucial than ever. The International Conference on Educational Transformation: Legal Reforms and 21st Century Global Perspectives is a sincere academic endeavour to deliberate upon emerging challenges, reforms, and innovative practices in education with a special emphasis on legal frameworks.

This conference is being organized through the collective efforts of the host institution in collaboration with esteemed academic and research institutions, reflecting a shared commitment to intellectual exchange and interdisciplinary dialogue. The deliberations aim to provide a common platform for academicians, legal professionals, researchers, policymakers, and students to engage in meaningful discussions, share scholarly insights, and propose forward-looking strategies aligned with global educational and legal developments.

The response to this conference has been truly encouraging, with participation from distinguished scholars and experts representing diverse institutions and jurisdictions. Their contributions, through research papers, keynote addresses, and panel discussions, are expected to enrich academic discourse and foster collaborative research and institutional networking.

On behalf of the Organising Committee, I extend my sincere gratitude to all collaborating institutions, patrons, advisors, speakers, delegates, and participants for their invaluable support and cooperation. I also acknowledge the dedicated efforts of the organising team whose commitment has made this academic gathering possible.

I am confident that the deliberations of this conference will lead to meaningful outcomes and contribute constructively to the evolving landscape of education and legal reforms.

Prof. Dr. Shaber Ali

Principal, V. M. Salgaocar College of Law

Conference Secretary

International Conference on Educational Transformation: Legal Reforms and

21st Century Global Perspectives

Message from the Organising Secretary



Dr. A. Vences Cyril

It is a matter of profound honor and immense pleasure to present the proceedings of the International Conference on Educational Transformation: Legal Reforms and 21st Century Global Perspectives (ICET 2026). As an Organising Secretary, I am delighted to witness this multidisciplinary gathering of brilliant minds, dedicated to exploring the evolving landscape of education through the lens of legal and global shifts. This conference, organized by Mithra Dev Publications, stands as a testament to our shared vision of creating a robust, inclusive, and future-ready educational framework.

The success of such a grand international endeavor is never the result of a single individual's effort but the fruit of a powerful collective collaboration. I wish to extend my deepest gratitude and sincere greetings to our esteemed collaborative partners who have played a pivotal role in making this event a reality. We are exceptionally grateful to **V.M. Salgaocar College of Law, Goa**, for providing a prestigious venue and legal expertise; the **Centre for Educational Research at Madurai Kamaraj University**, Tamil Nadu, for their academic guidance; the **Faculty of Liberal Arts at Shinawatra University, Thailand**, for bringing an invaluable international perspective; the **Department of Education at Manonmaniam Sundaranar University, Tirunelveli**, for their constant support; and the **Thiagarajar College of Preceptors (Aided), Madurai**, for their dedication to teacher education excellence. Their unwavering support has been the cornerstone of this conference's success.

In this era of rapid digital transformation, the research papers compiled in these proceedings address critical issues ranging from AI-driven pedagogy to the socio-legal protections of student well-being. Each contribution has been carefully scrutinized to reflect high standards of academic integrity. I would like to thank all the contributors, delegates, and the tireless organizing team for their commitment. It is my firm belief that the insights shared within these pages will not only enrich the academic community but also serve as a guiding light for policymakers and practitioners worldwide as we step further into the 21st century.

Thanking you

Dr. A. Vences Cyril

Organising Secretary,

Mithra Dev Publications,

Sivakasi, Tamil Nadu, India.

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ATTITUDE TOWARDS LEARNING MANAGEMENT SYSTEMS AMONG SCHOOL TEACHERS IN MADURAI DISTRICT

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Abstract

Learning Management Systems (LMS) have become a cornerstone of modern education, providing tools to improve teaching and learning experiences. This study investigates the attitudes of school teachers in Madurai District towards the acceptance and use of LMS. It examines their perceptions, challenges, and the factors manipulating their acceptance of these systems. The findings indicate a varied level of acceptance influenced by factors such as digital literacy, training, and access to resources, offering insights for improving LMS integration in schools.

Keywords: *Learning Management System, Attitude, School Teachers, Madurai District, Digital Education*

Introduction

The increasing reliance on technology in education has brought Learning Management Systems (LMS) to the forefront. LMS platforms facilitate the management, delivery, and monitoring of educational content, making them invaluable for teachers. However, the effective use of LMS depends on the attitudes and readiness of educators. In the context of Madurai District, where schools range from urban, resource-rich institutions to rural establishments with limited technological access, understanding teachers' attitudes towards LMS is essential for its successful implementation.

Need for the Study

The rapid digitalization of education, accelerated by the COVID-19 pandemic, has underscored the importance of integrating LMS into the teaching learning process. While LMS platforms offer significant potential to improve educational outcomes, their adoption heavily depends on teachers' acceptance and willingness to adapt. In Madurai District, schools display considerable diversity in terms of infrastructure, teacher preparedness, and access to digital resources. Understanding the attitudes of teachers towards LMS can help address barriers, design effective training programs, and ensure equitable access to digital education.

Background of the Problem

Education systems worldwide are experiencing a paradigm shift towards blended and online learning. However, the effectiveness of LMS implementation often varies due to factors such as teacher competence, infrastructure availability, and institutional support. In regions like Madurai District, challenges such as digital divide, lack of awareness, and resistance to change further complicate LMS adoption. Teachers play a pivotal role in this transformation, and their attitudes can either accelerate or hinder the integration of LMS into classrooms. Exploring this problem provides critical visions into overcoming existing challenges and enhancing digital education.

Operational Definition of key Terms

Attitude towards Learning Management System

Refers to the opinion of the school teachers towards the software application for the administration, documentation, tracking, reporting, computerization and delivery of educational courses, training programmes, material collectively called as Learning Management System.

School Teachers

Refers to those who are working Government, Government-Aided and Private High cum Higher secondary schools in Madurai district.

Madurai District

One of the Southern Districts in Tamil Nadu.

Variables of the Study

Dependent Variable

- Attitude towards Learning Management System.

Independent Variables

- Gender
- School Locality
- School Type
- Teaching Level

Objectives of the Study

1. To find out the school teachers' attitude towards Learning Management System.
2. To find out whether there is any significant in School teachers' attitude towards Learning Management System in terms of the independent variables viz., Gender, School Locality, School Type and Teaching Level.

Hypotheses of the Study

1. Attitude towards Learning Management System among school teachers is favourable.
2. Select independent Variables exerts a significant influence on school teachers' attitude towards Learning Management System

Methodology- in- Brief

- Design : Descriptive
- Method : Normative
- Technique : Survey

Sample of the study

A Stratified representative sample of 355 school teachers constituted from Government, Government aided and Private high and higher secondary schools situated in Madurai District.

Tools used

- Personal Information Schedule structured by the investigator.
- A Scale on Attitude towards Learning Management System constructed by **Athavanraj, A & Meenakshi, R (2024)**.

Statistical Treatment

The statistical treatment involved in the study is the test of significance of difference between the means of large independent samples ('t'-test).

Literature Review

Learning Management Systems in Education

Learning Management Systems (LMS) are digital platforms that simplify the management, delivery, and tracking of educational content. They have become progressively vital in modern education for blended and online learning environments. Popular LMSs like Moodle, Google Classroom, and Blackboard offer functionalities such as assignment tracking, discussion forums, and resource sharing, which enhance instructional delivery and student engagement.

Teacher Attitudes toward LMS Use

Teacher attitudes play a dynamic role in the effective adoption and execution of LMSs. Studies have shown that teachers' perceptions of ease of use, usefulness, and self-efficacy in technology significantly influence their willingness to adopt LMSs. Optimistic attitudes are related with higher adoption rates and more innovative uses of the platform.

Key Factors Influencing Attitudes

- **Perceived Usefulness:** Teachers are more likely to embrace LMSs if they believe the system improves their teaching efficiency and student learning outcomes.
- **Ease of Use:** Intuitive interfaces and minimal technical difficulties foster positive attitudes.
- **Training and Support:** Adequate professional development and ongoing technical support reduce resistance to LMS adoption.
- **Workload Implications:** Teachers are sensitive to whether LMSs streamline or increase their workload.
- **Cultural and Institutional Support:** Organizational policies, infrastructure, and peer support influence attitudes significantly.

Challenges in LMS Adoption

- Despite the advantages, several barriers hinder LMS adoption among school teachers:
- Lack of technical skills and confidence.
- Inadequate infrastructure and internet access.
- Resistance to change and traditional teaching preferences.
- Time constraints for learning and integrating new systems.

Related Studies

- Davis et al. (2019) - "Teacher Perceptions of LMS Effectiveness in K-12 Education". This study initiates that teacher attitudes toward LMSs were influenced by the level of training and support provided. Teachers who received comprehensive training were more likely to perceive LMSs as effective tools for managing classroom activities.
- Al-Fraihat et al. (2020) - "Evaluating LMS Success in Schools". The study painted that apparent ease of use and the flexibility of LMS platforms were critical determinants of teacher satisfaction and acceptance. Teachers appreciated LMSs for fostering collaborative and self-paced learning among students.
- Teo et al. (2018) - "The Role of Self-Efficacy in LMS Adoption". This research emphasized that teachers with higher self-efficacy in using technology established more optimistic attitudes toward LMSs. The study recommended targeted professional development to build confidence in technology use.

- Hamzah et al. (2020) - "Barriers to LMS Adoption in Rural Schools". This study focused on the challenges handled by teachers in rural schools, including limited access to technology and infrastructure. It recommended government interventions to provide better access to digital tools and resources.
- Cheng et al. (2021) - "Attitudes Toward Blended Learning Through LMSs in Schools". The study revealed that teachers valued the blended learning approach facilitated by LMSs but noted that time constraints and lack of institutional encouragement were key barriers to consistent use.

Data Analysis and Interpretations

The empirical average value of teachers' attitude towards learning management system is 46.18 while the theoretical average is 40 only. Hence, the teachers' attitude towards learning management system is found to be above average level. In other words, teachers possess a high attitude towards learning management system in Madurai District.

TABLE 1: Statistics of Learning Management System and Gender - Wise

Gender	N	M	SD	't' - Value	Significance at 0.05 level
Male	164	44.67	8.25	3.387	Significant
Female	191	47.48	7.22		

The obtained 't' value 3.387 is higher than the table value 1.96 at 0.05 level of significance. This shows that there is a significant difference between male and female school teachers in their attitude towards learning management system among school teachers.

Comment:

From the above table we can conclude that the Female school teachers possess favourable attitude towards learning management system than the Male school teachers.

TABLE 2: Statistics of Learning Management System and School Locality - Wise

School Locality	N	M	SD	't' - Value	Significance at 0.05 level
Rural	168	46.64	7.63	1.037	Not Significant
Urban	187	45.78	8.00		

The obtained 't' value 1.037 is lower than the table value 1.96 at 0.05 level of significance. This shows that there is a significant difference in attitude towards learning management system among school teachers those who are working in rural and urban schools.

TABLE 3: Statistics of Learning Management System And School Type - Wise

School type	N	M	SD	't' - Value	Significance at 0.05 level
Govt. & Govt. Aided	193	47.36	7.61	3.126	Significant
Private	162	44.78	7.87		

The obtained 't' value 3.126 is higher than the table value 1.96 at 0.05 level of significance. This shows that there is a significant difference in attitude towards learning management system among school teachers those who are working Govt. & Govt. aided schools and private Schools.

Comment:

From the above table we can conclude that the teachers those who are working in Govt. and Govt. Aided school teachers possess favourable attitude towards learning management system than the Private school teachers.

TABLE 4: Statistics of Learning Management System and Teaching Level - Wise

Teaching Level	N	M	SD	't' - Value	Significance at 0.05 level
BT Asst.	183	46.74	7.68	1.390	Not Significant
PG Asst.	172	45.59	7.96		

The obtained 't' value 1.390 is lower than the table value 1.96 at 0.05 level of significance. This shows that there is no significant difference in attitude towards learning management system among school teachers those who are working as BT Assistant and PG Assistant.

Hypotheses Verification

1. Professional college students have above average level of attitude towards augmented and virtual reality in teaching-learning process.

The empirical average value of teachers' attitude towards learning management system is 46.18 while the theoretical average is 40 only. Hence, the teachers' attitude towards learning management system is found to be above average level. In other words, teachers possess a high attitude towards learning management system in Madurai District.

2. Each of the independent variables involved in this study exerts significant influence on attitude towards learning management system of the school teachers

Out of Four independent variables, two variables viz., Gender and School type alone exerts a significant influence on attitude towards learning management system among school teachers in Madurai District.

Hence the hypothesis is partially accepted

Conclusions

The most important Conclusions emerged out the present study are listed below:

1. Attitude towards learning management system among school teachers in Madurai district is found higher.
2. Attitude towards learning management system among school teachers in Madurai district found dependent upon.
 - Gender
 - School Type
3. Attitude towards learning management system among school teachers in Madurai district is found independent upon.
 - School Locality
 - Teaching Level

Educational Implications

- Organize continuous professional development sessions to improve LMS-related technical skills and confidence among all teachers.
- Provide ongoing technical support to address challenges faced during LMS usage, ensuring teachers feel supported in their adoption journey.
- Develop and implement school-level ICT policies that promote the effective use of LMS, ensuring alignment with teachers' needs and school goals.

- Introduce incentive mechanisms (e.g., recognition programs, rewards) to encourage teachers' lively engagement with LMS.
- Foster a collaborative culture where teachers can share their LMS-related experiences, best practices, and strategies for effective use.
- LMS features should be customized to streamline teachers' administrative tasks, reducing their workload and increasing perceived usefulness.
- Private schools should focus on providing better access to resources, infrastructure, and training for teachers to boost their confidence and practice of LMS.
- Collaborative partnerships between private and government schools can assistance share best performs in LMS usage.
- Educational authorities can ensure policy alignment for equitable support of LMS integration across all types of schools, regardless of funding.

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CRITICAL THINKING, CREATIVITY, AND PROBLEM-SOLVING IN HIGHER EDUCATION: A PEDAGOGICAL IMPERATIVE FOR THE 21ST CENTURY

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Abstract

Contemporary higher education is increasingly challenged to prepare learners for complex academic, professional, and social realities. In this context, the cultivation of critical thinking, creativity, and problem-solving abilities has become a central educational priority. This paper discusses the role of higher education pedagogy in fostering these higher-order skills among students. Based on psychological theories of learning, sociological perspectives of collaborative knowledge construction, and philosophical foundations of learner-centred education, the paper highlights the effectiveness of innovative instructional practices such as inquiry-based, experiential, and collaborative learning. It also situates these competencies within the reformative vision of the National Education Policy (NEP) 2020, which promotes holistic development, flexibility, and competency-oriented education. The paper concludes that embedding critical thinking, creativity, and problem-solving into curriculum planning, classroom practices, and assessment processes is essential for developing independent, adaptable, and socially conscious graduates suited to the demands of the 21st century

1. Introduction

The 21st century is characterized by rapid technological advancement, globalization, and an unprecedented expansion of knowledge. These changes have significantly transformed the expectations placed on higher education institutions. Traditional instructional practices that emphasize rote memorization and passive learning are no longer sufficient to prepare students for the complexities of modern life and work. Instead, higher education must focus on developing learners' abilities to think critically, generate creative ideas, and solve problems effectively.

Critical thinking, creativity, and problem solving are widely recognized as essential competencies for academic achievement, professional success, and responsible citizenship. These skills enable learners to analyze information, adapt to new situations, and contribute innovatively to society. As a result, integrating these competencies into higher education pedagogy has become a central educational priority and a pedagogical imperative for the 21st century.

2. Conceptual Framework

2.1 Critical Thinking

Critical thinking refers to the ability to analyze, evaluate, and synthesize information in a logical and reflective manner. It involves questioning assumptions, assessing evidence, identifying biases, and making reasoned judgments. In higher education, critical thinking enables students to engage deeply with subject matter, develop independent viewpoints, and apply knowledge to real-world contexts rather than merely reproducing information.

2.2 Creativity

Creativity is the capacity to produce original, meaningful, and valuable ideas or solutions. It involves imagination, flexibility, and openness to new perspectives. In higher education, creativity supports innovation, interdisciplinary thinking, and the exploration of alternative approaches to learning and problem solving. Creative learners are more willing to take intellectual risks and experiment with new ideas.

2.3 Problem Solving

Problem solving is a systematic process of identifying problems, analyzing possible solutions, selecting appropriate strategies, and implementing effective actions. It requires both critical and creative thinking. In higher education, problem-solving skills prepare learners to handle complex academic tasks and real-life challenges encountered in professional and social environments.

3. Interrelationship among Critical Thinking, Creativity, and Problem Solving

Critical thinking, creativity, and problem solving are closely interconnected and mutually reinforcing. Critical thinking provides the analytical foundation needed to understand and define problems accurately. Creativity enables the generation of innovative and alternative solutions. Problem solving integrates critical analysis and creative thinking to implement practical and effective solutions. Together, these skills form a comprehensive framework for higher-order cognitive development in higher education.

4. Importance of These Skills in Higher Education

The development of critical thinking, creativity, and problem solving is vital for achieving the broader goals of higher education. These skills enhance academic performance by promoting deep learning and conceptual understanding. They also improve graduates' employability by equipping them with competencies valued in the modern workplace, such as adaptability, innovation, and decision making. Furthermore, these skills support lifelong learning and enable individuals to respond effectively to social, economic, and environmental challenges.

5. Pedagogical Strategies for Developing Higher-Order Thinking Skills

5.1 Inquiry-Based Learning

Inquiry-based learning encourages students to ask questions, investigate issues, and construct knowledge through exploration and reflection. This approach promotes critical thinking and problem solving by actively involving learners in the learning process.

5.2 Problem-Based Learning

Problem-based learning engages students with real-life or simulated problems that require collaborative analysis and solution development. It fosters critical thinking, creativity, and teamwork while connecting theoretical knowledge with practical application.

5.3 Collaborative Learning

Collaborative learning involves group discussions, projects, and peer interactions. It exposes learners to diverse perspectives and promotes creative thinking and problem solving through shared responsibility and cooperation.

5.4 Experiential Learning

Experiential learning emphasizes learning through direct experience, reflection, and application. Activities such as case studies, internships, simulations, and fieldwork help students apply theoretical concepts to real-world situations.

5.5 Technology-Enhanced Learning

Technology-enhanced learning uses digital tools and online platforms to support interactive and personalized learning experiences. Virtual simulations, discussion forums, and digital collaboration tools can effectively promote critical analysis, creativity, and problem solving.

6. Role of Teachers in Higher Education

Teachers play a crucial role in fostering critical thinking, creativity, and problem solving. Their role extends beyond content delivery to facilitation, mentoring, and the design of meaningful learning experiences. Teachers must create supportive learning environments that encourage questioning, reflection, experimentation, and intellectual risk-taking. Continuous professional development is essential to help educators adopt innovative pedagogical practices aligned with 21st-century learning goals.

7. Challenges in Implementation

Despite its importance, the integration of critical thinking, creativity, and problem solving in higher education faces several challenges. These include rigid curricula, examination-oriented assessment systems, limited faculty training, large class sizes, and time constraints. Addressing these challenges requires institutional commitment, curriculum flexibility, and supportive educational policies.

8. Implications for Curriculum and Assessment

Curricula in higher education should be designed to promote active learning, interdisciplinary approaches, and real-world relevance. Assessment practices must move beyond traditional written examinations to include projects, presentations, portfolios, case analyses, and reflective journals that effectively measure higher-order thinking skills. Alignment among learning objectives, teaching strategies, and assessment methods is essential for meaningful learning outcomes.

9. Conclusion

Critical thinking, creativity, and problem solving are indispensable skills for learners in the 21st century. Higher education institutions have a responsibility to embed these competencies into teaching–learning processes through innovative pedagogy, supportive learning environments, and appropriate assessment practices. By prioritizing the development of these skills, higher education can prepare graduates who are reflective, adaptable, and capable of addressing complex global challenges. Thus, promoting critical thinking, creativity, and problem solving is not merely an educational trend but a pedagogical imperative for the 21st century.

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THE INFLUENCE OF PERCEIVED ORGANISATIONAL CULTURE AND LEADERSHIP STYLE ON TEACHER JOB SATISFACTION IN INDIAN SCHOOLS: EVIDENCE FROM GUJARAT

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Abstract

This study examines the influence of perceived organisational culture and leadership style on teacher job satisfaction in Indian secondary schools, with empirical evidence drawn from the state of Gujarat. Grounded in established theories of organisational culture and leadership, the study explores how key cultural dimensions, namely adaptability, consistency, and involvement, as well as leadership styles, including transformational, transactional, and laissez-faire, relate to teachers' overall job satisfaction. A quantitative, cross-sectional research design was adopted, and data were collected from secondary school teachers using standardised questionnaires. Statistical analyses were conducted to determine the predictive effects of organisational culture and leadership style on teacher job satisfaction. The findings contribute to a clearer understanding of how school leadership practices and organisational culture shape teachers' professional well-being in the Indian educational context. The study further offers practical implications for educational leadership and school management aimed at improving teacher satisfaction and organisational effectiveness.

Keywords: Organisational Culture; Leadership Style; Teacher Job Satisfaction.

INTRODUCTION

Teacher job satisfaction is a key concern in educational organisations due to its strong association with teacher motivation, commitment, and retention. Job satisfaction has been defined as a positive emotional state resulting from an individual's evaluation of their job experiences (Locke, 1976). In school settings, higher levels of teacher job satisfaction are associated with sustained engagement and improved instructional quality. Within the Indian education context, increasing professional demands and institutional reforms have intensified the need to understand organisational factors that support teachers' job satisfaction.

Organisational culture constitutes a central contextual factor influencing teachers' work experiences. Culture refers to the shared values, beliefs, and norms that guide behaviour within organisations (Schein, 2010). In schools, cultural attributes such as involvement in decision-making, coherence of values, and openness to change are particularly salient. Empirical evidence indicates that organisational culture dimensions including adaptability, consistency, and involvement, are positively associated with organisational effectiveness and employee satisfaction (Denison & Mishra, 1995). Teachers who perceive their school culture as supportive and participatory are more likely to report higher levels of job satisfaction.

Leadership style represents another critical organisational determinant of teacher job satisfaction. School principals play a central role in shaping both school culture and teachers' professional experiences. Transformational leadership, characterised by vision, individualised consideration, and intellectual stimulation, has been consistently linked to higher levels of teacher job satisfaction and organisational commitment in educational settings (Bass & Avolio, 1994; Leithwood & Jantzi, 2005; Nguni et al., 2006).

Meta-analytic findings further suggest that transformational leadership demonstrates stronger positive associations with job satisfaction than transactional leadership, whereas laissez-faire leadership is negatively related to employee attitudes and effectiveness (Judge & Piccolo, 2004).

LITERATURE REVIEW

This section reviews empirical and theoretical literature on organisational culture and leadership style, focusing on their relationships with teacher job satisfaction within educational contexts, with particular attention to school-based studies.

Organisational Culture and Teacher Job Satisfaction

Organisational culture is commonly understood as the shared values, beliefs, and assumptions that influence how members of an organisation interpret and respond to their work environment (Schein, 2010). In school settings, culture is expressed through everyday practices related to collaboration, decision-making, leadership expectations, and openness to change. Such cultural features shape teachers' professional experiences and provide the context within which teaching and learning activities take place.

The model advanced by Denison and Mishra (1995) offers a useful framework for examining organisational culture in educational institutions. The model emphasises three dimensions that are particularly relevant to schools: involvement, consistency, and adaptability. Involvement refers to the extent to which teachers are empowered and engaged in school processes, consistency reflects the presence of shared values and internal coherence, and adaptability denotes the school's capacity to respond to internal and external demands. Research has shown that these cultural characteristics are associated with positive employee attitudes, including higher levels of job satisfaction, as they contribute to a sense of professional inclusion, clarity, and stability within the organisation.

Leadership Style and Teacher Job Satisfaction

Leadership style represents a further organisational factor with significant implications for teacher job satisfaction. Within the Full Range Leadership Theory, Bass and Avolio (1994) identified transformational, transactional, and laissez-faire leadership styles. Transformational leadership is characterised by the articulation of a clear vision, individualised support, and the encouragement of professional growth.

In educational research, transformational leadership has been consistently linked to favourable teacher outcomes, including higher job satisfaction and stronger organisational commitment (Leithwood & Jantzi, 2005; Nguni et al., 2006). Evidence from meta-analytic studies indicates that transformational leadership is more strongly associated with job satisfaction than transactional leadership, while laissez-faire leadership tends to be associated with negative employee attitudes and reduced effectiveness (Judge & Piccolo, 2004). These findings suggest that leadership approaches which recognise teachers' professional contributions and support their autonomy are more likely to enhance satisfaction within school environments.

Integrating Organisational Culture and Leadership

Organisational culture and leadership are closely linked, as leadership practices influence not only individual teacher experiences but also the broader cultural context of schools (Schein, 2010). The present study adopts an integrated perspective in which organisational culture and leadership style are examined jointly as predictors of teacher job satisfaction. Transformational leadership and positive cultural attributes are expected to be associated with higher levels of teacher satisfaction, whereas laissez-faire leadership is expected to show a negative relationship. Examining these relationships within Indian secondary schools allows for a more contextually grounded understanding of how organisational and leadership factors interact to shape teachers' work experiences.

METHODOLOGY

Research Design and Participants

This study employed a quantitative, cross-sectional survey design to examine relationships among perceived organisational culture, leadership style, and teacher job satisfaction in secondary schools. Data were collected at a single point in time using a non-experimental, correlational approach.

The participants were 100 secondary school teachers drawn from ten public and private schools in Gujarat, India, including five public and five private institutions located in Ahmedabad and surrounding districts. A stratified convenience sampling strategy was used to ensure representation of both school types. The sample comprised teachers from diverse subject areas and experience levels; 58% were female and 42% male, with ages ranging from 25 to 58 years (mean age approximately 40 years).

Instruments

Data were collected using three standardised instruments previously developed and validated within the Indian context. For analytical purposes, only composite scale scores were used, and individual items were not examined separately.

1. *Organisational Culture Questionnaire (OCQ)*. was assessed using the Organisational Culture Questionnaire developed by Singh and Mishra (2018). The instrument measures three dimensions: adaptability, consistency, and involvement. Responses are recorded on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree), with higher scores indicating more positive perceptions of school culture. In the present study, the overall scale demonstrated strong internal consistency (Cronbach's $\alpha = .90$). Subscale reliabilities were acceptable for adaptability ($\alpha = .79$), consistency ($\alpha = .82$), and involvement ($\alpha = .85$).
2. *Leadership Style Scale (L.P.C.)*. was measured using the Leadership Style Scale developed by Singh (2010). The scale assesses teachers' perceptions of their principals' transformational, transactional, and laissez-faire leadership behaviours. Responses are rated on a five-point Likert scale ranging from 1 (never) to 5 (always). Internal consistency estimates in the present sample were satisfactory for transformational leadership ($\alpha = .88$), transactional leadership ($\alpha = .76$), and laissez-faire leadership ($\alpha = .70$).
3. *Teacher's Job Satisfaction Scale (TJSS–MMB)*. it was measured using the Teacher's Job Satisfaction Scale developed by Mudgil, Mubar, and Bhatia (2005). The instrument provides a global assessment of job satisfaction across multiple facets of teachers' professional experiences. Responses are recorded on a five-point Likert scale, with higher scores reflecting greater job satisfaction. In this study, the scale demonstrated excellent internal consistency (Cronbach's $\alpha = .91$).

RESULTS

This section presents descriptive statistics, correlation coefficients, and regression results examining relationships among organisational culture, leadership style, and teacher job satisfaction.

Descriptive Statistics

Descriptive statistics and reliability coefficients are presented in Table 1. Teachers reported moderately positive perceptions of organisational culture and leadership, as well as moderate levels of job satisfaction. Adaptability and involvement showed slightly higher mean scores than consistency among the cultural dimensions.

TABLE 1: Descriptive Statistics and Reliability of Study Variables (N = 100)

Variable	Cronbach's α	Mean (M)	SD	Scale Range
Adaptability (Culture)	0.79	3.70	0.58	1–5 (Likert)
Consistency (Culture)	0.82	3.50	0.52	1–5 (Likert)
Involvement (Culture)	0.85	3.60	0.72	1–5 (Likert)
Transformational Leadership	0.88	3.80	0.81	1–5 (Frequency)
Transactional Leadership	0.76	3.40	0.69	1–5 (Frequency)
Laissez-faire Leadership	0.70	2.00	0.80	1–5 (Frequency)
Job Satisfaction	0.91	3.65	0.54	1–5 (Likert)

Correlation Analysis

Pearson correlation coefficients are reported in Table 2. Teacher job satisfaction was positively correlated with adaptability, consistency, and involvement, with involvement showing the strongest association. Transformational leadership was strongly and positively related to job satisfaction, whereas laissez-faire leadership demonstrated a significant negative relationship.

TABLE 2: Pearson Correlations among Study Variables (N = 100)

Variable	1	2	3	4	5	6	7
1. Adaptability	1.00						
2. Consistency	0.45**	1.00					
3. Involvement	0.50**	0.30**	1.00				
4. Transformational Leadership	0.55**	0.20*	0.60**	1.00			
5. Transactional Leadership	0.15	0.25*	0.10	0.20	1.00		
6. Laissez-faire Leadership	-0.35**	-0.20*	-0.40**	-0.50**	-0.20	1.00	
7. Job Satisfaction	0.40**	0.32**	0.48**	0.51**	0.21*	-0.29**	1.00

* $p < .05$, ** $p < .01$ (two-tailed).

Regression Analysis

Hierarchical multiple regression results are presented in Table 3. The final model was statistically significant and explained 46% of the variance in teacher job satisfaction ($R^2 = .46$, adjusted $R^2 = .42$).

TABLE 3: Multiple Regression Predicting Teacher Job Satisfaction (N = 100)

Predictor Variable	β	t	p
Adaptability (Culture)	0.12	1.25	.214
Consistency (Culture)	0.05	0.56	.578
Involvement (Culture)	0.20*	2.11	.038
Transformational Leadership	0.32**	3.01	.003
Transactional Leadership	0.09	0.98	.330
Laissez-faire Leadership	-0.21*	-2.34	.022

$R^2 = .46$, Adjusted $R^2 = .42$, $F(6, 93) = 13.27$, $p < .001$ * $p < .05$, ** $p < .01$.

DISCUSSION

This study examined the relationships between perceived organisational culture, leadership style, and teacher job satisfaction in secondary schools in Gujarat, India. The findings indicate that both organisational culture and leadership style play important, yet distinct, roles in shaping teachers' job satisfaction.

Teachers generally perceived their school environments as moderately positive, with relatively high levels of adaptability and involvement and low levels of laissez-faire leadership. These perceptions provide a meaningful context for interpreting the observed relationships among the study variables.

Among the organisational culture dimensions, involvement emerged as the strongest predictor of teacher job satisfaction. Teachers who reported greater participation in decision-making and a stronger sense of empowerment were more satisfied with their work. This finding is consistent with organisational culture theories that emphasise involvement as a key mechanism through which culture influences employee attitudes, particularly by enhancing autonomy, recognition, and professional engagement. Although adaptability was positively associated with job satisfaction at the correlational level, it did not retain a unique effect in the regression analysis, suggesting that its influence may be indirect or shared with leadership-related factors. Consistency showed weaker associations, indicating that stability and shared values alone may be insufficient to enhance job satisfaction without active engagement and supportive leadership.

Leadership style proved to be a critical determinant of teacher job satisfaction. Transformational leadership demonstrated a strong and independent positive association with job satisfaction, even after controlling for organisational culture. This finding supports theoretical assumptions that leaders who articulate a clear vision, provide individualised support, and recognise teachers' contributions can directly enhance teachers' motivation and well-being. In contrast, laissez-faire leadership showed a consistent negative association with job satisfaction, underscoring that leadership absence or avoidance undermines teacher morale and satisfaction. This result reinforces evidence that passive leadership is particularly detrimental in school settings, where guidance and engagement from principals are expected.

Taken together, the findings support an integrated perspective in which organisational culture and leadership style function as complementary influences on teacher job satisfaction. While organisational culture provides the broader normative context, leadership represents an active force that shapes daily experiences and can either strengthen or weaken cultural effects. The results further suggest that, within the Indian educational context, teachers value participatory cultures and supportive, engaged leadership, highlighting the relevance of transformational leadership practices in enhancing teacher job satisfaction.

CONCLUSIONS

This study examined the influence of perceived organisational culture and leadership style on teacher job satisfaction in secondary schools in Gujarat, India. The findings demonstrate that organisational and leadership factors play a meaningful role in shaping teachers' professional well-being. In particular, teacher involvement and transformational leadership emerged as the most influential positive predictors of job satisfaction, while laissez-faire leadership was associated with lower satisfaction.

The study underscores that organisational culture is not merely a background condition but a substantive determinant of teacher attitudes. Schools that promote participation, shared decision-making, and openness tend to foster higher levels of job satisfaction among teachers. At the same

time, leadership style exerts an independent and powerful influence. Principals who engage in transformational behaviours—such as articulating a shared vision, supporting teacher development, and recognising contributions—are more likely to cultivate satisfied and motivated teaching staff. Conversely, passive or avoidant leadership undermines teacher morale, even when other organisational conditions are relatively favourable. Further research may extend this work by examining mediating mechanisms (e.g., whether organisational culture mediates the relationship between leadership and satisfaction) or by incorporating additional outcomes such as teacher commitment, burnout, turnover intentions, and student-related indicators.

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INFLUENCE OF TECHNO- PEDAGOGICAL SKILLS ON TEACHING COMPETENCY OF STUDENT TEACHERS

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Abstract

The rapid growth of digital technologies has drastically transformed educational scenario. This paper aims to discuss the Influence of techno-pedagogical skills on teaching competency of student teachers that foster critical thinking, adaptability, digital competence and learner-centered teaching strategies. Emphasizing approaches such as blended learning, flipped classrooms, experiential and inquiry- based learning and digital simulation tools. It also discusses strategies shift from traditional teacher-led instruction to dynamic practices that personalize education and prepare student teachers for diverse classrooms. The researcher used a survey method, and a sample of 250 student teachers selected from the various college of education of Kanyakumari District was randomly selected. The findings of the study can be used to provide insights into the current level of techno-pedagogical skills on teaching competency of student teachers and identify areas that need improvement to enhance teaching and learning outcomes.

Key Words: *Techno-Pedagogical skills, Teaching competency, Student Teachers*

INTRODUCTION:

Education in the 21st century is being transformed by rapid advancements in digital technology. The integration of Information and Communication Technology (ICT) into the teaching–learning process has given rise to a new paradigm where pedagogical practices are redefined to meet the demands of a knowledge-driven society. Teachers are no longer considered as mere transmitters of knowledge, but as facilitators, mentors, and guides who must skilfully employ technological resources to make learning meaningful, engaging, and effective.

Thus, the present study on the Influence of Techno-Pedagogical Skills on Teaching Competency of Student Teachers seeks to explore the interrelationship between these two critical dimensions. It emphasizes the idea that the future of education depends on preparing teachers who are not only competent in subject knowledge and pedagogy but also proficient in the use of technology as a catalyst for innovation in teaching.

TECHNO-PEDAGOGICAL SKILL

Techno pedagogy refers to application of scientific principles and technological advancement on class room practices, especially teaching, learning and evaluation. Technology facilitated class room provides opportunity to learn with the teacher rather by the teacher. Role of technology influences the teaching learning process such as, Technology as a tutor, Technology as a teaching tool and Technology as a learning tool. Techno pedagogy is a platform where teachers can integrate technology, pedagogy and subject matter in an effective manner. Techno pedagogy refers to electronically mediated course that integrate the sound pedagogical principles of teaching learning process with the use of technology.

Techno-pedagogical competency concept is conducting the planning, applying and assessing processes depending upon technological and pedagogical contents in order to increase the effectiveness of teaching process (Niess, 2005).

In recent years, Technological Pedagogical Content Knowledge has become the main concept used in the reshaping process of teacher training programs for many universities in EU countries (Abell, 2008).

TEACHING COMPETENCY:

There are a large number of instructional and related activities to be performed by the teacher inside and outside the classroom. These activities are of varied types. The effective organization of these activities would require that a teacher possesses a certain amount of knowledge and also certain attitudes and skills. This is known as teaching Competency. In other words, teaching Competency refers to the right way of conveying units of knowledge, application and skills to students. The right way here includes knowledge of content, processes, methods and means of conveying content. Any definition of teaching Competency depends on teaching in a particular setting, the culture and values held in the community. It also depends on the innumerable teacher and student characteristics and the classroom context.

The effectiveness or ineffectiveness of teaching is closely linked to teaching Competency. Competent teacher would also create classroom conditions and climate, which are conducive for student learning. Teaching competency has various dimensions such as content knowledge, instructional planning, student motivation, presentation and communication skills, evaluation competencies and classroom management skills. While the teacher would require all these dimensions to a reasonable extent, it is in the manifestation of these in an integrated manner that makes him effective in the classroom context.

NEED AND SIGNIFICANCE OF THE STUDY

Techno-pedagogical skills and teaching competency are closely interrelated: the former serves as a critical component and predictor of the latter. For student teachers, developing techno-pedagogical expertise is no longer optional but essential to become competent, effective, and future-ready educators. Hence the investigator has tried to explore the influence of techno - pedagogical skills on teaching competency of student teachers.

STATEMENT OF THE PROBLEM

The statement of the problem is entitled as **“INFLUENCE OF TECHNO- PEDAGOGICAL SKILLS ON TEACHING COMPETENCY OF STUDENT TEACHERS”**.

OBJECTIVES

1. To find out the level of Techno - Pedagogical Skills of student teachers.
2. To find out the level of Teaching Competency of student teachers.
3. To find out the relationship between Techno - Pedagogical Skills and Teaching Competency of student teachers.

HYPOTHESES

1. The Techno - Pedagogical Skills among student teachers is at moderate level.
2. The Teaching Competency among student teachers is at moderate level.
3. There is no significant relationship between Techno - Pedagogical Skills and Teaching Competency of student teachers.
4. There is no significant difference in the Techno - Pedagogical Skills of student teachers with regard to their gender. (Male and Female)

5. There is no significant difference in the Teaching Competency of student teachers with regard to their gender. (Male and Female)
6. There is no significant difference in the Techno - Pedagogical Skills of student teachers with regard to their educational qualification. (U.G. and P.G.).
7. There is no significant difference in the Teaching Competency of student teachers with regard to their educational qualification. (U.G. and P.G.).
8. There is no significant difference among student teachers in the Techno - Pedagogical Skills with regard to their father's educational qualification. (school education, college education and professional education)
9. There is no significant difference among student teachers in the Teaching Competency with regard to their father's educational qualification. (school education, college education and professional education)
10. There is no significant difference among student teachers in the Techno - Pedagogical Skills with regard to their mother's educational qualification. (school education, college education and professional education)
11. There is no significant difference among student teachers in the Teaching Competency with regard to their mother's educational qualification. (school education, college education and professional education).

METHODOLOGY

The investigator used normative survey method to study the Techno - Pedagogical Skills and Teaching Competency of student teachers in Kanyakumari District.

TOOLS USED IN THE PRESENT STUDY

The investigator used the following tools for collecting data

- 1) Personal Data Sheet
- 2) Techno - Pedagogical Skills Assessment Scale (Developed by Sibichen and Annaraja (2009).
- 3) Teaching Competency Scale (Developed by Anisha J S and Dr. K. R. Selvakumar (2024).

POPULATION AND SAMPLE

The population for present study is therefore all the student teachers of various college of educations in Kanyakumari District. The investigator selected 250 student teachers from Kanyakumari district through stratified random sampling technique.

HYPOTHESIS 1

The level of Techno - Pedagogical Skills among student teachers is at moderate level.

Percentage analysis was made to find out the level of Techno - Pedagogical Skills in student teachers. The result was shown in Table

Level of Techno - Pedagogical Skills among student teachers

Variable	Total	Low		Moderate		High	
	N	N	%	N	%	N	%
Techno - Pedagogical Skills	250	51	20.4	164	65.6	35	14.0

From the table, it is inferred that level of Techno - Pedagogical Skills of student teachers is at moderate level. The analysis revealed that 20.4 % of student teachers have shown low level of

Techno - Pedagogical Skills, 65.6 % of student teachers have shown medium level of Techno - Pedagogical Skills and 14.0 % of student teachers have shown high level of Techno - Pedagogical Skills.

Thus it is concluded that Hypothesis – 1 stated that, *The level of Techno - Pedagogical Skills among student teachers is at moderate level* is accepted.

HYPOTHESIS 2

The level of Teaching Competency among student teachers is at moderate level.

Percentage analysis was made to find out the level of Teaching Competency in student teachers. The result was shown in Table

Level of Teaching Competency among student teachers

Variable	Total	Low		Moderate		High	
	N	N	%	N	%	N	%
Teaching Competency	250	28	11.2	180	72.0	42	16.8

From the table it is inferred that level of Teaching Competency of student teachers is at moderate level. The analysis revealed that 11.2 % of student teachers have shown low level of Teaching Competency, 72.0 % of student teachers have shown medium level of Teaching Competency and 16.8 % of student teachers have shown high level of Teaching Competency.

Thus it is concluded that Hypothesis – 2 stated that, *The level of Teaching Competency among student teachers is at moderate level.* is accepted.

IMPLICATIONS OF THE STUDY

The following are some of the implications of the present investigation which could be applied for the student teachers to improve their Techno - Pedagogical Skills and Teaching Competency.

For Teacher Education Institutions

- Teacher education programmes must embed **techno-pedagogical training** into the curriculum, going beyond theoretical ICT literacy to focus on practical integration of technology with pedagogy.
- Workshops, simulation-based teaching, and digital practicum sessions should be organized to ensure student teachers acquire hands-on experience in using technology effectively in classrooms.

For Student Teachers

- The study underlines the need for student teachers to develop themselves as **digitally competent educators**, capable of using technology to enhance teaching effectiveness and learner engagement.
- Developing techno-pedagogical competence will improve their **confidence, employability, and professional growth** in a competitive educational environment.

SUGGESTIONS FOR FURTHER STUDIES

On the basis of the findings of the present study, the investigator has given the following suggestion for further research in the field.

1. The present study was confined to the student teachers. This can be extended to the other students studying at different educational levels.

2. The study was limited to the student teachers of Kanyakumari district. The study can also be extended to other districts in Tamil Nadu.
3. The present study included only 250 students. This can be extended by covering more individuals in the sample, with some more variables related to Techno - Pedagogical Skills.
4. Techno-pedagogical skills, Thinking skills and Problem Solving skills of Arts and Science College students can be studied.
5. The other personality variables related to Teaching Competency can be undertaken in the future.

CONCLUSION

The present study on the Influence of Techno-Pedagogical Skills on Teaching Competency of Student Teachers highlights the growing importance of integrating technology with pedagogy in the field of teacher education. In the current era of digital transformation, teaching competency can no longer be viewed in isolation from techno- pedagogical expertise. The ability of student teachers to effectively plan, organize, and deliver lessons is strengthened when they are equipped with the skills to use technology as a tool for instruction, assessment, and learner engagement.

Findings across literature and practice suggest that student teachers who possess higher levels of techno-pedagogical skills demonstrate greater adaptability, confidence, creativity, and effectiveness in teaching. They are better able to create interactive, learner-centered classrooms that foster active participation and meaningful learning. Conversely, the absence of such skills may hinder teaching competency, leading to traditional, teacher-centered approaches that may not resonate with digital-age learners.

Thus, techno-pedagogical skills are not an additional advantage but an essential component of teacher competency in the 21st century. Teacher education institutions must therefore emphasize the development of these skills through curriculum integration, practical training, workshops, and digital literacy initiatives. By doing so, student teachers can be prepared to meet the challenges of modern classrooms and contribute to quality education in alignment with the goals of national and global educational reforms.

In conclusion, the study reinforces the idea that techno-pedagogical skills directly influence and enhance teaching competency, making them indispensable for the professional growth of student teachers and the advancement of education as a whole.

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EFFECT OF GAME-BASED LEARNING ON LEARNING OUTCOMES IN MATHEMATICS

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Abstract

Game-Based Learning (GBL) has gained increasing attention as a pedagogical strategy that combines instructional content with interactive gaming elements to foster deeper engagement and improved academic performance. This study explores the effect of GBL on learning outcomes in mathematics. A single group experimental design was adopted, involving 32 upper primary school students. Data were collected using pre-test and post-test. Results indicate that in post test, the students achieved significantly higher scores in mathematics compared to their scores in pretest. The findings suggest that integrating game-based strategies into mathematics instruction can positively influence learning outcomes, making abstract concepts more accessible and enjoyable. This study underscores the potential of GBL as a transformative approach in mathematics education, encouraging educators to adopt interactive, student-centered practices.

Keywords: Game-Based Learning, Mathematics Education, Learning Outcomes

INTRODUCTION

Mathematics education has long been challenged by issues of student disengagement, anxiety, and difficulties in conceptual understanding. Traditional instructional approaches, often dominated by rote practice and teacher-centered delivery, have been criticized for failing to sustain learner motivation and for limiting opportunities to develop higher-order thinking skills. In response, educators and researchers have increasingly turned to game-based learning (GBL) as an innovative pedagogical strategy that integrates play, challenge, and feedback into the learning process.

Game-based learning refers to the use of digital or non-digital games designed with explicit educational objectives, where learners acquire knowledge and skills through interactive problem-solving, competition, or collaboration. In mathematics, GBL has been shown to foster deeper engagement, improve retention, and enhance performance by situating abstract concepts within meaningful and enjoyable contexts (Frontiers in Education, 2024). Studies in primary and secondary classrooms suggest that games can support the development of procedural fluency, conceptual understanding, and higher-order reasoning, while simultaneously reducing math anxiety and improving attitudes toward the subject (IJFMR, 2024).

Recent meta-analyses highlight that GBL can positively influence both cognitive and affective learning outcomes, though the magnitude of its effect depends on factors such as game design quality, alignment with curricular goals, and teacher facilitation. For example, digital mathematics games that provide adaptive feedback and scaffolded challenges have been associated with significant gains in problem-solving and achievement (Publicatio, 2023). Similarly, classroom implementations that integrate structured debriefing and reflection help learners transfer skills beyond the game environment.

Despite these promising findings, gaps remain in the literature. Many studies focus on short-term interventions, with limited evidence on long-term retention and transfer.

There is also a need for more culturally contextualized research, particularly in diverse educational settings such as India, where mathematics achievement disparities persist. Addressing these gaps is crucial to understanding how GBL can be systematically integrated into mathematics curricula to improve learning outcomes at scale.

Therefore, this study investigates the effect of game-based learning on mathematics learning outcomes, aiming to contribute empirical evidence to the growing body of research on digital pedagogy. By examining both cognitive and affective dimensions of learning, the study seeks to clarify the potential of GBL as a transformative approach in mathematics education and provide insights for educators, curriculum designers, and policymakers.

OBJECTIVES OF THE STUDY

- To find the effect of game based learning on learning outcomes in Mathematics among upper primary school students.
- To find the differences, if any between upper primary boys and girls on learning outcomes in Mathematics

HYPOTHESIS

- There is no significant difference between pretest and post test scores on learning outcomes in Mathematics.
- There is no significant difference between upper primary boys and girls on learning outcomes in Mathematics in pretest.
- There is no significant difference between upper primary boys and girls on learning outcomes in Mathematics in post test.

REVIEW OF RELATED LITERATURE

Over the past decade, research has consistently highlighted the positive impact of game-based learning (GBL) on mathematics learning outcomes. Erşen and Ergül (2022) conducted a systematic review of GBL in mathematics education between 2010 and 2020, finding that students exposed to games demonstrated improved achievement and problem-solving skills. They emphasized that cognitive outcomes were strongest when games were aligned with curricular objectives and supported by teacher facilitation.

Similarly, Debrenti (2024) examined primary mathematics classrooms and reported significant gains in conceptual understanding and procedural fluency. Learners also showed reduced anxiety and greater persistence, suggesting that affective outcomes such as enjoyment and confidence play a mediating role in sustaining achievement.

In a broader meta-analysis, Clark, Tanner-Smith, and Killingsworth (2016) found small-to-moderate positive effects of digital games on mathematics achievement. Their study highlighted that adaptive feedback and scaffolded challenges were critical for cognitive gains, while motivational benefits such as engagement and time-on-task reinforced learning outcomes.

Finally, Wouters et al. (2013), though slightly earlier, remains influential in shaping the last decade's trajectory. Their meta-analysis of serious games demonstrated significant improvements in both cognitive and motivational outcomes, stressing the importance of explanatory feedback and structured debriefing for maximizing achievement and transfer.

Together, these studies confirm that GBL can enhance mathematics learning outcomes, provided that games are purposefully designed, instructionally integrated, and assessed beyond engagement alone.

METHODOLOGY

Design

Single group experimental method was employed for this study.

Sample

The study included 32 upper primary school students in Kanyakumari District.

Tool

Mathematics Learning Outcomes Test: A 20-item multiple-choice questions were prepared and used for both pretest and post test.

Statistical Techniques

Descriptive statistics (Mean, SD)

Inferential statistics (t-test)

RESULTS AND DISCUSSION

Hypothesis 1:

There is no significant difference between pretest and post test scores on learning outcomes in Mathematics.

TABLE 1: Comparison of pretest and post test scores on learning outcomes in Mathematics

	N	Mean	SD	t value
Pretest	32	7.49	1.907	27.985
Post test	32	16.35	3.028	

From the table 1, the t-value is greater than the table value at 0.05 level of significance. Hence, the null hypothesis is rejected at 0.05 level of significance. This indicates that there is significant difference between pretest and post test scores on learning outcomes in Mathematics.

The results demonstrate that the intervention (game-based learning in mathematics) had a highly significant positive effect on students' learning outcomes. The large increase in mean scores suggests that students not only improved their achievement but also likely gained better conceptual understanding and fluency in mathematics. The very high t-value confirms that this improvement is not due to chance, but rather attributable to the instructional strategy employed.

Hypothesis 2:

There is no significant difference between upper primary boys and girls on learning outcomes in Mathematics in pretest

TABLE 2: Comparison of upper primary boys and girls on learning outcomes in Mathematics in pretest.

	N	Mean	SD	t value
Boys	15	7.25	1.453	1.642
Girls	17	7.70	1.628	

In the table 2, the t-value is less than the table value at 0.05 level of significance. Hence, the null hypothesis is accepted at 0.05 level of significance. This implies that there is no significant difference between upper primary boys and girls on learning outcomes in Mathematics. This indicates that gender does not play a substantial role in achieving learning outcomes in Mathematics in pretest at the upper primary level.

Hypothesis 3:

There is no significant difference between upper primary boys and girls on learning outcomes in Mathematics in post test.

TABLE 3 Comparison of upper primary boys and girls on learning outcomes in Mathematics in post test.

Group	N	Mean	SD	t value
Boys	15	16.23	3.094	0.914
Girls	17	16.45	2.989	

In the table 3, the t-value is less than the table value at 0.05 level of significance. Hence, the null hypothesis is accepted at 0.05 level of significance. This implies that there is no significant difference between upper primary boys and girls on learning outcomes in Mathematics. This indicates that gender does not play a substantial role in achieving learning outcomes in Mathematics in post test at the upper primary level.

RECOMMENDATIONS

1. Since the study demonstrated a significant improvement in learning outcomes after the intervention, it is recommended that game-based learning strategies be systematically integrated into mathematics instruction at the upper primary level.
2. Teachers should be trained to design, adapt, and facilitate mathematics games that align with curricular objectives. Professional development programs can help educators effectively implement game-based pedagogy and maximize student achievement.
3. Games should be designed not only to improve scores but also to strengthen conceptual understanding, problem-solving, and procedural fluency. This ensures that learning gains are durable and transferable beyond the classroom.
4. As results indicated no significant difference between boys and girls in both pretest and posttest scores, educators can confidently apply game-based learning strategies across genders without bias. Equal opportunities should be provided to all learners to engage in interactive mathematics activities.
5. Future studies should explore the long-term effects of game-based learning on mathematics achievement, retention, and higher-order thinking skills. Comparative studies across different grade levels and cultural contexts would provide deeper insights into its broader applicability.

CONCLUSION

The findings of this study clearly establish that game-based learning has a highly significant positive effect on mathematics learning outcomes among upper primary students. The substantial increase in mean scores from pretest to post test confirms that the intervention enhanced achievement, conceptual understanding, and fluency. Importantly, the analysis revealed no significant differences between boys and girls in either pretest or post test scores, indicating that gender does not influence the effectiveness of game-based learning in mathematics.

Overall, the study underscores the potential of game-based learning as an innovative and inclusive pedagogical strategy that can transform mathematics education. By fostering both cognitive and affective gains, game-based approaches make mathematics more engaging, equitable, and effective, thereby contributing to improved learning outcomes and supporting the broader goal of quality education.

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INNOVATIVE PEDAGOGICAL APPROACHES IN MATHEMATICS EDUCATION: AN EXPERIMENTAL STUDY WITH SCHOOL STUDENTS

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Abstract

This experimental study investigates innovative pedagogical approaches integrating gamification, inquiry-based learning, and technology-enhanced visualization to improve mathematics achievement among upper primary school students (grades 4-6). Employing a randomized pretest-post test control group design, 120 students were assigned to either an experimental group receiving gamified algebra instruction grounded in Self-Determination Theory and Flow Theory, or a control group following traditional lecture-based methods. ANCOVA analysis of post-test scores, adjusted for pretest covariates, revealed significant gains in algebraic reasoning and conceptual understanding for the experimental group. Qualitative data from student reflections highlighted increased engagement and reduced math anxiety. Findings demonstrate that theory-driven gamification transforms abstract mathematics into accessible, motivating experiences, offering scalable strategies for diverse classroom contexts. Implications for teacher training and curriculum design emphasize balancing digital tools with collaborative problem-solving to foster 21st-century mathematical competencies.

Key words: Mathematics education, Innovative Pedagogical approach

1. Introduction

Mathematics education at the upper primary level serves as a critical foundation for developing abstract reasoning and problem-solving skills essential for STEM disciplines. However, algebra the gateway to higher mathematics consistently poses significant challenges for students aged 9-11, with studies indicating that 70-80% struggle with converting word problems into mathematical expressions and understanding variable relationships. In India, where mathematics phobia affects primary students, traditional lecture-based instruction exacerbates these difficulties, leading to high anxiety and disengagement.

Theoretical Underpinnings:

Self-Determination Theory (SDT) posits that learning environments supporting autonomy, competence, and relatedness foster intrinsic motivation, while Flow Theory suggests optimal engagement occurs when challenges match skill levels. Gamification integrating game elements like points, badges, and progressive challenges operationalizes these theories by transforming abstract algebra into interactive, mastery-oriented experiences.

Recent reviews confirm gamification's positive effects on primary mathematics motivation and achievement, yet experimental evidence remains limited, particularly in resource-constrained South Asian contexts. The National Education Policy (NEP) 2020 emphasizes innovative pedagogies to combat math phobia, creating an urgent need for empirically validated interventions.

This study addresses these gaps through a randomized controlled trial investigating theory-driven gamified algebra instruction versus traditional methods among 120 upper primary students in Coimbatore, Tamil Nadu. By employing ANCOVA analysis of pretest-posttest data, the research

tests whether gamification significantly enhances algebraic reasoning while reducing anxiety a scalable solution aligned with 21st-century educational imperatives.

Research Questions:

1. Does gamified instruction produce greater post-test algebra achievement gains than traditional methods?
2. To what extent does gamification impact student engagement and math anxiety?

2. Literature Review

2.1 Challenges in Primary Algebra Learning

Algebraic thinking transitions students from concrete arithmetic to symbolic reasoning, yet primary learners face persistent barriers. Research identifies difficulties in relational thinking (71% failure rate), word problem translation (83%), and variable conceptualization. Traditional rote instruction fails to address these misconceptions, perpetuating math anxiety particularly among elementary students.

2.2 Gamification in Mathematics Education

Theoretical Foundations:

- **SDT:** Gamified elements satisfy basic needs competence (badges/mastery), autonomy (choice in paths), relatedness (collaborative challenges) enhancing intrinsic motivation.
 - **Flow Theory:** Progressive difficulty maintains optimal challenge-skill balance, sustaining engagement.
- Algebra-Specific Applications:** Gamified equation-solving games accelerate relational thinking development, with board games proving particularly effective for concrete-to-abstract progression.

2.3 Gaps in Current Research

1. **Limited Experimental Rigor:** Many studies employ quasi-experimental designs lacking randomization.
2. **Contextual Bias:** Predominantly Western samples overlook Global South realities.
3. **Theoretical Integration:** Few interventions explicitly link game mechanics to SDT/Flow constructs.
4. **Algebra Focus:** Geometry/number games dominate; algebraic thinking underrepresented.

Indian Context: NEP 2020 advocates experiential learning, yet empirical validation of gamification remains scarce amid persistent math phobia.

2.4 Conceptual Framework

Traditional Instruction → Rote Learning → High Anxiety → Poor Algebraic Reasoning

↓

Gamified Instruction (SDT + Flow) → Intrinsic Motivation → Flow State → Enhanced Algebraic Achievement

3. Methodology Outline

3.1 Research Design

Randomized pretest-posttest control group experimental design with two parallel groups:

- **Experimental Group** (n=60): Gamified algebra instruction
- **Control Group** (n=60): Traditional lecture-based instruction

Randomization: Simple random assignment using random number generator after baseline pretest equivalence.

3.2 Participants

Population: Upper primary students (Grades 4-6), ages 9-11

Sample: 120 students from two government-aided schools in Coimbatore, Tamil Nadu

Sampling: Purposive (intact classes) followed by randomization within classes

4. Data Interpretation

ANCOVA Table (Post test- Group +Pretest)

Source	SS	df	MS	F	p	Partial η^2
Group	245.60	1	245.60	12.45	0.001	0.096
Pretest	980.30	1	980.30	49.70	<0.001	0.298
Error	2309.00	117	19.74			
Total	38145.00	119				

Adjusted Post test Means

Group	Adjusted Mean	Std. Error
Control (0)	68.20	1.02
Experimental (1)	76.50	1.01

Results

An analysis of covariance (ANCOVA) was conducted to examine the effect of the innovative pedagogical approach on students' algebra achievement, while statistically controlling for initial differences in pre-test scores. The **dependent variable** was the post-test algebra achievement score, the **independent variable** was the instructional method (control vs. experimental group), and the **covariate** was the pre-test algebra score.

The covariate, pre-test score, had a **significant effect** on post-test achievement, $F(1,117) = 49.70, p < 0.001$, indicating that students' initial performance was strongly related to their final scores. After adjusting for pre-test differences, there was a **statistically significant main effect of group** on post-test scores, $F(1,117) = 12.45, p = 0.001, \eta_p^2 = 0.096$. This partial eta squared value shows a **medium effect size**, meaning that approximately 9.6% of the variance in post-test achievement was explained by the type of instruction, over and above the effect of pre-test performance.

The **adjusted mean** post-test score for the control group (traditional lecture-based instruction) was 68.20 (SE = 1.02), whereas the experimental group (gamified, inquiry-based, technology-enhanced instruction) obtained a higher adjusted mean of 76.50 (SE = 1.01). Thus, even after controlling for pre-test scores, the experimental group outperformed the control group by about **8.3 points**, indicating a meaningful advantage for students who experienced the innovative pedagogical module. These findings support the hypothesis that integrating gamification, inquiry-based learning, and visualization tools can significantly enhance upper primary students' algebra achievement compared to conventional teaching methods.

5. Conclusion

The present experimental study demonstrates that a theory-driven gamified pedagogy, integrating inquiry-based learning and technology-enhanced visualization, significantly improves upper primary students' algebra achievement compared to traditional lecture-based instruction. After statistically controlling for initial differences through ANCOVA, the experimental group

showed higher adjusted post-test means and a meaningful effect size, indicating that the intervention produced genuine learning gains in algebraic reasoning rather than simple test familiarity. These findings align with recent systematic reviews reporting that gamification in mathematics education yields consistent positive effects on learners' conceptual understanding, numerical fluency, and motivation across diverse contexts.

Grounded in Self-Determination Theory and Flow Theory, the gamified module in this study effectively supported students' basic needs for autonomy, competence, and optimal challenge, thereby fostering intrinsic motivation and flow-like engagement during algebra tasks. Qualitative reflections further suggested that students experienced reduced mathematics anxiety and greater enjoyment, echoing international evidence that well-designed game elements such as progressive challenges, immediate feedback, and meaningful rewards can transform mathematics classrooms into more inclusive and affectively supportive environments. At the same time, the results caution that gamification must remain tightly aligned with curricular goals to avoid superficial "pontification" that distracts from deep learning, a concern emphasized in contemporary critical reviews.

For practice, the study underscores the potential of integrating structured gamified modules into regular upper primary mathematics teaching as a scalable strategy for advancing NEP 2020's call for engaging, competency-based learning in India. Teacher education programs should explicitly train pre-service and in-service teachers to design and facilitate gamified learning environments that balance digital tools with collaborative problem-solving, ensuring that game elements serve clear conceptual objectives. At the policy and research levels, the findings support continued investment in evidence-based gamification initiatives while also highlighting the need for long-term, multi-site trials that examine sustainability, equity of technology access, and the optimal blend of intrinsic and extrinsic motivational supports. Overall, this study adds to the growing body of empirical work showing that thoughtfully designed gamified pedagogy can be a powerful lever for enhancing both achievement and affect in school mathematics.

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INCLUSIVE AND BARRIER-FREE EDUCATION UNDER THE NATIONAL EDUCATION POLICY 2020: OPPORTUNITIES AND CHALLENGES

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Abstract

The National Education Policy (NEP) 2020 marks a significant shift in India's educational framework by emphasizing inclusion, equity, and barrier-free access to learning. In a socially and economically diverse country, achieving inclusive education remains a critical challenge due to disparities related to gender, disability, region, language, and socio-economic status. This paper examines the provisions of NEP 2020 that aim to promote inclusive and barrier-free education across school and higher education systems. It highlights policy initiatives such as targeted support for socio-economically disadvantaged groups, digital learning platforms, multilingual education, assistive technologies, and infrastructure development. The study also discusses key implementation challenges, including the digital divide, infrastructural limitations, teacher preparedness, and governance issues. By adopting a policy-oriented and analytical approach, the paper emphasizes that while NEP 2020 provides a strong framework for inclusive education, its success depends on effective implementation, coordinated governance, and sustained institutional commitment to ensure equitable educational opportunities for all learners.

Keywords: National Education Policy 2020, Inclusive Education, Barrier-Free Learning

1. Introduction

Education plays a pivotal role in shaping an equitable, progressive, and inclusive society. In a diverse country like India, ensuring equal access to quality education for all sections of society has remained a persistent challenge due to socio-economic disparities, regional imbalances, gender inequality, and barriers faced by marginalized and differently-abled learners (Government of India, 2020). Inclusive and barrier-free education is therefore essential to promote social justice, national development, and lifelong learning opportunities in the 21st century.

The National Education Policy (NEP) 2020, introduced by the Government of India, represents a landmark reform aimed at transforming the Indian education system to meet contemporary global standards (Ashokkumar et al., 2025). One of the central objectives of NEP 2020 is to promote equity, inclusion, and accessibility across all levels of education, from early childhood to higher education (Kalita, 2024). The policy emphasizes universal access, flexible learning pathways, multilingual education, digital inclusion, and support for socio-economically disadvantaged groups. NEP 2020 envisions an education system that is learner-centric, inclusive, and free from physical, social, economic, and technological barriers (Rangarajan, 2025). It advocates targeted interventions for underrepresented communities, students with disabilities, and learners from rural and remote areas. Furthermore, the policy recognizes the role of technology, teacher capacity building, and governance reforms in creating an inclusive and barrier-free learning ecosystem. In this context, the present paper examines the provisions of NEP 2020 related to inclusive and barrier-free education. It highlights the opportunities offered by the policy while also addressing the challenges associated with its effective implementation. The study aims to provide a policy-oriented perspective on how NEP 2020 can contribute to building an equitable and inclusive education system in India.

2. Overview of the National Education Policy 2020

The NEP 2020 was introduced after more than three decades, replacing the National Policy on Education 1986 (Mandal, 2021). It aims to restructure and modernize the Indian education system in response to the changing social, economic, and technological needs of the 21st century. The policy is rooted in the principles of access, equity, quality, affordability, and accountability, with a strong focus on holistic and multidisciplinary learning. NEP 2020 envisions a comprehensive transformation of education by emphasizing learner-centered approaches, flexibility in curriculum design, and the integration of skills, values, and knowledge (Kumar, 2025). It promotes a shift from rote learning to conceptual understanding, critical thinking, creativity, and problem-solving abilities. The policy also highlights the importance of early childhood care and education, foundational literacy and numeracy, and continuous professional development of teachers.

A key feature of NEP 2020 is its commitment to inclusive education. The policy identifies socio-economically disadvantaged groups, including students from rural areas, economically weaker sections, minorities, women, and students with disabilities, and proposes targeted measures to improve their access and participation in education. Financial support mechanisms, scholarships, open and distance learning, and digital platforms are encouraged to reduce educational disparities.

Additionally, NEP 2020 underscores the role of technology and digital learning in expanding educational access and ensuring continuity of learning (Meena, 2025). Initiatives such as online education platforms, digital infrastructure development, and blended learning models are envisioned to create flexible and accessible learning environments. The policy also stresses multilingual education and the use of mother tongue or regional languages, especially at the foundational level, to enhance comprehension and inclusivity (Sumartana et al., 2025). Overall, NEP 2020 provides a forward-looking policy framework that seeks to create an education system aligned with global standards while addressing India's unique social and cultural diversity. Its emphasis on inclusion and accessibility lays the foundation for promoting barrier-free education across all levels.

3. Inclusive Education Initiatives under NEP 2020

Inclusive education is a core pillar of the NEP 2020, with clearly defined strategies and measurable targets aimed at reducing educational disparities across India. The major inclusive and barrier-free education initiatives proposed under NEP 2020 are summarized in Table 1.

TABLE 1: Key Inclusive and Barrier-Free Education Initiatives under NEP 2020

Policy Area	NEP 2020 Provision	Intended Outcome
Universal Access	Target of 100% GER in school education by 2030 and 50% GER in higher education by 2035	Increased participation across all education levels
Socio-Economically Disadvantaged Groups (SEDGs)	Scholarships, hostels, financial aid, and targeted interventions	Reduction of educational inequality
Inclusive Education for Persons with Disabilities	Barrier-free infrastructure, assistive technologies, accessible learning materials	Equal participation of learners with disabilities
Digital Inclusion	Platforms such as DIKSHA, SWAYAM, and SWAYAM PRABHA	Continuity and flexibility in learning

Multilingual Education	Mother tongue/regional language instruction up to Grade 5 (preferably Grade 8)	Improved comprehension and reduced dropouts
Educational Technology	Establishment of National Educational Technology Forum (NETF)	Innovation and evidence-based digital learning

One of the most significant goals outlined in NEP 2020 is to achieve 100% Gross Enrolment Ratio (GER) in school education by 2030 and to increase the GER in higher education to 50% by 2035, with special emphasis on learners from socio-economically disadvantaged groups (Government of India, 2020).

NEP 2020 formally identifies Socio-Economically Disadvantaged Groups (SEDGs), including students from Scheduled Castes (SC), Scheduled Tribes (ST), Other Backward Classes (OBC), minorities, migrant communities, children with disabilities, and learners from rural and aspirational districts (Sharma & Sharma, 2020). To address historical inequities, the policy recommends targeted interventions such as scholarships, conditional cash transfers, free hostels, bicycles, uniforms, and textbooks, particularly for female students and learners from economically weaker sections.

For students with disabilities, NEP 2020 emphasizes the implementation of barrier-free access in educational institutions, including physical infrastructure (ramps, accessible classrooms), learning materials in appropriate formats (Braille, audiobooks, sign language), and assistive technologies (Halder, 2024). The policy aligns with the principles of the Rights of Persons with Disabilities Act, 2016, reinforcing inclusive education as a legal and ethical obligation rather than a welfare measure.

Digital inclusion is another key initiative supported by NEP 2020. Recognizing the digital divide exposed during the COVID-19 pandemic, the policy promotes platforms such as DIKSHA, SWAYAM, and SWAYAM PRABHA, which provide free online courses and educational content across disciplines (Kumar & Goyal, 2023). According to government estimates cited in NEP 2020, millions of learners accessed digital platforms during school closures, highlighting both the potential and the necessity of technology-enabled inclusive education.

Further, NEP 2020 promotes multilingual education as a means of inclusion. The policy recommends the use of mother tongue or regional languages as the medium of instruction at least up to Grade 5, and preferably till Grade 8, to improve learning outcomes, reduce dropouts, and support first-generation learners (Yalla, 2025). This approach is supported by pedagogical research indicating better comprehension and retention when children are taught in their native language. Overall, NEP 2020 adopts a structured and data-driven approach to inclusive education by setting clear enrolment targets, identifying disadvantaged groups, and proposing institutional, financial, and technological interventions. These initiatives collectively aim to create an equitable education system that addresses access, participation, and learning outcomes systematically.

4. Barrier-Free Education and the Role of Technology

4.1 Concept of Barrier-Free Education under NEP 2020

Barrier-free education under the National Education Policy 2020 extends beyond physical accessibility and includes the removal of economic, digital, linguistic, and institutional barriers that restrict equitable participation in education. NEP 2020 explicitly recognizes that access alone is insufficient unless learners are provided with supportive infrastructure, adaptive learning resources, and enabling technologies.

4.2 Addressing the Digital Divide through Technology

One of the major barriers highlighted in NEP 2020 is the digital divide, particularly between urban and rural regions (Shukla et al., 2025). To address this, the policy proposes the expansion of national digital infrastructure through initiatives such as DIKSHA, SWAYAM, and SWAYAM PRABHA. SWAYAM offers Massive Open Online Courses (MOOCs) covering school, undergraduate, and postgraduate levels, while SWAYAM PRABHA delivers educational content through DTH television channels, ensuring access even in areas with limited internet connectivity. These platforms have been instrumental in maintaining learning continuity, especially during the COVID-19 pandemic.

4.3 National Educational Technology Forum (NETF)

NEP 2020 also emphasizes the establishment of a National Educational Technology Forum (NETF) as a dedicated platform to facilitate research, innovation, and the exchange of best practices in educational technology (Singh, 2025). The NETF is envisioned to guide policymakers and institutions in adopting evidence-based digital solutions, including adaptive learning systems, artificial intelligence-enabled assessment tools, and inclusive digital content tailored to diverse learner needs.

4.4 Assistive Technologies for Learners with Disabilities

For learners with disabilities, technology plays a crucial role in enabling barrier-free education. NEP 2020 encourages the use of assistive technologies, such as screen readers, text-to-speech software, captioned videos, and digital learning materials in accessible formats (Pal, 2024). These measures are aligned with universal design principles and aim to ensure that students with visual, auditory, or mobility impairments can participate effectively in mainstream education.

4.5 Inclusive Physical Infrastructure Development

In addition to digital initiatives, NEP 2020 calls for the development of barrier-free physical infrastructure in educational institutions (Stanley & Pundhir, 2024). This includes accessible classrooms, libraries, laboratories, and sanitation facilities, particularly in government schools and higher education institutions. The policy stresses that infrastructure planning must be inclusive from the design stage rather than adopting retrofitted solutions.

4.6 Integrated Approach to Barrier-Free Education

By integrating technology with inclusive infrastructure and governance reforms, NEP 2020 seeks to create a flexible and learner-centric education system (Sharma, 2025). The strategic use of digital platforms, assistive tools, and national-level technology frameworks demonstrates the policy's commitment to reducing systemic barriers and promoting equal learning opportunities across a diverse population.

5. Challenges in Implementing Inclusive and Barrier-Free Education

5.1 Infrastructure and Resource Constraints

Despite the comprehensive vision of the National Education Policy 2020, the effective implementation of inclusive and barrier-free education faces several practical and structural challenges. One of the primary concerns is the uneven availability of infrastructure across regions. Many government schools and higher education institutions, particularly in rural and remote areas, continue to lack basic facilities such as accessible classrooms, digital devices, reliable internet connectivity, and assistive learning resources (Jafar et al., 2023). This infrastructural gap limits the reach of NEP 2020's inclusive initiatives.

5.2 Persistent Digital Divide

Another significant challenge is the digital divide. While NEP 2020 promotes digital learning platforms, disparities in access to smartphones, computers, and broadband services remain pronounced among socio-economically disadvantaged groups (Bandyopadhyay et al., 2021). Students from low-income households, rural communities, and marginalized backgrounds often face difficulties in accessing online learning resources, thereby reducing the effectiveness of technology-driven inclusion strategies.

5.3 Teacher Preparedness and Professional Training

Teacher preparedness and training also pose a major challenge. Inclusive education requires educators to be trained in differentiated instruction, inclusive pedagogical practices, and the use of assistive technologies. However, many teachers have limited exposure to inclusive education methodologies, particularly in addressing the needs of learners with disabilities, first-generation learners, and students from multilingual backgrounds (Fitas, 2025). Inadequate professional development opportunities may hinder the successful translation of policy objectives into classroom practices.

5.4 Governance and Administrative Challenges

Administrative and governance-related issues further affect implementation. Coordination among central, state, and local authorities is essential for the uniform execution of NEP 2020 initiatives (Coletti & Filippetti, 2025). Variations in policy adoption, funding allocation, and institutional capacity across states may result in inconsistent outcomes. Additionally, the absence of robust monitoring and evaluation mechanisms can make it difficult to assess the effectiveness of inclusive education programs.

5.5 Social and Cultural Barriers

Lastly, social and cultural barriers, including gender bias, stigma associated with disability, and resistance to change, continue to influence educational participation (McDonald et al., 2007). Without sustained awareness programs and community engagement, policy-driven reforms may not achieve their intended impact at the grassroots level.

6. Conclusion

The National Education Policy 2020 represents a transformative framework aimed at building an inclusive, equitable, and barrier-free education system in India. By prioritizing access, flexibility, digital inclusion, multilingual education, and targeted support for socio-economically disadvantaged groups, NEP 2020 lays a strong foundation for addressing long-standing educational inequalities. The policy's emphasis on technology-enabled learning, inclusive infrastructure, and learner-centric approaches highlights its alignment with global educational standards and the demands of 21st-century learning. However, the realization of these objectives depends largely on effective implementation, adequate infrastructure development, teacher capacity building, and coordinated governance mechanisms. Addressing challenges such as the digital divide, regional disparities, and institutional limitations is crucial to ensuring that inclusive education moves beyond policy intent to practical outcomes. Strengthening monitoring systems, investing in teacher training, and promoting community participation can significantly enhance the effectiveness of NEP 2020 initiatives. In conclusion, while NEP 2020 offers significant opportunities to promote inclusive and barrier-free education, sustained commitment, collaborative efforts, and evidence-based implementation strategies are essential to achieving its vision of an equitable and accessible education system for all learners in India.

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IMPACTS OF CURRICULUM INTEGRATED WITH MULTILINGUALISM AND LOCAL CONTEXTS ON STUDENT LEARNING OUTCOMES IN BURUNDIAN ELEMENTARY SCHOOLS

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Abstract

This study will investigate the impacts of a curriculum that integrates multilingualism and local contextual knowledge on the pupils of primary school at an early age in Burundian elementary schools, who are not mature enough to determine how to differentiate between different languages, and the study will also deal with knowing how are their academic outcomes. Based on the multilingualism integrated in the elementary school from the lower level of elementary school, this study will explore how the integration of French, English, Kiswahili, and Kirundi is managed by the learner and their outcomes. Using a survey research design, data will be collected from teachers, students, and the school leaders from Bujumbura province. To gather data, the structured questionnaire will be employed, using Google Forms, and will be analyzed by suitable statistical analysis. The expected findings are that the students and teachers are exposed to a multilingual context in their teaching and learning that they don't understand well, and the responsive curricula can bridge cultural gaps in early grade achievement. The study recommends that the government of Burundi first encourage the professional development of teachers by focusing on language learning.

Keywords: Multilingual education, Local context, curriculum integration

1. INTRODUCTION

Education systems require well-organized curricula that respond to local community needs. Many countries face challenges such as limited funding, teacher shortages, overcrowded classes, and low learning outcomes. Curricula are often outdated or poorly aligned with learners' realities. Implementing multilingual and culturally grounded education raises questions about its real impact on achievement. Early use of learners' mother tongues is widely seen as essential for comprehension and cognitive development. In Burundi, the integration of Kirundi, French, Kiswahili, and English calls for careful analysis of its benefits and challenges.

1.1.STATEMENT OF THE PROBLEM

Despite reforms, many Burundian primary pupils still perform below national standards. A key challenge is the use of instructional languages that learners and teachers do not fully master. This language mismatch limits comprehension, participation, and learning progress. The curriculum also lacks strong links to learners' cultural and community experiences. Limited local research leaves educators uncertain about the impact of multilingual and culturally relevant curricula.

1.2.OBJECTIVES:

1. To find out the impact of a curriculum integrated with multilingualism on students' learning outcomes in elementary school in Burundi.
2. To find out the impact of local contexts on the students' learning outcomes in elementary schools in Burundi

3. To compare the impact of Curriculum integration with multilingualism and local contexts on students' learning outcomes.

1.3.HYPOTHESES

H₀₁: There is no significant impact of a curriculum integrated with multilingualism on students' learning outcomes in elementary school in Burundi.

H₀₂: There is no significant impact of local contexts on the students' learning outcomes in elementary schools in Burundi

H₀₃: There is no significant difference in the impact of Curriculum integration with multilingualism and local contexts on students' learning outcomes

1.4.METHODOLOGY

As the study aims to investigate the effect of a curriculum that integrates multilingual instruction and local context on learning outcomes of elementary school pupils in Burundi, it employs a survey research design. Data were collected from elementary teachers, pupils, and the school leaders in Bujumbura province, comprising a total sample of 499 respondents. The sampling technique was purposive. To gather data, the structured questionnaire was employed using Google Forms and analyzed by suitable statistical analyses.

2. LITERATURE REVIEW

Abroad Studies

UNESCO (2024). **Title:** Language Matters: Global Guidance on Multilingual Education. **Objectives:** Advocate multilingual education as a human right for inclusive, equitable, quality learning. Guide policymakers on integrating learners' home languages to drive systemic educational change. **Methodology:** Because this is a **UNESCO policy guidance report** rather than a conventional empirical research article, it does **not use a typical empirical methodology with sampling**. **Sample/sampling techniques:** Not applicable in the conventional sense

Findings. Many learners are taught in unfamiliar languages, hindering learning outcomes. Mother-tongue-based multilingual education improves literacy, achievement, and inclusion. Success requires supportive policy, trained teachers, local materials, and community engagement

Fitzsimons, S., et al. (2020). **Title: Context Matters: Adaptation Guidance for Developing a Local Curriculum from an International Curriculum Framework.** **Objectives:** Provide practical guidance for adapting the Learning Passport Curriculum Framework into locally relevant curricula, particularly in emergency and crisis-affected education contexts. Emphasize the importance of cultural, linguistic, and social context in transforming international frameworks into meaningful, accessible learning experiences. Highlight broader curriculum development lessons on balancing global standards with local realities to ensure relevance, equity, and learner engagement. **Methodology:** The article uses a descriptive, conceptual methodology based on the collaborative development of the Learning Passport Adaptation Guidance by academic and practitioner partners. It synthesizes educational theory, curriculum design principles, and examples from crisis education contexts without employing quantitative data or statistical analysis. **Sample/sampling techniques:** The publication **does not involve primary data collection**, so it does **not have a traditional sample or sampling method**. **The findings:** Effective curriculum adaptation requires deep sensitivity to local sociocultural, linguistic, and educational contexts rather than uniform application of international frameworks. Meaningful localization aligns content with local priorities, languages, pedagogies, indigenous knowledge, and practical constraints like teacher capacity and resources. Curricula are most effective when they are inclusive, culturally grounded, multilingual, and connected to learners' lived experiences. **Trudell & Piper (2019). Title: The effect of language of**

instruction on literacy and learning outcomes in East Africa. **Objectives:** Assess how different languages of instruction shape elementary students' literacy, comprehension, and overall learning in East Africa by comparing early mother-tongue/local language instruction with early use of dominant non-local languages. Examine how national and regional LOI policies are implemented in classrooms and how alignment (or mismatch) between policy and practice influences student achievement. **Methodology:** Because the full paper text itself is not open-access, the **methodology is inferred from the literature (and from linked related papers by the same authors and research tradition).** **Sample/sampling techniques:** The article's exact sample sizes and sampling methods are not publicly available due to subscription access.

It likely involved early grade students from multiple East African countries with varied language policies and practices. **The findings:** The study finds that students learn literacy skills more effectively when taught in languages they understand. Gradual transitions from familiar languages to official languages improve reading and academic outcomes, while abrupt shifts hinder learning. Language of instruction also influences student engagement, confidence, and overall educational success.

BURUNDIAN STUDIES

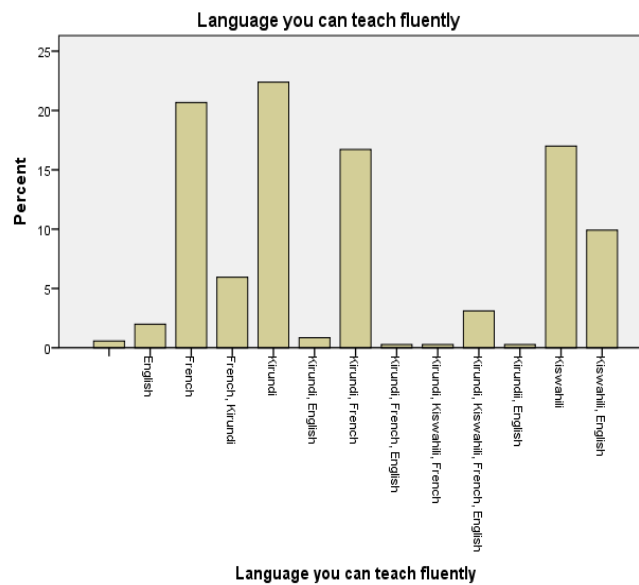
Nsengiyumva et al (2022). **Title:** *Issues in multilingual education in Burundi: The 'old' multilingual education system* (Asian Journal of Multilingualism and Applied Linguistics). **Objectives:** Trace the historical development of multilingual education in Burundi. Analyze policy impacts on curriculum, language goals, and student outcomes. Examine policymakers' beliefs about multilingual competence and language interaction. **Methodology:** Qualitative document and content analysis of policy-produced curriculum materials and academic literature. Interpretation of policymakers' beliefs and goals through triangulation to reconstruct the historical multilingual education system. **Sample/sampling techniques:** Purposive selection of policy and curriculum documents on the former language education system. Documentary and literature-based analysis without human participants. **The findings:** Shift from Kirundi monolingualism to fragmented multilingual policies. Unrealistic language mastery goals and top-down reforms are misaligned with realities. Rigid language separation limited learning; interactional approaches are needed

UNICEF (2017). **Title:** *The Impact of Language Policy and Practice on Children's Learning: Evidence from Eastern and Southern Africa, Burundi Country Review.* **Objectives:** Examine Burundi's current multilingual education policy and classroom language use across primary grades and its impact on learning and cognitive load. Synthesize research findings and recommendations on improving language instruction, curriculum design, and teacher professionalization. **Methodology:** Qualitative policy review and descriptive synthesis within a UNICEF country profile. Analysis of national policy documents, curricula, academic literature, and the LASCOLAF study. **Sample/sampling techniques:** Purposeful selection of relevant texts and research findings that relate to language-in-education issues in Burundi's primary schooling. No direct participant sampling or classroom survey was conducted for the profile itself; the country note relies on documented sources. **The findings:** Early-grade multilingualism creates high cognitive load and teacher strain. Tensions between Kirundi identity and French for social mobility persist. Recommendations stress focused language use, teacher training, and curriculum alignment.

Scope of the Study

The research examines government elementary schools found in the province of Bujumbura. The focus is on the primary school from P1 to P9

3. ANALYSIS AND INTERPRETATION OF DATA



The chart displays the **percentage distribution of languages used by the teacher in his class**. The languages include 4 languages such as Kirundi, Kiswahili, French, and English. Kirundi (**≈22–23%**), French (**≈21%**). **Kiswahili alone** and **French–English (16–17%)**, Kiswahili-English (10%), French-Kirundi (6%), Kikundi–Kiswahili–French–English (**below 5%**), English (1-2%).

H₀1: There is no significant impact of a curriculum integrated with multilingualism on students' learning outcomes in elementary school in Burundi.

Table 3.1
Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.153	.024	.021	1.01653

a. Predictors: (Constant), CIM

The table indicates the regression model, where curriculum integrated with multilingualism (CIM) accounts for 2.4% of the variance in students' learning outcomes (SLO) (R Square=0.024, Adjusted R Square=0.021). The model is statistically significant but with a weak impact of curriculum integrated with multilingualism (CIM) on students learning (SLO) in elementary schools in Burundi.

Table 3. 2
ANOVA

Model		Sum Squares	df	Mean Square	F	Sig.
1	Regression	8.699	1	8.699	8.419	.004
	Residual	360.631	349	1.033		
	Total	369.330	350			

a. Dependent Variable: SLO

b. Predictors: (Constant), CIM

The table is about ANOVA, where its results show an F-statistic of 8.419 and a p-value of 0.004 ($P < 0.05$). This confirms the significance of the regression model. The regression Sum Squares (8.699) compared to the residual Sum of Squares (360.631) indicates the variation in students' learning outcomes. These results prove **empirical evidence** that a curriculum integrated with multilingualism **significantly influences students' learning outcomes** in elementary schools in Burundi. The null hypothesis is thus rejected.

Table 3.3
Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.413	.264		9.125	.000
	CIM	.561	.193	.153	2.902	.004

a. Dependent variable: SLO

This table of coefficients reveals that the P-value is less than .001 ($P < .001$), which represents the expected level of students' learning outcomes (SLO) when the curriculum integrated with multilingualism (CIM) is held at zero. ($\beta = 0.153$, and the p-value = .004) indicate a positive impact of curriculum integrated with multilingualism (CIM), but an impact which moderate or weak, as the model summary confirmed it. Since the *t*-value for CIM is **2.902**, and the associated significance level is **p = .004**, which is less than the conventional alpha level of .05, This indicates that the effect of CIM on students' learning outcomes is **statistically significant**. Hence, the hypothesis is rejected.

H₀₂: There is no significant impact of local contexts on the students' learning outcomes in elementary schools in Burundi

Table 3.4
Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.958	.917	.917	.29594

a. Predictors: (Constant), ILC

The regression model explains 91.7% of the variance in the students' learning outcomes ($R^2 = 0.917$, Adjusted $R^2 = 0.917$). R^2 is equal to Adjusted R^2 ; this justifies a stable model that is not inflated by the local context found in elementary schools in Burundi. Based on these results, the hypothesis is strongly rejected.

Table 3.5
ANOVA

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	338.766	1	338.766	3868.127	.000
	Residual	30.565	349	.088		
	Total	369.330	350			

a. Dependent Variable : SLO

b. Predictors: (Constant), ILC

The ANOVA results in this table show an F-statistic of 3868.127 and a p-value of 0.000 ($P < 0.001$). These results confirm the significance of the regression model. The regression Sum Squares (338.766) compared to the residual Sum of Squares (30.565), the regression Sum is much larger than the residual Sum, which indicates a variation in students' learning outcomes. This means that the local contexts statistically have a strong impact on students' learning outcomes in elementary schools in Burundi. The null hypothesis is thus rejected.

Table 3.6
Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.105	.052		2.037	.042
	CIM	.968	.016	.958	62.194	.000

a. Dependent variable: SLO

Table 3.6 shows a standardized coefficient ($\beta = 0.958$), $t\text{-value} = 62.194$, $p < .001$. The **Unstandardized coefficient ($B = 0.968$)** indicates that for every one-unit increase in local context factors, students' learning outcomes increase by **0.968 units**, holding other factors constant. This confirms a **strong positive effect of the local contexts on students' learning outcomes. Thus, the null hypothesis is rejected.**

H₀₃: There is no significant difference in the impact of Curriculum integration with multilingualism and local contexts on students' learning outcomes.

Table 3.7
Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.958	.917	.917	.29635

a. Predictors: (Constant), CIM, ILC

The table indicates the strong and positive relationship between the curriculum integrated with multilingualism and the integration of local contexts and students' learning outcomes. The curriculum integrated with multilingualism accounts for **91.7%** of the variance in students' learning outcomes (The **R Square value = 0.917**, The **Adjusted R Square = 0.917**). Therefore, **the null hypothesis stating that there is no significant difference in the impact of curriculum integration with multilingualism and local contexts on students' learning outcomes is not supported by the model summary.** Instead, the results indicate that these factors play a **major and meaningful role** in influencing students' learning outcomes.

Table 3.8
ANOVA

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	338.769	2	169.384	1928.737	.000
	Residual	30.562	348	.088		
	Total	369.330	350			

a. Dependent Variable: SLO

b. Predictors: (Constant), CIM, ILC

The ANOVA results in this table show an F-statistic of 1928.737 and a p-value of 0.000 ($P < 0.001$). The p-value (.000) is **much smaller than the conventional significance level of 0.05**, which means the regression model is statistically significant. These results confirm the significance of the regression model. The regression Sum Squares (338.769), the residual Sum of Squares (**30.562**), and the **Total Sum of Squares = 369.330**. These results indicate that a very large proportion of the total variance in students' learning outcomes is explained by the predictors (CIM and ILC). Since $p < 0.05$, the null hypothesis is **rejected**.

Table 3.9
Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.118	.086		1.378	.169
	CIM	.969	.016	.958	61.306	.000
	ILC	-.011	.057	-.003	-.189	.850

a. Dependent Variables: SLO

Table 3.9 shows a standardized coefficient for the integration with local contexts ($\beta = 0.958$), **t-value = 61.306, $p < .001$** . **The Unstandardized coefficient (B = 0.969) these results indicate that ILC has a strong, positive, and statistically significant effect on students' learning outcomes.** This indicates that an increase in curriculum integration with local contexts is associated with a substantial improvement in students' learning outcomes. **curriculum integration with multilingualism ($\beta = -0.003$), ($t = -0.189$), ($p = .850$), and the Unstandardized coefficient (B = -0.011 , and this indicates that CIM has no statistically significant effect on students' learning outcomes.** The very small coefficient and high p-value indicate that curriculum integration with multilingualism does **not** meaningfully predict students' learning outcomes in this model. Therefore, the null hypothesis was rejected, indicating a significant difference in the impact of the two curriculum integration approaches on students' learning outcomes.

4. Conclusion of the Study

In summary, it can be stated that a curriculum that incorporates multilingualism and local contexts in nations with multiple languages plays a crucial role in language enhancement, beginning within educational environments. In Burundi, the predominant language spoken throughout the nation is Kirundi. The research indicated a slight positive effect of a curriculum that integrates multilingualism on the learning outcomes of elementary school students in Burundi. However, the significant degree of local context integration, which suggests that the local language both influences and poses challenges to the integration of multilingualism within the curriculum in Burundi, may hinder fluency and advancement in other languages.

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INCLUSIVE CRITICAL THINKING SKILLS: LESSONS FROM AUTISTIC LANGUAGE AND COGNITION FOR NEP 2020 IMPLEMENTATION

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Abstract

NEP 2020 urges Indian education to move beyond memorisation and embrace thoughtful, reflective, and inclusive learning. Achieving this requires understanding how different minds shape meaning and engage with the world. This paper studies the phenomenological experiences of autistic individuals to explore how their distinctive ways of reasoning can support India's shift toward deeper critical thinking. Autistic learners encounter language with unusual precision, respond to concepts through direct sensory and experiential engagement, and often show a strong preference for coherence and clarity. These qualities reveal important aspects of how thinking emerges, develops, and stabilises. By examining these patterns, the paper argues that autistic cognition provides valuable guidance for teachers working within the aims of NEP 2020. The study proposes that integrating lessons drawn from autistic modes of learning can help Indian classrooms become more inclusive, patient, intellectually grounded, and capable of nurturing meaningful critical thought among all learners.

Keywords: NEP 2020, Autism, Phenomenology, Learning, Inclusion, Critical Thinking

1. Introduction

NEP 2020 attempts to transform Indian education by placing reasoning and deep learning at its core foundation. However, the shift from memorisation to meaningful thinking demands more than just mere curricular adjustments. It calls for a reconsideration of how students understand the world, how they usually interpret language, and how they make sense of classroom experiences. This is where the study of autistic cognition becomes directly relevant and can be fully connected.

The paper therefore emphasises that Indian education needs a renewed understanding of how thinking actually develops inside different minds. NEP 2020 can only move beyond memorisation when teachers recognise that reasoning grows from perception, language, experience, and the learner's internal cognitive rhythm. Meaningful learning depends on acknowledging these differences rather than assuming that all students think in the same way.

Autistic learners often challenge the assumptions embedded in typical classroom communication. Their responses to language are more literal, their sensitivity to detail is sharper, and their refusal to accept unclear explanations exposes weaknesses in teaching that are usually overlooked by the nation. These tendencies are not obstacles as they reveal the structure of the thought itself. When education begins to acknowledge the variety of cognitive rhythms present in Indian classrooms, it becomes possible to create an environment that fully matches NEP's expectation for thoughtful, and reflective learning.

2. Language Acquisition, Experience, and the Foundations of Reasoning

Language is more than a tool for communication because it is the way to develop the reasoning capability of human being. Autistic individuals often acquire language through certain patterns that highlight the depth of meaning-making. Many show a preference for structure, such as repetitive linguistic forms, stable sequences, strongly defined word meanings, and a reliance on concrete

terms. These preferences reveal that the process of understanding grows from the body's experience of the world, and not merely from abstract learning.

In typical Indian classrooms, instructions often contain hidden expectations or implied meanings that depend on social familiarity. Autistic learners struggle with such ambiguity because they demand clarity, not the traditional lectures where teachers simply point out facts from textbooks and pre-written notes. This demand is, in fact, an essential foundation for critical thinking. When language is precise, reasoning becomes precise. When explanations are clear, students are able to question, compare, and evaluate ideas more effectively and conveniently.

Phenomenological analysis helps reveal how autistic learners experience language moment by moment. Words are not casual markers, but are anchors for meaning. Their insistence on exact usage shows how language can either support or obstruct thought. Indian classrooms often rush past this delicate process, but autistic cognition brings it into focus. When teachers observe how different learners build understanding through language, they become better equipped to shape lessons that nurture reflection. SARTHAQ (Students' and Teachers' Holistic Advancement through Quality Education) reinforces the importance of developing multilingual teaching and learning resources which supports language clarity and helps students build stronger conceptual understanding across linguistic backgrounds.

3. Cognitive Development in Autism and Its Relevance to Critical Thinking

Autistic cognitive development often brings out qualities that are valuable for rigorous thinking. Many autistic individuals show strong pattern recognition, heightened attention to detail, and a deep need for internal consistency. These traits give them a form of clarity that aligns naturally with the goals of NEP 2020. One important aspect is the pace of comprehension. Autistic learners often take longer to process information, but their understanding, once formed, is stable and deeply rooted. Early observations of an "*insistence on sameness*" further support the idea that autistic cognition develops through stable, predictable patterns, which allow deeper and more consistent forms of understanding. This contrasts with the exam-centric culture of Indian schools, where speed is rewarded over depth. In line with this, SARTHAQ promotes the use of technology-enabled learning tools that allow students to move at their own pace, making it easier to support different cognitive processing styles in the classroom. NEP calls for a different model, a model where one's understanding matters more than rapid performance. Autistic cognition naturally aligns with this model, showing that reflective thinking emerges when learners are allowed to move at their own cognitive rhythm.

By looking closely at how autistic learners shape meaning, teachers gain a clearer picture of how reasoning grows. This is not merely beneficial for autistic students as it strengthens the entire intellectual culture of the classroom.

4. Phenomenology and the Meaning of Inclusive Reasoning

Phenomenology often provides a method for understanding learning by paying attention to lived experience. Instead of imposing standard categories of thinking, it examines how each learner encounters the world through perception, memory, and emotion. Applying phenomenology to autistic cognition reveals that thinking is not a mechanical process but a dynamic relationship between the individual and their environment.

Autistic learners usually perceive the world with heightened intensity. Sounds, textures, gestures, and small changes in routine carry more weight for them. It has also been observed that autistic learners often maintain a form of inward-directed attention or "*aloneness*," which does not indicate withdrawal but shows a strong dependence on internal coherence when trying to make

sense of the world. This sensory awareness brings depth to their reasoning because it places attention on the immediate experience of the world. When educators recognise this, they understand that thinking does not always begin from conceptual categories, but it often begins from the sensory ground of life itself.

This perspective has great value for Indian classrooms that include students from diverse linguistic and cultural backgrounds. Learning becomes more inclusive when teachers recognise the varied ways students construct meaning. Phenomenology helps educators and caregivers listen to the internal landscape of the learner rather than forcing every student into the same cognitive pattern.

Through this philosophical approach, autistic cognition becomes a window through which Indian educators can re-examine the foundations of critical thinking. Reflection, not memorisation, becomes the guiding principle. Experience, not uniformity, becomes the basis of understanding. And cognitive diversity becomes a strength rather than a deviation.

5. Toward an Inclusive Model of Critical Thinking for NEP 2020

For NEP 2020 to succeed, it is better that Indian classrooms shall adopt a form of critical thinking that grows from, and adapts to, the diversity of students' experiences. The study of autistic cognition offers a clear direction for this transformation. An inclusive model of critical thinking begins with the acceptance that reasoning does not follow one pathway. Some students reason through language, others through visual patterns, while others through concrete sensory experience. Autistic learners show that these pathways are equally valid. When a classroom recognises this, it becomes a space where every learner can reach meaningful understanding.

Such a model also requires clarity in communication. Autistic tendencies toward precision push educators to be more exact with their language and expectations. This improves comprehension for all students and strengthens the foundation of reasoning in the classroom. Moreover, inclusive critical thinking requires patience. Autistic learners often take longer to fully grasp something and properly understand of what is being taught, but the quality of their understanding is truly remarkable. When teachers value depth over speed, they create a culture where sustained thinking is encouraged.

This form of education aligns perfectly with the philosophical spirit behind NEP 2020, i.e., learning that values reflection, clarity, and genuine comprehension rather than mechanical recall. This direction stays consistent with NEP 2020's shift toward more flexible, holistic, and competency-based forms of learning. By allowing autistic cognition to guide the development of teaching methods, Indian education becomes more humane, more thoughtful, and more capable of nurturing minds that can question and understand the world.

Conclusion

Indian education is entering a stage where the quality of thinking matters more than the quantity of information memorised. NEP 2020 reflects this shift, but it can succeed only when teachers understand how thinking forms in different minds. Autistic language and cognition offer this clarity, showing that thought grows from lived experience, precise language, and individual rhythms of attention.

For classrooms, this understanding has practical value. It highlights the need for clear explanations, patience, flexible pacing, and learning rooted in experience. These qualities benefit all students, though autistic learners make them more visible.

To cultivate genuine critical thinking, Indian education must build on these concepts. Autistic modes of learning should inform teaching, not as specialised methods but as reminders of how

understanding develops. When classrooms encourage questioning, careful observation, and thoughtful language use, learning moves beyond mechanical recall.

Recognising cognitive diversity does not mean teaching everyone the same way. It means creating conditions where each student can think with clarity and authenticity. When this becomes central, NEP 2020's vision of an inclusive and reflective education system becomes achievable. Such an approach not only fulfils NEP 2020's aims but also strengthens the intellectual and ethical foundations of Indian education.

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A COMPARATIVE STUDY OF THE PHILOSOPHICAL PERSPECTIVES OF AMARTHYA SEN AND JOHN ROWLS

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Introduction

One of the most important notions in philosophy, equality has influenced ethical, economic, political, and social thought in many ways throughout history. Beginning with the earliest philosophical formulations to date, equality has been an important starting point for all philosophical discussions related to justice, human rights, and politics. This research examines equality using a comparative approach, using the ideas of John Rawls, one of the leading philosophers in contemporary political philosophy, and Amartya Sen, one of the preeminent economists, whose ideas have clarified the meaning of equality in the pursuit of justice.

The idea of equality can also be traced back to ancient philosophy. In ancient Greece, Plato and Aristotle wrote about the ideas of justice and equality. Plato's *Republic* or other literary works on a well structured state were looking for a hierarchical and just society where people would perform tasks based on their nature. Plato's ideas were based on functionality and equality, rather than equality itself.

In his *Nicomachean Ethics* and *Politics*, Aristotle made a distinction between arithmetical (or strict) equality and proportional equality, also referred to as distributive justice. He believed that people must receive what they deserve in proportion to their contributions or merits.

In today's modern period, equality also had an increasingly universal formulation. Thinkers such as John Locke and JeanJacques Rousseau formulated ideas of natural equality. Locke's theory of natural rights holds that people in general are naturally and equally so in matters of rights to life, liberty, and property. The concept of moral and political equality in Rousseau's *Social Contract* proposed that political power must emanate from the general will of people and must treat everyone equally.

The modern discourse on equality acknowledges its complex nature, which encompasses several dimensions such as economic equality, political equality, social equality, and moral equality. This discourse also distinguishes between formal equality (equality under the law) and macro equality (equality of results). A lot of progress has been made in this discourse during the 20th and 21st centuries, especially through the contributions of Amartya Sen and John Rawls.

In his book "*A Theory of Justice*," John Rawls formulates justice as fairness. According to his theory, a just society is established on the basis of principles chosen in the original position with a veil of ignorance. The veil of ignorance is designed to maintain objectivity by hiding information related to social status, ability, or personal traits of individuals, so fairness is not apparent.

As stated in the principle of liberty, each individual must have an equal right to a wide variety of basic liberties that can coexist with the same rights of others. According to the difference principle, social and economic inequalities must only favor the least advantaged individuals in society.

Rawls gives priority to tangible things such as rights, freedoms, opportunities, income, and wealth, emphasizing his vision of a proximate and fair distribution. While he does not emphasize

equality, he strongly promotes the cause of the disadvantaged and supports schemes that reduce inequalities. His ideas have had a profound impact on modern discussions of distributive justice and policy formulation.

Sen presents an alternate view to the prevailing theories on justice and equality. His writings on “The Idea of Justice” in 2009 and “Freedom as Development ” in 1999 challenge the prevailing view on primary goods and resources and suggest that it’s the capability to achieve well-being through their “capabilities” that matters. The implication in this view is that it’s the freedom or capability to do things such as “maintain their health,” “achieve an education,” and “pursue religious observances” that matters.

Sen's theory is more focused on the capability that people have in making resources into something more valuable, rather than accumulating resources. For example, when people have equal access to education (a resource), they may end up with different results depending on their personal situations, like being disabled or from a different social class. Sen's theory is more concerned with enhancing people's capabilities.

Although Rawls and Sen are engaged with justice and equality as their objectives, their strategies differ widely.

This paper combines the ideas of both philosophers and presents solutions that are relevant to the realities of the world, while at the same time emphasizing the need for the blending of idealistic theory and practicality.

02. Research Problem

What is equality in philosophy, and how do Amartya Sen’s and John Rawls’s contributions impact equality in reality?

Equality, essentially, is a principle of fairness in treatment among persons in a society. It has developed from more traditional concerns with social status, entitlements in ancient Greek philosophy, and modern notions of entitlements to resources in justice. Rawls, in his conception of justice based on institutions and just distribution in primary goods, emphasizes the more structural aspects of justice. Sen, in his capability approach to justice, places continued primary focus on enhancing human freedom. In these respects, these different strands provide a complementary guide: Rawls offers the rules that enable just institutions, while Sen places primary focus on capabilities that persons have. Such a composite perspective guides toward effective means for healing current inequalities in the world.

03. Hypothesis

There are points of similarity and differences between Amartya Sen’s philosophical thought and John Rawls’s philosophical thought.

04. Research Objectives

4.1 Main Objective:

To thoughtfully compare Amartya Sen and John Rawls on the idea of equality, and to assess the ways in which their ideas shed light on and respond to contemporary issues associated with equality.

4.2. Particular Objectives:

1. To trace the historical course of equality from ancient thought to modern day interpretation.
2. To consider how Rawls and Sen define and frame equality within their respective theoretical frameworks.
3. To discuss the contrast that Rawls maintains regarding distributive equality with that of Sen, who focuses on capabilities and personal freedom.

4. To examine how their theories address practical problems of economic, political, and social inequality, gender gaps, and unequal access to opportunities.
5. Assess the relevance of their ideas throughout the different contexts and on policy making and development.
6. To identify the strengths and limitations inherent in their approaches.
7. Discussing how their contributions might be intertwined to produce a wider, more subtle understanding of equality.

05. Significance of the Study

Equality is a pivotal concept in moral philosophy and political ideology, influencing our discussion on rights, justice, and democracy. In understanding these perspectives on these issues by Sen and Rawls, we are in a better position to grasp how justice can be established in society with regard to addressing both group and individual concerns.

In today's world, there exist many different types of inequalities, such as inequality in economy, social inequality, gender inequality, and so on. The concepts of both Sen and Rawls enable us to analyze these issues and describe how we could make policies so that everyone has an equal opportunity to access the same things.

Their theories about equality have already been implemented in welfare policies and health care systems. Understanding and implementing ideas about equality can develop better health care systems and reduce health disparities.

When global challenges such as poverty and climate change arise, equity studies offer a guide for ethical solutions. Theories of Sen and Rawls were developed as international guidelines for development with emphasis on justice at system levels as well as at the personal level.

Ultimately, the study of equity is critical in the founding of a society in which all individuals can flourish. It causes us to rethink our systems in society, to acknowledge the inequities in our world, and to seek a world in which justice reigns.

But this is not just a matter of academic discourse. This is a call that has to happen in order for equity, equality, and human dignity to emerge despite the inequalities that are still prevalent.

06. Concept of Equality

Equality is generally understood as the state of being equal in status, rights, and opportunities. According to the *Encyclopaedia Britannica*, equality refers to the condition in which individuals or groups are treated alike, especially in terms of rights, status, and access to resources (Britannica, n.d.-a). Similarly, the *Cambridge Dictionary* defines equality as the right of different groups of people to have the same social position and receive the same treatment, without discrimination (Cambridge Dictionary, n.d.). These dictionary definitions establish equality as a normative principle concerned with fairness and non-discrimination in social life.

From a broader analytical perspective, *ScienceDirect* describes equality as a foundational concept in social and political theory, referring to the absence of unjustified differences among individuals in access to opportunities, rights, and benefits (ScienceDirect, n.d.). This understanding moves beyond mere sameness and emphasizes the moral requirement that differences must be justified if equality is to be preserved.

Equality can be further classified into different dimensions, particularly economic and political equality. Economic equality refers to the fair distribution of income, wealth, and resources among members of society (Britannica, n.d.-b). It does not necessarily imply identical economic outcomes but focuses on reducing excessive disparities that undermine social justice. Political equality, on the

other hand, means that all citizens have equal political rights, such as voting, participation in governance, and equal consideration of interests (Britannica, n.d.-c). Cohen (2020a) emphasizes that political equality requires not only formal voting rights but also equal influence in political decision-making processes.

Philosophers have long debated the relationship between equality and fairness. Cohen (2020b) argues that equality is closely linked to fairness, as unequal treatment is morally problematic unless it can be justified by relevant differences. This view aligns with classical philosophical discussions, such as Emmet's (1939) argument that equality is a moral ideal rather than a purely factual condition, requiring ethical judgment in its application.

In modern political philosophy, equality plays a central role in theories of justice. Rawls (1971) defines equality in terms of equal basic liberties and fair equality of opportunity, allowing inequalities only when they benefit the least advantaged members of society. Sen (2009) expands this understanding by arguing that equality should be evaluated in terms of people's real freedoms and capabilities rather than merely the distribution of resources. Contemporary scholars such as Sandel (2009) and Das (2022) further emphasize that equality must be understood within broader moral and social contexts, including dignity, responsibility, and social cooperation.

In sum, equality, as defined by dictionaries and developed by philosophers, is not simply about treating everyone the same, but about ensuring fair treatment, equal respect, and justifiable differences in social, economic, and political life.

07. Literature Review

01. John Rawls's *A Theory of Justice*, published in 1971, is a cornerstone of modern political philosophy. The book elaborates a systematic scheme for conceiving and constructing a just society, with equality and fairness at the foundation of social cooperation. Rawls challenges the utilitarian mantra of "the greatest happiness for the greatest number" on the basis of the conviction that it is wrong to sacrifice someone's rights for the common good. This remains the main theoretical framework on which Page bases her thesis.

John, Rawls, 1999. *A Theory of Justice*, the belknap press of harvard university press Cambridge, Massachusetts.

02. Amitai Sen's *The Idea of Justice*, 2009, couches a critique against theories of justice, above all those emanating from Rawls's idealized blueprint for a perfectly just society. Sen, on the other hand, advances a conception of justice more oriented to the removal of actual injustices, one which has a practical, comparative edge. This text represents the second key theoretical foundation on which the study is based.

Amartya, Sen. 2009. *The Idea of Justice*. The Belknap Press of Harvard University Press Cambridge, Massachusetts.

03. In the journal *Political Theory* (1996), Amartya Sen focuses on equality. He considers justice as a moral issue but convincingly explains how equality can be interpreted in more than one way. Although the concepts sound similar when broadly read, he demonstrates that there are subtle assumptions and interpretations that make them different from one another. He does this by providing concrete examples of how such concepts can be related to one another in partial ways and helps to fill out the broader connection between his philosophy and equality.

Sen, A. (1996). On the Status of Equality. *Political Theory*, 24(3), 394-400

04 The Fair Equality of Opportunity paper from Stanford University promotes fair opportunities and wants careers to be officially open on the basis of merit; it also demands that everyone be given an equal chance to occupy those careers. The most prominent proponent for Fair Opportunities is

John Rawls. According to Rawls's ideas on FEO, one's success in seeking public position(s) must depend on one's attitude in regard to one's expectancies and natural talents and one's willingness to apply them. Education could mitigate this if it isn't based on one's class. That's the crux of it.

Fair equality of opportunity. (n.d.). Equality of Opportunity and Education.

05. The Paradigm of Justice, John Rawls and Amartya Sen The current literature goes deeper into philosophical discourse by contrasting and comparing these two philosophers. The presentation of their differently constructed paradigms provides a wide-ranging treatment of justice as an ideal. Analysis by Das also sheds light upon the strengths and weakness of justice ideals constructed by Rawls and Sen and fills any gaps that exist. Rawls constructs a strong institutional platform, and Sen fosters a real-world platform that makes justice possible. The literature also strengthens philosophical discourse by proposing that justice and individual liberty can co-exist by adversely removing any and all forms of social injustice. The concepts and ideals constructed by Rawls and Sen also exist within a wider philosophical chronology that stretches from Greek ideas and concepts about justice to contemporary ideas and concepts.

Das, K. (2021). *The Paradigm of Justice: A Contemporary Debate between John Rawls and Amartya Sen*. Routledge

6. Alfonso D Amodio's article examines justice fairness in relation to Rawls's institution-based justice compared to justice based on capabilities, according to Sen. Rawls's philosophy covers impartial principles such as maximin justice and difference principles for fair distribution. Sen's philosophy is critical of justice based on idealism, focusing more on effective justice for current inequalities brought about by increased freedom. The topic combines Aristotelian concepts for human flourishing with more general principles developed in Adam Smith's economics. Applications for Rawls's justice framework are intended to incorporate aspects of justice based on capabilities, aiming to address contemporary inequalities, climate change, and technological shifts.

D'Amodio, A. (2020). *Toward a human-centered economy and politics: the theory of justice*

7. As fairness from Rawls to Sen. *Philosophies*, 5(4), 44, 07. This article by Hasper promotes inclusive dialogues to address social inequalities that have been undertaken by Aprithyayen. His insightful insights bridge theory and practice. India is moving towards a more just society. In the idea of justice, public debate refers to the process of open and active participation among individuals and groups in a society to discuss issues of justice, fairness, and social policy. Emphasizing public debate as a cornerstone of democracy and justice, Seth focuses on its use to evaluate social decisions and address injustice. This provides some insight into how it can be implemented in Sri Lanka.

Gaspar. D. (2020), Amartya Sen, social theorizing and contemporary India. *ISS Working Paper Series/General Series*, 658.

08. Research Gap

Comparing Equality in Sen and Rawls

There hasn't been sufficient literature comparing directly the views of Amartya Sen and John Rawls on equality. Both discuss equality but with a different focus, and there hasn't been a direct juxtaposition of the two in the literature. It appears that a combination of Sen's Capability Approach with Rawls' Difference Principle and Theory of Justice might fill this gap.

Unfortunately, there are only a few works that examine the definition of equality in these two philosophers, approach the issue of inequality, and describe the means they use to attain an equal society. The majority of the existing works focus on one of the philosophers, with the rest of the aspects of the theories being highlighted, but not the comparison of the definition of equality of these two individuals in particular.

09. Research Methodology

The problem with which we are currently grappling is a methodological one, which informs how a study will be carried out. To address such a problem, we cite a combination of selected primary, secondary, and tertiary source material available in a given field.

The research uses a literature review methodology as a means of condensing the theories of equality propounded by Amartya Sen and John Rawls. The relevant texts from key literature were selected for their relevance to this topic. The research entails the analysis, comparison, and critique of the intersecting ideologies postulated by both Amartya Sen and John Rawls.

10. Theoretical Perspective on Equality

According to John Rawls's understanding, equality is justice as fairness. He bases it on equal basic rights and freedoms consider freedom of thoughts, expression, and political involvement. Fair equality in opportunities refers to the fact that individuals who share similar abilities must be equally treated in an unrestricted way. There will be differences in income and status for some, but only if it helps the least advantaged group. The essence of equality, as perceived by John Rawls, focuses on fairly constructing institutions and fairly assigning resources.

Equality, as understood through the prism of Amartya Sen, deals with real freedom and not mere equality of resources. A person can be said to be equal only when he or she has the ability to lead his/her own life as they wish.

People have different bodily capabilities, social circumstances, and environmental circumstances, Sen argues, so it will not be possible to achieve equality of outcome simply by equalizing resources. For example, a handicapped person will require some additional effort to achieve the same level of life as others. Therefore, Sen defines equality as equality of capabilities, which means reducing material limitations such as poverty, illness, and illiteracy.

11. Amartya Sen on John Rawls

Sen holds John Rawls in high esteem and shares much of his fundamental concerns-especially the confidence Rawls has in fairness, liberty, and helping the least advantaged. Yet Sen thinks Rawls' theory isn't fully workable in the messy details of real life. He doesn't discard Rawls outright; he adjusts and expands the frame.

At the root of Sen's critique is an attack on Rawls' preoccupation with primary goods-things such as income, rights, and opportunities. As Sen sees it, equal, or fair, access to resources doesn't translate into lives people can actually live well. People differ in how well they can convert resources into real well being because of health, disability, age, gender, and social context. In this regard, Sen believes that Rawls underestimates this human diversity.

He objects to the Difference Principle, which justifies inequalities that promote the position of the least advantaged. To Sen, more income and resources simply do not automatically imply more real freedom. Greater economic growth perhaps raises average incomes, but if people lack basic education, healthcare, or political freedoms, their actual opportunities in life remain crippled. Thus, Sen fears that Rawls' scheme may justify inequalities that would not actually reduce suffering or injustice.

Another cornerstone of Sen's critique is Rawls's focus on ideal theory: Rawls sketches principles for a perfectly just society under idealized conditions-full compliance, well-functioning institutions. Sen insists that this is less useful for dealing with the urgent injustices that exist today. Rather than dream about a perfectly just world, Sen asks how we can make actual, tangible steps toward less injustice here and now.

Sen pushes back against Rawls' very heavy emphasis on institutions. For Rawls, social structures are the main engine of justice, while Sen insists that what is at stake for justice can also be found in everyday social practices how families are organized, which cultural norms come into play, and how individuals actually behave. Without these factors taken into account, the effectiveness of Rawls' theory is compromised, according to Sen.

Even with these critiques, Sen gives Rawls due credit for serving to transform political philosophy in many important and permanent ways. He is quite welcoming of Rawls' emphasis on freedom, equality, and moral reasoning, but attempts to reconceptualize equality through the capability (as opposed to resource) perspective. In this regard, Sen's capability approach can be considered an evolution and refinement of Rawls', but not an absolute overthrow of it.

For Sen, justice is something that ought to be measured in terms of the actual lives people lead and their real freedoms, rather than by idealized conventions regarding institutions. He thus goes one step beyond Rawls by shifting the focus from general principles to concrete human results.

11. The Capability Approach to Development by Martha Nussbaum

Role of Martha Nussbaum in Amartya Sen has conceptualized development, not in terms of GDP growth or an increase in earnings, but in the expansion of genuine freedoms that people actually have the possibility of practicing in their lives. According to him, a society becomes developed when people have the actual possibility of living lives they have reasons to want, i.e., lives that include good health, education, and participation in social and political activities.

Crucially, Sen has a non-specific list of capabilities. He is confident that it will become clear which capabilities are of importance by public discourse, democratically elected processes, and social context. Naturally, cultures, historical developments, and levels of development will allow for a natural differentiation of which capabilities are considered most important. Sen finds this flexibility ideal for policy implementation. Some critics find this flexibility to be a complication for policy formulation.

Martha Nussbaum extends Sen's thoughts and has given a more concrete and prescriptive form to the Capability Approach. However, she has departed from Sen on one issue: she thinks that there are some core capabilities which all human beings need if they are going to live a life with dignity. In order to achieve that, she has identified ten core human capabilities that every just society should have the responsibility of providing for its citizens.

Nussbaum delineates a catalogue of basic capabilities: the capacity to be alive, to be physically healthy, to have bodily integrity, to have the senses and imagination, to have emotions, practical reason, forming attachments, caring for other living species, having fun, and the ability to guide one's political and material world. Nussbaum's own view is certainly more specific and implementation-oriented than Sen's.

Whereas Sen focuses on freedom and choice, Nussbaum focuses on dignity and entitlement. Sen fears that placing people in a straitjacket of an overall list might forget cultural differences and democratic procedure. Whereas Nussbaum argues that without an overall list, vulnerable sections of society, such as women, children, or disabled people, can continue being left out.

In development, Sen's approach is very useful for measuring societal advancements and reducing injustices, but Nussbaum's approach is most appropriate for constitutionalism, human rights, and social policies. They collectively shift the development paradigm from being purely income-driven to a sense of well-being.

In summary, Sen provides the philosophical foundations for the Capability Approach, while Nussbaum refines it by giving it moral depth and orientation. Together, they reinvent development by expanding human capabilities instead of narrowly focusing on growth.

12. Critical Analysis of Equality

1.Focus of Equality

Rawls focuses on equality in the distribution of primary goods such as rights, income, and opportunities, whereas Sen argues that equality should be assessed in terms of capabilities and real freedoms. Sen critically points out that equal resources do not guarantee equal living conditions.

2.View of Human Diversity

Rawls assumes that people can benefit similarly from primary goods, which Sen criticizes as unrealistic. Sen emphasizes that people differ in age, health, gender, and social circumstances, and therefore require different levels of support to achieve equality.

3.Approach to Justice

Rawls develops an ideal and institutional theory of justice based on fair principles chosen behind the veil of ignorance. In contrast, Sen adopts a practical and comparative approach that focuses on reducing actual injustices rather than designing a perfectly just society.

4.Treatment of Inequality

Rawls allows inequality through the Difference Principle if it benefits the least advantaged members of society. Sen questions whether such inequalities truly improve people's real freedoms and argues that some inequalities may persist even when resources increase.

5.Measurement of Equality

Rawls measures equality through access to primary goods and fair opportunities, which Sen criticizes as too narrow. Sen proposes evaluating equality by examining what people are actually able to do and be, such as being healthy, educated, and socially included.

6.Role of Institutions vs. Individuals

Rawls places strong emphasis on institutions as the main agents of justice. Sen agrees that institutions matter but argues that social norms, family structures, and individual conditions also play a crucial role in creating or limiting equality.

7.Strengths and Limitations

Rawls provides a clear and morally powerful framework for fairness in liberal societies, but his theory may overlook real-life disadvantages faced by marginalized groups. Sen's approach is more flexible and sensitive to human realities, but it is often criticized for lacking precise rules for policy implementation.

13. Comparison Between John Rawls and Amartya Sen and Their Application to Sri Lanka

John Rawls and Amartya Sen share the concerns about equality and justice in society; however, the way in which the two thinkers consider the concepts is not the same. While Rawls concentrates exclusively upon fairness in the institution for determining equality in society, Sen prioritizes the reality of freedom in his concept of equality in society.

If the views of Rawls and Sen are taken together, it would be possible to address the issues associated with inequality in society effectively while formulating the concept of equality in society.

A recent theory that emphasizes justice is that of Rawls, who bases justice on the principle of "justice as fairness." According to Rawls, a just society must uphold basic liberties for all its members speech, participation in politics, and so on. He also advocates a fair equality of

opportunity, one that does not penal a person because of where he or she was born and raised. Under what is known as the Difference Principle, he permits social and economic inequalities only if they benefit the worst-off persons. Now, that can be a guideline for formulating fairer laws, welfare plans, and redistribution policies consider progressive taxation, education, and a strong social security plan.

Sen, however, takes Rawls to task for paying excessive attention to securing equal distribution of resources and institutions. Sen points out that "equality for people cannot adequately be judged by their possession of resources: rather, it will be judged by their abilities. The abilities of healthy people include being able to move about unaided and being able to read and write," for instance. Thus Sen's conception of equality takes into account "actual life" as opposed to abstract equality.

In simple terms, Sen's capability approach is a useful methodology to overcome issues related to poverty, inequality, and exclusion. When governments adopt a Sen's approach, their focus goes beyond merely observing increases in incomes. They start observing how people really live: their educational attainment levels, their access to healthcare and healthcare services, their diet and nutritional status, gender equality, and political participation. The key benefit of well-being measurement goes beyond money in their pockets. A conceptual shift of this nature has given way to global development policies. The Human Development Index is one such widely recognized index.

Now, take Sri Lanka, for example, and observe how these two theories apply. Rawls' approach provides a focus on enhancing justice in institutions to ensure all individuals are provided with education, employment, and political representation without any distinction based on ethnicity, geography, and social divisions. Free education provided by the state and universal health care are manifestations of Rawls' justice, which targets the weakest sections of society. Eradication of corruption in society and providing equal protection by law is in line with a just society proposed by Rawls.

Sen's philosophy is more relevant in Sri Lanka because equality is more than just a function of income. It pervades social and regional segments as well. A lack may prevail in village areas, plantations, women's groups, or ethnic minorities despite equality in law. It is necessary to enhance growth in dimensions like quality in education, maternity health, nutrition, and employment in opportunity dimensions, rather than increasing average incomes, according to the capability approach. Malnutrition, youth, and public service egalitarianism are directly addressed in equal freedom concerns identified in Sen's philosophy.

Rawls and Sen, when combined, form a potent package is while Rawls has a solid institutional sense of justice, Sen retains the emphasis on practical, lived reality for humans, ever subject to the outcomes. Rawls and Sen can, therefore, help Sri Lanka become a better society where just institutions and policies that benefit mankind coexist.

14. Conclusion

Rawls and Sen outline two roads to achieving social justice. Rawls places equality at the foundational structure of society, including basic rights in life, an equal track for opportunities, and a distribution principle to direct resources for achieving just overall patterns. His approach to justice provides a robust moral grounding for achieving equality in systems.

Sen's concept, on the other hand, involves targeted strategies for achieving justice within systems to realize equality in different dimensions, which Rawls had overlooked in his approach to justice. Sen's approach to achieving justice in systems, therefore, provides an appropriate corrective for Rawls

However, while sounding somewhat alike in his concerns regarding justice and those who are least advantaged, Sen moves his emphasis from resource numbers toward what people are capable of doing with what they have. For example, while some people may have an equal number of primary goods, not all people are similarly capable of making those primary goods into meaningful lives.

Critically, Rawls provides a clear, coherent, and detailed set of guidelines, but could fail to address the inequalities in the realities of lives characterized by diversity. On the other hand, Sen's perspective has a greater sensitivity to the realities of disadvantages, although it does not define the details of the rules of the institution. In an insightful combination, both theories enhance our understanding of the principle of equality in conjunction with structural fairness and practical freedom.

Thus, Rawls and Sen do not contradict each other, but rather supplement each other. Rawls spells out an example of just institutions, while Sen is there to determine whether these institutions make a difference to humanity. To properly grasp the meaning of equality in modern times, one must recognize Rawls' justice with Sen's stress on capabilities.

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EDUCATIONAL TRANSFORMATION: EDUCATIONAL REFORMS IN THE 21ST CENTURY

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Introduction

Over the last few years, education has undergone significant changes, influenced by an increasingly interconnected and technologically advanced society. These shifts have not only impacted instructional delivery but have also redefined the roles of educators, learners, and policymakers. Recognising the diverse range of learning environments, 21st-century educational reforms aim to tackle inequalities in access, quality, and achievement across different demographics. By leveraging new technologies and encouraging collaborative learning, these reforms seek to equip students with the essential skills needed for the future, thereby promoting equity and inclusivity within educational frameworks. This paper delves into the complex aspects of current reforms, examining their effects on teaching methods, curriculum development, and assessment strategies. Ultimately, understanding these reforms is vital for ensuring education remains relevant and effective in preparing students for the challenges of a constantly changing global context.

Definition of Educational Reforms

Educational reforms represent structured changes designed to enhance both the calibre and reach of academic systems. They typically arise from the realization that traditional pedagogy must evolve to keep pace with a modern, fast-moving society. Viewed as a strategic response to the dual forces of globalisation and technological advancement, these initiatives aim to cultivate a workforce capable of navigating a complex social landscape. Ultimately, these movements reflect a commitment to the ongoing evolution of learning institutions.

Importance of Education in the 21st Century

In an era characterised by swift technological progress and globalisation, the field of education stands as a crucial foundation for promoting both societal advancement and individual growth. The demands of the 21st century necessitate that educational institutions transform to equip learners for multifaceted challenges, fostering competencies such as critical thinking, adaptability, and collaboration.

Recent investigations underscore the importance of comprehensive professional development for educators; specifically, methodical assessments and feedback systems can augment teaching effectiveness, which in turn positively impacts student achievement (Almana). Additionally, outdoor learning approaches have gained prominence as adaptable, integrative methods that foster personal and social development, illustrating the essential need for creative curricula that extend beyond conventional classroom settings (Lee). Consequently, the role of education transcends the mere attainment of knowledge; it is instrumental in cultivating engaged individuals capable of contributing meaningfully to a diverse and interrelated global society.

Overview of Key Reforms and Their Impact

Reforms implemented during the 21st century have fundamentally altered educational landscapes, emphasising adaptability and inclusivity within curricular frameworks and pedagogical approaches. A major shift arises from the integration of technology and digital instruments within classrooms, which facilitates personalised learning and broadens the availability of resources.

Technological Integration in Education

In recent years, the field of education has experienced a considerable transformation, primarily due to the infusion of technology into various learning settings. This transition does not just make resources more accessible; it also encourages interactivity and personalised learning experiences tailored to meet diverse student requirements. By utilizing tools such as multimedia resources and platforms for virtual collaboration, educators can encourage deeper engagement while cultivating critical thinking—skills aligned with 21st-century expectations.

Furthermore, the focus on competencies such as digital literacy and adaptability is pivotal for thriving in an increasingly complex global context (Samir et al.). Ongoing inquiry into Design Education emphasizes the importance of curricular innovation that incorporates technology-centred methodologies from the foundational stages of education (Bhandari et al.). In summary, successful technological integration goes beyond superficial enhancements; it is integral to equipping students for their future academic and professional trajectories.

The Rise of Online Learning Platforms

The progression of educational technology has significantly influenced the 21st-century framework, with online platforms emerging as crucial enablers of accessibility. As conventional systems encountered difficulties during the global pandemic, these platforms ensured continuity and ignited advancements in pedagogical approaches. For instance, reports underscore the effective execution of remote education through educator assistance and parental involvement (Ndaruhutse et al.). Additionally, dialogues concerning deep learning adjustments highlight the importance of incorporating technology to equip students for an intertwined global setting (Reimers). This transition has resulted in a democratisation of access, permitting learners from various backgrounds to engage with a wide spectrum of resources.

Challenges of Digital Equity and Access

The increasing dependence on digital instruments has made issues surrounding digital equity more evident. Many students, especially those from under-resourced communities, face challenges related to consistent internet connectivity and hardware availability. These obstacles actively widen the achievement gap. Research indicates that while there is a strong emphasis on implementing 21st-century skills, there is a lack of focus on remedying the infrastructural shortages that worsen inequities (Kain). As governmental agencies digitize to improve efficiency (Yang), it remains pivotal to ensure these improvements are inclusive. By prioritising access, reforms can promote a more equitable environment for every student.

Curriculum and Pedagogical Changes

In the 21st century, reforms have called for a significant transformation in curriculum and teaching methods. The focus has shifted toward nurturing critical thinking, teamwork, and tech-savviness. This is apparent in junior high school English instruction in China, where reforms prioritise communicative abilities over rote memorisation (Feng et al.). Likewise, high school biology programs now align with innovative practices and practical life abilities (Kasap et al.). Such shifts illustrate a wider acknowledgment that educational practices must adapt to address the varied challenges of modern society.

Incorporation of Global Citizenship Education

The adoption of Global Citizenship Education (GCE) has surfaced as a significant reform designed to develop informed and responsible citizens. This method acknowledges the interrelations of global issues and prompts students to tackle societal challenges. In the Republic of Ireland, the creation of a policy framework for Development Education-Global Citizenship Education (DE-GCE) serves as an illustration of this movement (Kearns). By incorporating GCE, educators enable learners to scrutinize their roles within the global community and nurture ethical obligations. This shift necessitates sustained commitment to infrastructure and a transformative comprehension of social responsibility (Zwitter et al.).

The Impact of Standardised Testing on Educational Quality

Standardised testing is a fundamental component of evaluation, yet it provokes concerns regarding educational quality. Advocates posit that these instruments yield benchmarks for success and institutional accountability. Conversely, detractors assert that a focus on measurable outcomes may lead to a "narrowed" curriculum, where educators prioritise test preparation over deep learning. This environment can potentially curtail creativity and critical thinking. Additionally, the stress linked with these examinations may detrimentally impact student engagement and teacher efficacy, potentially undermining the very standards the tests aspire to uphold (McNeil).

Conclusion

In synthesizing 21st-century educational reforms, it is apparent that various international frameworks have appeared, each shaped by distinct cultural and social environments. The various interpretations of key competencies such as communication, collaboration, and problem-solving reflect this complexity (Lu et al.). Furthermore, changing paradigms in teacher education reveal the need to suit student-centred methods while navigating the hazards of a technocratic approach (Voropaev et al.). As these reforms progress, stakeholders must foster environments that value both academic success and holistic development. The convergence of these themes highlights the continuous necessity for committed research and policy innovation to effectively steer future initiatives.

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POPULAR (POP) CULTURE AS PEDAGOGY

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Abstract

Culture is a key idea in sociology because of its impact on daily behaviors, social relationships, and beliefs. Popular culture, which includes music, movies, television, fashion, sports, and digital media, has a big influence on today's young students. The importance and development of popular culture, its many interpretations, and its use as a teaching tool are all examined in this essay. It traces the development of popular culture from the jazz era of the 1920s to the rock and roll movement of the 1960s, the blockbuster films of the 1980s, and the technology-driven digital culture of today, while also offering insights into its potential future trajectory. Additionally, the study explores pedagogy as a science and an art, relating it to methods like as critical pedagogy, culturally responsive pedagogy, and the learner-centered framework described in the National Education Policy 2020. Results from relevant studies carried out in different settings are presented. According to the study, social media interactions improved student participation in higher education. The difficulties of integrating popular culture into the classroom are discussed in the paper's conclusion, along with issues with consumerism, stereotyping, and teacher readiness. It highlights how popular culture may improve education to become more experiential, inclusive, and socially conscious when used carefully. Popular culture as pedagogy promotes critical thinking, active engagement, and the growth of socially conscious students by connecting academic ideas to actual cultural experiences.

Key words: culture, popular culture, pedagogy, media, education

Introduction

Culture plays a crucial role in sociology, as sociologists recognize its profound effect on our social interactions. It is vital in shaping social relationships, maintaining and challenging societal norms, directing our perception of the world and our roles within it, and influencing our everyday behaviors and experiences in society. It includes both concrete and abstract components (Cole & Nicki Lisa, 2024). Popular culture, commonly known as "pop culture," generally refers to the practices and material aspects of a particular society. In modern Western society, pop culture relates to cultural products like music, art, literature, fashion, dance, film, digital culture, television, and radio that are embraced by a broad segment of the population. It comprises media forms that are easily accessible and appealing to the general public. "*Popular Culture as Pedagogy*" suggests that contemporary learners are significantly shaped by media, films, music, sports, and social media. These cultural expressions influence their thinking more than traditional textbooks do. By integrating popular culture into the classroom, educators can create a learning experience that is more engaging, relatable, and critical. This subject is significant because it connects academic knowledge with students' real-world experiences, enabling them to examine society in a meaningful manner.

Definition of Popular Culture

John Storey (2018) outlines six different perspectives on popular culture in his prestigious book “Cultural Theory and Popular Culture”. First, it includes cultural products that are broadly appreciated, carrying a predominantly positive connotation. Second, pop culture can be regarded as any culture that doesn't fit the definition of high culture, hence being viewed negatively as a lesser form of culture. Third, popular culture is characterized by its commercial production aimed at mass audiences, frequently neglecting aesthetic considerations. In this regard, the elite may exploit pop culture as a way to control or influence the general public. Fourth, pop culture can be compared to folk culture, suggesting that rather than being dictated by elite interests through mass production, these cultural expressions are genuinely created by the people. Fifth, it represents a dynamic interplay between the elite and the general populace; while elites may produce cultural products on a large scale, the public maintains the power to accept or reject these offerings. Finally, Storey argues that in the postmodern context, authentic culture and commercial culture merge, enabling users to engage interactively in both consumption and creation. They possess the agency to endorse or disregard what is offered and alter it to formulate their own content. The social media platform TikTok illustrates this trend (Larson, 2024).

Popular culture can be defined as “the communicative practices of everyday life,” where “communicative practices” encompasses all activities involved in generating meaning—including talking, writing, social rituals like dining, shopping, dancing, music, visual arts, sports, fashion, etc. that are collectively shared by numerous individuals within a society, especially those who lack significant social, economic, or political power.

This somewhat clumsy definition accomplishes three objectives: (1) it highlights the inclusion of mass media within, and alongside, everyday life practices, without hastily defining the nature of its relationship with those practices; (2) it emphasizes the importance of popular culture—meaningful in both significance and in the context of creating meaning and social value; and (3) it draws attention to the issue of power that consistently affects the formation of culture in general and popular culture specifically (Szeman and Susie O'Brien, 2017).

History of Pop Culture

The term “popular culture” originated in the mid-1800s and referred to the cultural activities of the general populace, contrasting with the “official culture” maintained by the government or elite classes. In contemporary times, this concept is often viewed qualitatively pop culture is frequently perceived as a more superficial or inferior form of artistic expression (Crossman & Ashley, 2025).

- *Pop Culture in the 1920s:* The 1920s marked the introduction of pop culture into American life. During this era, pop culture brought forth new elements like the flapper, automobiles, jazz music, films, and nightclubs. After World War I, the 1920s represented a time of heightened prosperity and freedom for many individuals.
- *Pop Culture in the 1940s:* The 1940s saw a rise in music and sports, even though society faced the struggles of the Great Depression. Although fashion trends became more muted and theater attendance dropped due to financial difficulties, music continued to be a source of happiness that lifted people's spirits.
- *Pop Culture in the 1960s:* The 1960s embraced ideas of sex, love, and rock & roll as a way of life. Pop culture acted as a refuge from governmental issues, protests, wars, and violence. Famous bands and musicians such as The Rolling Stones, The Supremes, The Beach Boys, and Elvis Presley achieved considerable popularity. Movies from the 1960s reflected the decade's enjoyment, fashion, rock & roll, and social changes.

- *Pop Culture in the 1980s:* With the end of the Cold War and the fall of the Berlin Wall, the 1980s saw a boom in comedy films. Vibrantly colored accessories, including sunglasses, bangles, and hoop earrings, became essential fashion staples. This decade produced some of the most iconic films to date, ranging from E.T. to Goonies to Freddy Krueger, catering to audiences of all ages.
- *Pop Culture Today:* The transformation of pop culture over the decades has been astounding. Fashion now serves as a means of personal expression with endless possibilities. Technological advancements have created a society enthralled by social media. Today, we experience reality television, YouTube influencers, music videos, and depend on touch screen devices for much of our communication.
- *Future Predictions:* We foresee that pop culture will become wholly driven by technology. Future technological innovations will exceed today's capabilities and will pervade every facet of culture.

Different Areas of Pop Culture

Pop culture covers a wide range of topics. It covers a variety of musical genres, including pop, rock, hip-hop, and jazz fusion; Hollywood, Bollywood, and independent films; television and streaming services like Netflix; console and mobile video games; fashion trends; literature, including comic books, novels, and manga; and visual art.

This includes everything from street art to digital designs; and last, the internet, which features popular videos, podcasts, memes, and social media influencers. Every one of these components is essential to the everyday experiences of students. We may increase students' enthusiasm, relevance, and enjoyment for learning by including these subjects into our teaching strategies.



Pedagogy: What it is?

Pedagogy is the field that blends the science and art of teaching pupils. The Greek word "paidagogos," which combines the words "paidos" (child) and "agogos" (leader), is where this name originates. Around 3000 B.C., the invention of writing led to an educational strategy that prioritized knowledge, skill development, and reflection. Plato promoted the Socratic approach to education during this time, which pushes pupils to use inquiry to find meaning. According to renowned scholar and cultural critic Henry Giroux, who is well-known for his contributions to public pedagogy and cultural studies, "pedagogy is not merely about teaching; it involves empowering individuals to critically reflect on their identities and their relationships with others and the larger world." Pedagogy needs to evolve in order to make education more immersive, thorough, integrated, inquiry-driven, learner-centered, discovery-oriented, discussion-based, flexible, and enjoyable. NEP, 2020. (Anjum Sibia, NCERT Professor)

Pedagogy is not just a descriptive science but also a normative science that sets standards, guidelines, and norms for parenting and education. Furthermore, it is both an investigative science (looking into and analyzing new educational phenomena) and an explanatory science (identifying and explaining processes, outcomes, and elements effecting education), which is a crucial function of pedagogy. It is also projecting science, i.e., suggesting new and better methods, resources, or initiatives. Education includes a scientific theory, which is a validated, comprehensive, and cohesive collection of field findings organized within the parameters of the scientific discipline. It employs a specific vocabulary and a scientific language (Duchovičová and et al., 2012).

Pedagogy is the study of teaching methods. Regardless of level, all educators need to make sure that their teaching methods and materials significantly improve students' education. The impact of teachers on students' education is the focus of pedagogy. Understanding pedagogy enables teachers to provide pupils a comprehensive grasp of the subject matter and facilitates their application of what they have learned outside of the classroom. Pedagogy is the study of instruction and learning in relation to established educational objectives. The two primary participants in the teaching-learning process are the instructor and the pupil. These two groups can communicate with each other through pedagogy. It covers both the methods teachers use to present a lesson and the methods they use to gauge how well the material is understood by the students. In order to accomplish predetermined goals, teachers apply a variety of strategies and approaches, which are outlined in pedagogy.

Types of Pedagogy

The various types of pedagogy include (Shirke, 2021)

1. Social pedagogy:

This approach focuses on the social development, awareness, and overall well-being of students. The teaching component should encompass values and moral education.

2. Critical pedagogy:

The goal of this method is to understand and analyze various everyday issues and challenges. It encourages students to explore deeper into subjects and reflect on their own thoughts and beliefs regarding specific topics.

3. Culturally responsive pedagogy:

This style seeks to acknowledge the cultural diversity present among students. It fosters an understanding of cultural differences and enhances awareness of such variations within the school environment.

4. Socratic pedagogy:

This method encourages students to seek knowledge from other sources in addition to what is offered in class. This approach assists students in discovering alternative solutions to various problems.

Popular Culture as Pedagogy

Popular culture, which is often defined as the collective cultural expressions of the general public and includes a variety of forms like music, film, television, sports, fashion, and social media, has a significant impact on how people, particularly young people, view and interact with the world. Researchers claim that in addition to being entertaining, popular culture also reflects and develops society's values (Buckingham & Sefton-Green, 1994). As a result of this understanding, educators are now integrating popular culture into their pedagogy and cultural components into teaching and learning activities.

Teachers need to figure out how to make learning more engaging, relevant, and learner-centered in the twenty-first century. Pedagogy is the term for this (NEP, 2020). Teachers can use digital media, music, movies, and advertisements to relate academic ideas to students' real-world experiences. For instance, advertisements can be used to examine gender stereotypes, and the film *Taare Zameen Par* can be utilized to discuss inclusive education. This approach uses popular culture as a teaching tool to enhance critical thinking, cultural relevance, and engagement (Duncum, 2009).

Evidence backs this integration. Shegar and Weninger (2010) observed that children's interaction with media figures bolstered early literacy, while Valiente-Neighbours (2020) showed how social media and popular culture in higher education decreased student anxiety and encouraged involvement. These findings emphasize the role of popular culture in connecting theoretical concepts with practical application, inspiring learners, and validating their cultural experiences.

In India, numerous educators incorporate elements of popular culture into their teaching. Films like *Dangal* and *Chak De! India* are utilized to discuss themes of gender and athletics. Campaigns such as *Beti Bachao, Beti Padhao* promote social awareness. Music, dialogue, and even cricket commentary serve as tools to impart lessons on communication, collaboration, and leadership. These examples demonstrate how popular culture can effectively link classroom content with students' real-life experiences.

Nonetheless, researchers warn that popular culture may perpetuate consumerism and stereotypes if not approached with a critical lens. Therefore, educators should thoughtfully choose their materials and engage in critical discussions around them. In summary, employing popular culture as a pedagogical approach presents an opportunity to create a more experiential, inclusive, and socially aware educational environment.



Source: <https://hostwebs.site/1CNc0L>

Related Studies

In the UK, the examination of popular culture has been included in the educational curriculum since the 1930s (Buckingham & Sefton-Green, 1994). In the last twenty years, media education has been reinforced through comprehensive research and practical application (Buckingham, Banaji, Burn, Carr, Cranmer & Willett, 2005; Sefton-Green & Seop, 2007). This collection of work offers a robust theoretical and practical base for developing pedagogy centered on popular culture. Numerous countries have since implemented their educational initiatives based on these findings. In contrast, art education in regions like the United States is still in a nascent and experimental phase, with methodologies not always aligning with the well-established conclusions from media education. Duncum (2009) underscores the necessity for teaching methods that progress beyond trial and error and toward reliable and effective practices. Numerous studies have been conducted on the development of literacy through popular culture.

Shegar and Weninger (2010) conducted an ethnographic study with five preschool boys in Singapore to show how children interacted with media texts at home. They demonstrated how

children's exposure to popular cultural texts, such as TV shows and media characters, enhanced literacy skills, stimulated creativity, and provided them with prior textual experiences using the concept of intertextuality. Significantly, this study revealed that teachers frequently overlook or underutilize the cultural references that students bring to the classroom. When recognized, these references can serve as vital learning support systems.

Studies carried out in higher education have also shown the advantages of integrating popular culture into classroom. Valiente-Neighbours (2020), referencing Paulo Freire's idea of "students-as-teachers," investigated how social media and popular culture could alleviate student anxiety and enhance engagement in courses based on theory. By encouraging students to link academic ideas with their cultural experiences, teachers validated students' knowledge and promoted critical participation. This strategy also highlighted the significance of experiential knowledge in fostering inclusive learning environments.

In addition to educational settings, researchers have delved into the role of popular culture in public administration. McCandless and Elias (2020) claimed that popular culture is still insufficiently explored in this domain, despite its potential to offer valuable insights into governance, equity, and ethics. Through critical discourse analysis, they illustrated how popular culture reflects urgent issues of social equity and opens pathways for enhancing students' comprehension of societal power dynamics. Their research emphasizes the necessity of interdisciplinary approaches to pedagogy.

Pierson-Smith, Chik, and Miller (2014) investigated a university course on popular culture structured within a general education framework in a multicultural environment. The investigation revealed that popular culture could be utilized to cultivate students' critical evaluation skills and prompt them to think beyond their own cultural practices. Meanwhile, the authors identified obstacles such as teaching methods, language difficulties, and variations in cultural interpretation. These challenges underline the importance of well-structured curricula when incorporating popular culture into educational contexts.

These studies illustrate that popular culture serves as a significant educational resource across various levels and fields. It aids in literacy growth among young children, alleviates anxiety and boosts engagement in higher education, and offers critical perspectives on governance and equity. Nevertheless, the research also emphasizes challenges such as stereotyping, language obstacles, and insufficient teacher readiness. Together, the literature confirms that when applied thoughtfully, popular culture can enhance pedagogy, link academic learning to real-life experiences, and cultivate critical, socially conscious learners.

Challenges and Practical Methods

However, there are challenges as well.

- Because mainstream culture sometimes encourages consumption and perpetuates stereotypes, a critical viewpoint is required.
- Teachers need to be trained in order to support students effectively; else, the material could become merely entertaining.
- Certain cultural references might not be appropriate for every learner.

Teachers must therefore choose their materials wisely and use them for discussions rather than merely for amusement.

Here are some practical methods for Teachers to use popular culture:

- Play a short movie clip and ask students to consider the social message it conveys.
- Use a popular song to educate social topics, poetry, or linguistic skills.

- To improve media literacy, look at ads or memes.
- Link inspirational and collaborative learning to athletes or celebrities.

It is crucial to ask critical questions about culture rather than just "present" it.

Conclusion

In this manner, contemporary educational methods are deeply interconnected with various concepts and ideas, as well as with the instructional techniques applied to students. Furthermore, it suggests that these practices are directly linked to the students' accomplishments, outcomes, and the skills they acquire through this approach. In conclusion, popular culture serves more than just entertainment; it acts as a means of education that students encounter every day. By integrating it into the classroom with intention, the teachers can enhance the learning experience, making it more engaging, culturally pertinent, and thought-provoking. As educators, we have the responsibility to help students understand the deeper messages in the media they consume, allowing them to grow into thoughtful, accountable, and empowered individuals.

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INFLUENCE OF SOFT SKILLS IN TEACHING COMPETENCY OF BACHELOR OF EDUCATION STUDENTS

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Abstract

The present research examines the soft skills in teaching competency of bachelor of education. Soft skills can enhance the career mobility of a person and increase the chances of success in getting the job wants. They are essential for a student to develop so that can scope with different situations in the study/work place. Soft skills are essential for children and adolescents to achieve success in academic and professional fields. teaching competency as the process by which a person helps other people to learn. Teaching helps people gain the knowledge and attitudes they needs to be responsible citizens, earn a living and lead a useful and rewarding life. It also provides the chief means of passing knowledge to the next generation. The world would change greatly as humanity lost the knowledge, skills and ideals inherited from past generations. The investigator used stratified random sampling techniques, 6 colleges were selected and from each college the students were selected randomly from colleges in Tamil Nadu. Totally the sample consisted of 300 Bachelor of Education student teachers. The investigator adopted the Soft skills inventory standardized tool provided by Arockiasamy and Murugesh (2013) and Teaching competency scale standardized tool prepared by Arockiasamy and Murugesh (2013). The interpretation of data was done with statistical methods in percentage analysis, mean, standard deviation and 't'-test.

Key Words: Soft Skills, Teaching Competency and Bachelor of Education Students.

INTRODUCTION

Education is the process by which people acquire knowledge, skills, habits, values or attitudes. The word education is also used to describe the results of the educational process. Education should help people become useful members of society it should also help them develop an appreciation of their cultural heritage and live more satisfying lives, education involves both learning and teaching. Sometimes people learn by teaching themselves. But they also learn with the help of other people, such as parents or teachers.

SIGNIFICANCE OF THE STUDY

Soft skills play a vital role for professional success. They help one to excel in the work place and their importance cannot be denied in this age of information and knowledge. Good soft skills which are in fact scarce in the highly competitive corporate world will help us stand out in a milieu of routine job seekers with mediocre skill and talent. Teaching competency is complex and many sided, demanding a variety of human traits and abilities. Also includes the subject knowledge and the psychological principles of a teacher. Subject knowledge may help a teacher to be competent but not always. Even if the students are adult, The need motivation and all other psychological principles, When consider the psychological traits of a teacher, need to know their communicative behavior.

TITLE OF THE PROBLEM

INFLUENCE OF SOFT SKILLS ON TEACHING COMPETENCY OF BACHELOR OF EDUCATION STUDENTS.

INFLUENCE

Influence is defined as a person or thing that affect or to have an effect on the way a person thinks and behaves.

In the present study, influence refers to the effect of thinking styles and soft skills management of prospective teachers on their teaching competency.

SOFT SKILLS

By the term soft skills can enhance the career mobility of a person and increase the chances of success in getting the job wants. They are essential for a student to develop so that can scope with different situations in the study/work place. Soft skills are essential for children and adolescents to achieve success in academic and professional fields.

TEACHING COMPETENCY

By the term teaching competency as the process by which a person helps other people to learn. Teaching helps people gain the knowledge and attitudes they need to be responsible citizens, earn a living and lead a useful and rewarding life. It also provides the chief means of passing knowledge to the next generation. The world would change greatly as humanity lost the knowledge, skills and ideals inherited from past generations.

BACHELOR OF EDUCATION

Bachelor of Education is one year course with an emphasis on principles and methodology of teaching. The minimum qualification to study Bachelor of Education is graduation.

Bachelor of Education students the individuals after graduation or post-graduation who are in the process of obtaining a Bachelor's degree education course during.

OBJECTIVES

1. To find out the Level of soft skills of Bachelor of Education students in total sample.
2. There is no significant difference in soft skills and its dimension of Bachelor of Education students in terms of gender
3. To find out the Level of teaching competency Bachelor of Education students in total sample
4. To find out the significant difference between teaching competency and its dimension of bachelor of education students in terms of gender
5. To find out the significant relationship between soft skills and teaching competency of bachelor of education students

NULL HYPOTHESES

1. There is no significant difference in soft skills and its dimension of Bachelor of Education students in terms of gender
2. There is no significant difference between teaching competency and its dimension of bachelor of education students in terms of gender
3. There is no significant relationship between soft skills and teaching competency of bachelor of education students.

METHOD ADOPTED IN THE PRESENT STUDY

The researcher has chosen survey method to study the problem of influence of soft skills and teaching competency of B.Ed., student.

POPULATION FOR THE STUDY

A Population refers to any collection of specified group of human beings or non-human entities. The population for the present study consisted of Bachelor of Education students studying.

SAMPLE

The investigator used stratified random sampling techniques, 6 colleges were selected and from each college the students were selected randomly from colleges in Tamil Nadu. Totally the sample consisted of 300 Bachelor of Education student teachers.

TOOLS USED FOR THE STUDY

By keeping various objectives of the study in mind, the following tools were used by investigator for collecting data.

1. Personal data form prepared by the investigator.
2. Soft skills inventory standardized tool provided by Arockiasamy and Muruges (2013).
3. Teaching competency scale standardized tool prepared by Arockiasamy and Muruges (2013).

STATISTICAL TECHNIQUES USED

“Statistics is the scientific study of handling quantitative information. It embodies a methodology of collection, classification, description and interpretation of data obtained through the conduct of surveys and experiments”. (Aggarwal Y.P, 2000).

Percentage analysis, Arithmetic mean, Standard deviation and ‘t’ test.

ANALYSIS

Table 1.1

LEVEL OF SOFT SKILLS OF BACHELOR OF EDUCATION STUDENTS IN TOTAL SAMPLE

Dimensions	Low		Moderate		High	
	N	%	N	%	N	%
Oral communication	54	18.0	194	64.7	52	17.3
Written communication	51	17.0	198	66.0	51	17.0
Computer skill	49	16.3	216	72.0	35	11.7
Stress management	48	16.0	192	64.0	60	20.0
Organizing	60	20.0	198	66.0	42	14.0
Time management	52	17.3	201	67.0	47	15.7
Leadership	34	11.3	231	77.0	35	11.7
Soft skill in total	41	13.7	218	72.7	41	13.7

Table 1.2

DIFFERENCE BETWEEN IN SOFT SKILLS AND ITS DIMENSION OF BACHELOR OF EDUCATION STUDENTS IN TERMS OF GENDER

Dimensions	Gender	Mean	Std. Deviation	Calculated 't' Values	Remark
Oral communication	Male	30.51	4.652	1.557	NS
	Female	29.63	5.016		
Written communication	Male	28.42	3.948	2.653	S
	Female	27.11	4.513		
Computer	Male	27.22	4.117	0.227	NS
	Female	27.11	4.020		
Stress management	Male	28.77	4.156	2.079	S
	Female	27.69	4.776		
Organizing	Male	27.61	4.034	1.466	NS
	Female	26.91	4.170		
Time management	Male	24.23	3.586	1.585	NS
	Female	23.54	3.799		
Leadership	Male	9.54	1.591	0.0418	NS
	Female	9.62	1.807		
Soft skill in total	Male	175.37	21.499	1.718	NS
	Female	170.99	21.917		

(At 5% level of significance the table value of 't' is 1.96)

Table 1.3

LEVEL OF TEACHING COMPETENCY BACHELOR OF EDUCATION STUDENTS IN TOTAL SAMPLE

Dimensions	Low		Moderate		High	
	No	%	No	%	No	%
Use of appropriate techniques	28	9.3	235	78.3	37	12.3
Efficiency in teaching	35	11.7	233	77.7	32	10.7
Effective use of aids	47	15.7	212	70.7	41	13.7
Teaching competency in total	3	1.0	24	8.0	273	91.0

Table 1.4

DIFFERENCE BETWEEN TEACHING COMPETENCY AND ITS DIMENSIONS OF BACHELOR OF EDUCATION STUDENTS IN TERMS OF GENDER

Dimensions	Gender	Mean	Std. Deviation	Calculated 't' Values	Remark
Use of appropriate techniques	Male	48.06	6.562	0.894	NS
	Female	47.35	6.876		
Efficiency in teaching	Male	55.27	7.987	0.525	NS
	Female	54.78	8.073		
Effective use of aids	Male	28.32	4.524	1.721	NS
	Female	29.25	4.674		
Teaching competency in total	Male	175.37	21.499	1.718	NS
	Female	170.99	21.917		

(At 5% level of significance the table value of 't' is 1.96)

Table 1.5

**RELATIONSHIP BETWEEN SOFT SKILLS AND TEACHING COMPETENCY OF
BACHELOR OF EDUCATION STUDENTS**

N	ΣX	ΣY	ΣX^2	ΣY^2	ΣXY	Calculated	Remark
300	51832	39444	2686556224	1555829136	2044461408	0.630	S

(At 5% level of significance, for (298 df) table value of 'γ' is 0.1638, S – Significant)

RESULTS AND DISCUSSION

1. It is inferred from the above table (1.1) that 18.0 %, 64.7%, 17.3% of bachelor of education, students have low, average and high level of towards active oral communication skills and its dimension. It is inferred from the above table shows that 17.0%, 66.0%, 17.0% of bachelor of education, students have low, average, high level of towards active written communication skill and its dimension. It is inferred from the above table shows that 16.3%, 72.0%, 11.7% of bachelor of education, students have low, average, high level of towards active computer skill and its dimension. It is inferred from the above table shows that 16.0%, 64.0%, 20.0% of bachelor of education, Students have low, average, high level of towards active stress management skill and its dimension. It is inferred from the above table shows that 20.0%, 66.0%, 14.0% of bachelor of education, students have low, average, high level of towards active organizing skill and its dimension. It is inferred from the above table shows that 17.3%, 67.0%, 15.7% of Bachelor of Education, students have low, average, high level of towards active time management and its dimension. It is inferred from the above table shows that 11.3%, 77.0%, 11.7% of Bachelor of Education, students have low, average, high level of towards active leadership skill and its dimension and It is inferred from the above table shows that 13.7%, 72.7%, 13.7% of Bachelor Education, students have low, average, high level of towards active soft skill and its dimension.

2. It is inferred from the above table (1.2) that there is no significant difference between in soft skills dimensions in their oral communication, computer, organizing, time management, leadership and soft skill in total of bachelor of education students in terms of gender. But there is significant difference between in soft skills dimensions in their written communication and stress management of bachelor of education students in terms of gender. While comparing the mean scores of female (27.11) students and the mean scores of male (28.42) students in their written communication. The male students are better than female students in their written communication and While comparing the mean scores of female (27.69) students and the mean scores of male (28.77) students in their stress management. The male students are better than female students in their stress management.

3. It is inferred from the above table (1.3) that 9.3%, 78.3%, 12.3% of Bachelor of Education students have low, average, high level of attitude of towards active learning methodology and its dimension – use of appropriate techniques. It is inferred from the above table shows that 11.7%, 77.7%, 10.7% of Bachelor of Education students have low, average, high level of attitude of towards active learning methodology and its dimension – Efficiency in teaching. It is inferred from the above table shows that 15.7%, 70.7%, 13.7 % of Bachelor of Education students have low, average, high level of attitude of towards active learning methodology and its dimension –Effective use of aids. It is inferred from the table shows that 1.0%, 8.0%, 91.0% of Bachelor of Education students have low, average, high level of attitude of towards active learning methodology and its dimension – Teaching competency in total.

4. It is inferred from the above table (1.4) that there is no significant difference between male and female B.Ed., students in their dimensions in their use of appropriate techniques, Efficiency in teaching, Effective use of aids and teaching competency in total of Bachelor of Education students.

5. The above the table (1.5) shows that there is significant relationship between soft skills and teaching competency. Hence the null hypothesis is rejected.

INTERPRETATIONS

The 't' test result shows that the male students are better than the female students in their soft skills bachelor of education students. This may be due to the fact that the male students are matured and they know their soft skills providing more for the hid, so the most of the male students have high soft skills. Male students have more social relationship around their situation it may help them to have more soft skills.

The correlation test result shows that there is significant relationship between soft skills and teaching competency female students. This may be due to the fact that any problems could be solved either step approach or through their own experience from the society. So the above result insists that both have negative relationship. This soft skills and teaching competency information processing may make them to excel in their education of female students.

RECOMMENDATIONS

1. Students should be motivated to participate in teaching activities, which may develop their soft skills.
2. The special programmers like science quiz, science exhibition, and fieldtrip should be conducted to develop the teaching the students.
3. Seminars and talks on Soft skills and teaching competency should be frequently arranged.
4. Group activities such as project work, group discussion, cultural programmers, sports and games may be conducted to improve their teaching.

CONCLUSION

Many researchers revealed that soft skills influence either directly or indirectly in teaching competency. Here the sample is Bachelor of Education students as they make the younger generation a valuable one it is responsibility of them to develop good soft skills. Since the teachers are the backbone of our nation, they should cultivate good soft skills and teaching competency in turn a better society. The Findings in the study may be helpful for teacher educators, counselors, parents who are responsible for development of children. So the teachers can give the ideas to manage and control the soft skills and teaching competency to the students which will help them in throughout their life. To sum up the role and contribution of teaching and parenting play a vital as well as inseparable role.

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ATTITUDE OF THE ARTS AND SCIENCE COLLEGE STUDENTS TOWARDS EDUCATIONAL TECHNOLOGY

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ABSTRACT

The present study is entitled as “Attitude of the arts and science college students towards educational technology”. Today educational technology is the study and ethical practice of facilitating learning and improving performance by creating, using and managing appropriate technological processes and resources. Educational technology thus refers to the use of both physical hardware and educational theoretic. It encompasses several domains, including learning theory, computer-based training, online learning, and, where mobile technologies are used, m-learning. There is no doubt that the impact of educational technology determines the standard of the teaching learning process as well as quality education too. The research was a survey type, which consists of random sampling of 300 arts and science students in Salem District. The author has adopted an Attitude towards educational technology scale prepared and validated by Arockia Samy (2016), Personal data sheet was prepared by the investigator. The interpretation of data was done with statistical methods in percentage analysis, mean, standard deviation and ‘t’-test.

INTRODUCTION

Educational technology is an inclusive term for the tools that technologically or electronically support learning and teaching. Educational technology is not restricted to high technology. However, modern electronic educational technology has become an important part of society today. Technology depending on whether a particular aspect, component or delivery method is given emphasis, a wide array of similar or overlapping terms has been used.

SIGNIFICANCE OF THE STUDY

The study on *Attitude of Arts and Science College Students towards Educational Technology* holds critical importance in contemporary higher education as digital tools become integral to teaching and learning processes. With the rapid integration of technologies like Learning Management Systems (LMS), AI-driven platforms, and virtual classrooms, understanding student attitudes helps institutions tailor tech-based pedagogies effectively. This research is particularly significant as it bridges the gap between technology availability and its actual acceptance among arts and science students two streams often perceived to have differing tech-adoption patterns. By identifying factors that influence attitudes (e.g., ease of use, perceived utility, or institutional support), the study can inform faculty training programs, curriculum design, and policy interventions to enhance engagement. Additionally, it addresses equity concerns by highlighting disparities in tech access or readiness among student subgroups (e.g., rural vs. urban, gender). The findings will empower educators to create inclusive, student-centered digital learning environments, ultimately improving academic outcomes and preparing graduates for a technology-driven workforce. For policymakers, this study provides evidence to allocate resources strategically, ensuring equitable tech integration across disciplines.

TITLE OF THE RESEARCH

ATTITUDE OF THE ARTS AND SCIENCE COLLEGE STUDENTS TOWARDS EDUCATIONAL TECHNOLOGY

1.4 OPERATIONAL DEFINITIONS

Attitude

Attitude is the result of an individual interaction with social objects and social situations and are subjects to alternation, maintenance and breakdown through manipulation of the same order of variables as those producing their original acquisition. Attitudes can be changes through thinking inhibition, extinction and fatigue that is they are subject to conditioning.

Educational Technology

Educational technology refers to the effective use of technological tools in learning. As a concept, it concerns an array of tools, such as media, machines and networking hardware, as well as considering theoretical perspectives for their effective application.

Arts and Science Students

In the present study arts and science students refers to the students studying both U.G and P.G degree in any discipline.

OBJECTIVES

The major objective of the study is to find out the attitude of the arts and science college students towards educational technology.

The other specific objectives are given below.

1. To find out the level of attitude towards educational technology of arts and science college students
2. To find out the significant difference between male and female arts and science students in their attitude towards educational technology.
3. To find out the significant difference between below 23 and above 23 age group of arts and science students in their attitude towards educational technology.
4. To find out the significant difference between arts and science subject group arts and science students in their attitude towards educational technology.

HYPOTHESES OF THE STUDY

- 1.1 There is no significant difference between male and female arts and science students in their attitude towards educational technology.
- 1.2 There is no significant difference between below 23 and above 23 age group of arts and science students in their attitude towards educational technology.
- 1.3 There is no significant difference between arts and science subject group arts and science students in their attitude towards educational technology.

METHOD ADOPTED IN THE PRESENT STUDY

The investigator adopted the survey method of research to **ATTITUDE OF THE ARTS AND SCIENCE COLLEGE STUDENTS TOWARDS EDUCATIONAL TECHNOLOGY**. Survey is a procedure in which the data is systematically collected from a population through some form of direct solicitation such as face ace interview, questionnaire or schedule.

TOOLS USED IN THE PRESENT STUDY

By keeping various objectives of the study in mind, the following tools were used by the investigator for collecting the data.

1. Personal data form
2. The author has adopted an Attitude towards educational technology scale prepared and validated by Arockia Samy (2016), this tool was adopted for this study.

POPULATION FOR THE STUDY

Koul (1984) says “A population refers to any collection of specific group of human being or non – human being such as objects, educational instruction, time units, geographical areas salaries drawn by individuals, some statisticians it universe cell”. The population of the study consists of students those who are studying arts and science colleges.

SAMPLE FOR THE STUDY

Best says, “A sample is a small proportion selected for observation and analysis”.

For the present study, the investigator has randomly selected 300 arts and science college students.

STATISTICAL TECHNIQUES USED

“Statistics is the scientific study of handling quantitative information. It embodies a methodology of collection, classification, description and interpretation of data obtained through the conduct of surveys and experiments”. (Aggarwal Y.P, 2000). Percentage analysis, Arithmetic mean, Standard deviation and ‘t’ test.

ANALYSIS

Table 1.1

LEVEL OF ATTITUDE TOWARDS EDUCATIONAL TECHNOLOGY OF ARTS AND SCIENCE COLLEGE STUDENTS

Attitude towards Educational technology of Arts and Science College Students	Low		Moderate		High	
	N	%	N	%	N	%
	33	11.0	201	67.0	66	22.0

Table 1.2

DIFFERENCE BETWEEN MALE AND FEMALE STUDENTS IN THEIR ATTITUDE TOWARDS EDUCATIONAL TECHNOLOGY

Attitude towards Educational technology of Arts and Science College Students	Category	Count	Mean	S.D	Calculated ‘t’ value	Remarks at 5% level
	Male	134	100.903	11.7645	0.207	NS
	Female	166	100.627	11.1189		

(At 5% level of significance the table value of ‘t’ is 1.96)

Table 1.3

DIFFERENCE BETWEEN BELOW 23 AND ABOVE 23 AGE GROUP OF STUDENTS IN THEIR ATTITUDE TOWARDS EDUCATIONAL TECHNOLOGY

Attitude towards Educational technology of Arts and Science College Students	Category	Count	Mean	S.D	Calculated 't' value	Remarks at 5% level
	Below 23	168	99.006	11.3873	3.043	S
	Above 23	132	102.970	11.0502		

(At 5% level of significance the table value of 't' is 1.96)

Table 1.4

DIFFERENCE BETWEEN ARTS AND SCIENCE SUBJECT GROUP STUDENTS IN THEIR ATTITUDE TOWARDS EDUCATIONAL TECHNOLOGY

Attitude towards Educational technology of Arts and Science College Students	Category	Count	Mean	S.D	Calculated 't' value	Remarks at 5% level
	Arts	140	99.686	11.1227	1.527	NS
	Science	160	101.681	11.5793		

(At 5% level of significance the table value of 't' is 1.96)

RESULTS AND DISCUSSION

1.1 It is inferred from the above table (1.1) shows that 11.0% of arts and science college students have low, 67.0% of them have moderate and 22.0% of them have high level of attitude towards educational technology.

1.2 It is inferred from the above table (1.2) shows that there is no significant difference between male and female arts and science students in their attitude towards educational technology.

1.3 It is inferred from the above table (1.3) shows that there is a significant difference between below 23 and above 23 age group arts and science students in their attitude towards educational technology. While comparing the mean scores of below 23 (mean = 99.006) and above 23 age group students (mean= 102.970) arts and science students, above 23 age group students are better than the below 23 age group in their attitude towards educational technology.

1.4 It is inferred from the above table (1.4) shows that there is no significant difference between arts and science subject group students in their attitude towards educational technology.

INTERPRETATIONS

The 't' test revealed that, above 23 age group students are better than the below 23 age group students in their attitude towards educational technology. This may be due to the fact that they have more exposure in their experience by using technology and their environment may support to use this technology for learning purpose while comparing below age group of 23. This may be help them to have better attitude towards educational technology.

RECOMMENDATIONS

1. Every teacher and parents should responsible for improving the personal attitude of the students. Hence it will improve attitude of educational technology of the students.
2. Seminar and workshop can be conducted for the arts and science college students especially the below 23 age group students.
3. College Teachers should conducting activities in class via technology.

4. Providing assignments to the students daily via ICT tools, this will support increasing their interest in using educational technology.
5. Making a habit of improving general knowledge via technology to the students. It provides making confident among them and improve positive attitude.

CONCLUSION

Education system should focus on the student behaviour, ensuring development and acquisition of high-quality knowledge, skills and competencies appropriate to life in the 21st century. The thrust of quality education by all standards of understandabilities should be on the wider use of educational technology. Students have used educational technology for communications and entertainment itself, it is not to fulfil the aim of the learning process, they are busier with the social network such as Facebook, YouTube and others, instead of using the Internet to do their educational purposes. Government should pay attention to the students and facilitate certain conditions in order to encourage students to use educational technology in their learning by enhancing their affection and beliefs towards using educational technology.

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IGNOU's TECHNOLOGICAL INTERVENTIONS TO REACH THE ODL LEARNERS IN LINE WITH NEP 2020

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ABSTRACT

The Indira Gandhi National Open University (IGNOU) is one of the premier universities in India, promoting Open and Distance Learning (ODL) and Online Learning to diverse learners through its network of Regional Centres and Learner Support Centres across the country. The National Education Policy (NEP) 2020 promotes holistic, multidisciplinary, flexible and inclusive education for the 21st century in the country. The key objective of the NEP 2020 focuses on critical thinking, creativity, and vocational skills, with a greater emphasis on a learner-centric education system that empowers citizens with a value for traditions. IGNOU is more committed to provide multidisciplinary education with skills competence has taken several digital interventions to provide blended learning models and measures to improve its knowledge resources through the digital pathways. The rapid development of internet-based technologies and the increase in mobile internet users significantly play a vital role in disseminating knowledge and skills on a wider level, promoting inclusion in society. Higher Educational Institutions always aim to equip their students with the knowledge and competitive skills by imparting quality education. The Indira Gandhi National Open University has adopted several technological interventions, especially in the pandemic situation in the country, fostering innovative teaching and learning activities for its diverse group of learners. IGNOU is integrating technology in line with the National Education Policy (NEP) 2020 by focusing on a blended learning approach and robust digital infrastructure like eGyankosh, Gyandarshan TV Channels, Gyanvani FM Radio, Gyandhara internet Radio, Swayam Prabha DTH TV Channels, SWAYAM MOOCs, etc. The support services to the ODL learners are extended through technological interventions to enhance access, equity, quality and a flexible learning approach to the learners. The present paper aims to address the current developments and technological interventions of the IGNOU for ODL learners in line with the objectives of the NEP 2020.

Keywords: Open and Distance Learning (ODL), Technology, NEP 2020.

INTRODUCTION

The Open and Distance Learning is one of the key alternatives to the conventional higher education system, fulfilling the higher educational goals of millions of learners in the country. After the COVID-19 pandemic, there have been huge systemic developments in the technological interventions to reach out to the learners in diverse ways for the teaching and learning process, which not only save money and fulfil the timely service to the learners, breaking their isolation and distance between the institution and learning place. The increase in consumers, especially for the mobile-based internet services and the revolution in the 5G network coverage in the mobile network services has amplified its usage for the learning process. The Indira Gandhi National Open University (IGNOU) is one of the premier institutions of higher learning in the country serving to the educational aspirations of the millions of the learners both in the country as well in the abroad nations has introduced several Online Learning Programmes considering the need for the diverse group of learners in the several geographic areas to study while work and upgrade knowledge and skills. IGNOU since from its inception has played a key role in the increase of Gross Enrollment

Ratio (GER) in the country by introducing several need based academic programmes in the Open and Distance Learning (ODL) and last few years in the Online Learning (OL) Programmes to cater the need of employable human resources and skilled manpower requirements for the sustainable development of the nation. The National Education Policy (NEP) 2020 mandates multidisciplinary education, skill development and traditional knowledge to develop the human resources for the growing competent job markets and diverse entrepreneurial skills developments for the growing demands and to compete in the global markets for sustainable developments.

NEP 2020 – A GAME CHANGER IN THE EDUCATION SECTOR

The National Education Policy (NEP) 2020 envisages a comprehensive development with key objective for the high-quality education with equity and expanding access and holistic learning experiences, also it focuses on the multidisciplinary approach, critical thinking, problem solving ability, vocational skills and integrating technologies at all levels aims to achieve 50% GER in the Higher Education in the country by the year 2035. The Open and Distance Learning (ODL) is considered one of the best alternative mechanisms to reach out to the millions of learners in the country through Information and Communication Technologies (ICT) rather than the conventional system of higher education, as there is limited access due to diverse reasons. The Indira Gandhi National Open University (IGNOU) as a pioneer in the field of Open and Distance Learning (ODL) in the country with cumulative strength of the learners above 3.5 million, aims to bridge the digital divide and offers various innovative need based academic programmes to diverse segments in the society for their knowledge development, professional competence, career advancement etc., Further the University offers Massive Open Online Courses (MOOCs) under SWAYAM platform and Online Learning Programmes with robust Learning Management System (LMS) and Web based student support services and media based educational delivery on anywhere and anytime access to the its learners. The students from various socio-economic background especially from rural and remote places, can consider the Open and Distance Learning (ODL) as a viable option since the programmes are cost-effective and flexible. The student support services in the Open and Distance Learning are one of the broad areas and the technological advancements helps in many ways to reach out the learners and solve their issues and problems on time. The ODL has attained a paradigm shift from the traditional distance learning to the blended learning approach from the post COVID era, and due to ease of access through ICT intervention by the University from admission level to till the end of completion of the programme of study, many aspiring learners are making their choice with IGNOU for their higher education goals. The digital platforms of IGNOU, such as eGyankosh, YouTube Channels, SWAYAM, SWAYAM Prabha DTH TV Channels, Gyandarshan TV Channels, Gyanvani FM Radio and Gyandhara Internet Radio, etc. has amplified the learning resources to the learners accessible anywhere and anytime, making the Open and Distance Learning a core competency to achieve the global educational goals. The use of digital technologies in Education has advanced more rapidly than any other innovation and reached around 50% of the developing population in the last two decades (UN, 2020).

DIGITAL INFRASTRUCTURE DEVELOPMENTS IN IGNOU

The Institutional Development Plan (IDP) of IGNOU mandates the roadmap for the future growth of the University focusing on achieving its vision by aligning with National Education Policy – 2020 with widening access in the ODL and Online Learning, extending global outreach, improving the employability skills of the learners on the latest developments and strengthening the governance, digital infrastructure, academic research, with major focus ensuring inclusivity, quality education, and sustainability for providing the world class education to its learners. As per the IDP of IGNOU, incorporating online tools like virtual learning environments, virtual labs, mobile applications for learning, and immersive learning experiences towards widening academic

expansion through expanding digital learning spaces is the key focus. The following are the salient features of IGNOU, as there are numerous facilities for the learners of ODL.

1. Pre-admission counselling (Online and Face-to-Face)
2. Online Admission and Online Re-Registration through Samarth Platform
3. Flexible Admission Rules
4. Socially relevant programmes based on student need analysis
5. Multidisciplinary and skill-aligned curriculum
6. Nationwide network of Student Support Services through Regional Centres and Learner Support Centres
7. Modular approach and cost-effective programmes
8. Print and Digital Self Learning Materials (SLMs)
9. Online tracking facility for the delivery of print SLMs
10. Online Student Management System
11. E-portfolios to learners with student login websites and Mobile apps
12. Anywhere and anytime learning – Self-paced, Online and F2F academic counselling, Web Enabled Academic Support (WEAS), Practical, Internship and Projects
13. Online Library and e-Resources
14. Web-based student support services
15. iGRAM facility for grievance resolution
16. Collaboration with Higher Educational Institutions for the sharing of resources
17. TV and media-based educational support to learners (Gyandarshan TV Channels, Gyan Vani FM Radio, Gyandhara Internet Radio, Podcasts, YouTube Channels, SWAYAM Prabha DTH TV Channels for multilanguage delivery of lessons)
18. Bulk Email and SMS alerts, WhatsApp/telegram channels, social media
19. Help Desks, Online Grievance Redressal Meetings
20. Innovation and Entrepreneurship Development
21. Online Exam form portal, Revaluation form portal, TEE results and Grade Card Checking, and Online portal for registration to the Convocation.
22. Alumni Portals

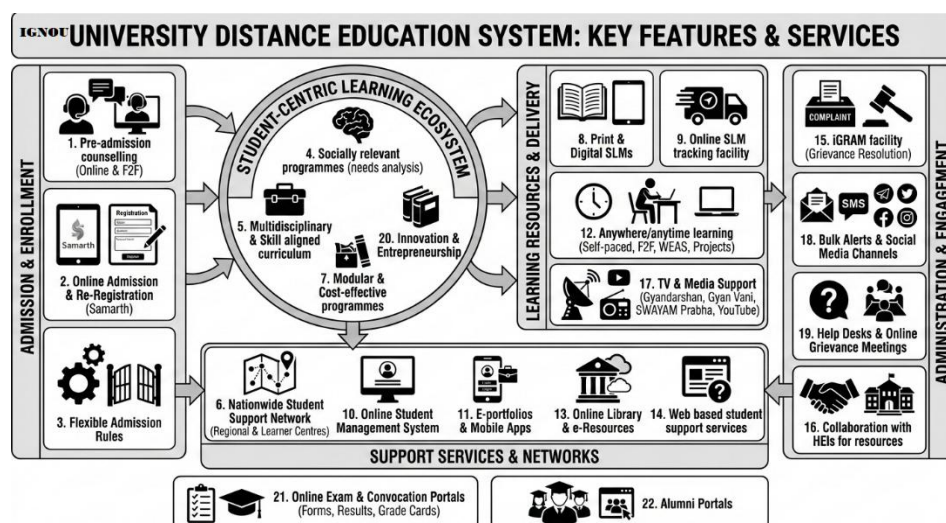


Fig.1. IGNOU Student Support System

IGNOU PROMOTING SKILL DEVELOPMENT AND VOCATIONAL TRAINING:

IGNOU has entered into an MoU with the Ministry of Skill Development (MSDE) to promote vocational skills to the undergraduate learners in line with the objective of the NEP 2020 to strengthen the country's skill ecosystem and establish skill training work centres in the National Skill Training Institutes, PM Kaushal Kendra, Industrial Training Institutes and Jan Shikshan Sansthan (JSS). More than 750 skill training centres were established to provide training to the UG Degree learners during their study to augment their potential for future job readiness and also for developing the entrepreneurial ecosystem in the nation. The initiative of the IGNOU in integrating vocational skills with academic journey aligning its academic curriculum for skill development training with national standards in line with the Qualification Framework to ensure seamless mobility and recognition to the learners.

SCHOLARSHIP AND FEE WAIVER TO THE DISADVANTAGED SECTIONS:

IGNOU offers a fee waiver to the SC/ST learners enrolling in BAM, BCOMF and BSCM Programmes, subject to their family income criteria limits and also the students from the SC/ST and backward categories of learners can avail the scholarship through the National Scholarship Portal, subject to the fulfilment of eligibility criteria. Such an initiative encourages the beneficiaries to enroll in IGNOU programmes from the disadvantaged sections to empower their educational goals with the premier higher learning institution by availing the educational services at their doorstep.

IGNOU'S INITIATIVES IN IMPLEMENTATION OF NEP 2020

IGNOU, as a major educational domain of ODL and Online learning in the country and the apex institution in the capacity of a central open university under the Ministry of Education, Govt. of India, has taken measures to implement the NEP 2020. The following are the key initiatives of the IGNOU in line with NEP 2020,

1. Establishment of NEP 2020 Cell in the University Campus
2. Capacity building of the Faculties of HEIs in the Country and IGNOU has successfully conducted an online Professional Development Programme on implementation of NEP-2020 for University and College Teachers in the Country, involving around 60000 faculty members of the Universities and Colleges in the Country.
3. IGNOU offered the 2-credit SWAYAM Programme on NEP 2020
4. Five-year Institutional Development Plan (IDP) as a roadmap to increase GER
5. Four-Year UG Programmes with multidisciplinary and skill focus
6. Credit transfer and Academic Bank of Credits
7. Introduction of nearly 51 Online Programmes
8. Introduction of Skill Training under PMKVY in every Regional Centre
9. Promoting Equity and Access by expanding the network of RCs and LSCs in the Country
10. Multiple entry and exit in the UG and PG programmes of study
11. IGNOU-MSDE Skill Development Centres in the NSTIs, PMKK, JSS and Industrial Training Institutes to promote skill training and vocational education
12. MOOCs under the SWAYAM Platform and Regional Language Live Counselling Sessions through the SWAYAM Prabha DTH TV Channels.
13. Promoting Indian Knowledge System (IKS) and introduction of Hindu Studies, Vedic Studies, Sanskrit, Bhagavat Gita and Jyotish Studies in the PG Programmes.
14. More ICT and Internet-based Educational Delivery in the ODL, and a major push towards hybrid mode learning
15. Innovation and Entrepreneurship developments through the IGNOU's National Centre for Innovations in Distance Education (NCIDE)

CONCLUSION

The Open and Distance Learning (ODL) has attained several transformations due to technological advancements in recent years, and the growing demand for ODL and Online Learning in the country also witnesses that the IGNOU, like the Open University, has to invent and implement several ideas to cater to the needs of the learners in the ODL and Online learning system. The National Education Policy supports the integration of technology in education for the holistic development and to promote equity and access. The role of Open Universities in this dimension is imperative to practice and develop several technological interfaces to reach out to the learners, since conventional higher education alone cannot meet the demands in higher education. IGNOU has to implement the interactive self-learning materials for the distance education learners to make it more attractive. Further introduction of more ODL and Online Programmes in the regional languages will be useful to many rural learners to achieve their higher educational goals with the IGNOU. The University should also focus on the periodical training and capacity building of the ODL functionaries in a hybrid mode about the use of the latest ICT facilities, funding for Research on ODL and Online Learning, on-demand examinations, MCQ-based assignments for the Online Learning Programmes, etc. IGNOU has to focus on developing audio-video content in the regional languages in the emerging interdisciplinary studies for the learners to promote inclusive education and outreach in line with NEP 2020.

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THE PREVALENCE OF NOMOPHOBIA AND ITS IMPACT ON ACADEMIC PERFORMANCE AMONG HIGH SCHOOL STUDENTS IN MADURAI DISTRICT

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Abstract

*Nomophobia, defined as the fear of being without mobile phone access, has emerged as a significant psychological concern among adolescents in the digital age. This study examined the prevalence of nomophobia among high school students in Madurai District and explored its relationship with gender and residential location. The study involved 410 high school students (170 males and 240 females) from government and aided schools across rural and urban areas in Madurai District. Data were collected using the standardized Nomophobia Questionnaire (NMP-Q), and statistical analyses including descriptive statistics, independent samples *t*-tests, and Pearson correlation coefficients were performed. Results revealed that 79.7% of students experienced moderate to severe nomophobia ($M = 113.68$, $SD = 18.95$). Female students demonstrated significantly higher nomophobia scores ($M = 115.32$, $SD = 17.70$) compared to males ($M = 110.09$, $SD = 20.64$), $t(408) = -2.78$, $p = 0.006$, Cohen's $d = 0.27$. Urban students showed significantly higher scores ($M = 114.49$, $SD = 18.49$) than rural students ($M = 112.51$, $SD = 19.86$), $t(408) = -2.05$, $p = 0.041$, Cohen's $d = 0.11$. Weak but significant correlations were found between nomophobia and gender ($r = 0.137$, $p = 0.006$) and residential area ($r = 0.101$, $p = 0.041$). Gender and residential area were independent ($r = 0.085$, $p = 0.089$). These findings underscore the urgent need for targeted interventions addressing smartphone dependency among adolescents, particularly for female and urban students.*

Keywords: *Nomophobia, Smartphone Dependency, High School Students, Academic Performance, Madurai District, and Adolescent Mental Health.*

1. Introduction

The rapid proliferation of smartphones has fundamentally transformed communication patterns and daily routines across all age groups. While these technological advances provide unprecedented connectivity and information access, they have also introduced new psychological challenges, particularly among adolescent populations. Nomophobia, derived from “no-mobile-phone phobia,” refers to the anxiety or fear experienced when individuals cannot access their mobile devices. This contemporary phenomenon has gained recognition as a significant behavioural concern affecting millions worldwide, especially young people who have grown up as digital natives.

High school students represent a particularly vulnerable demographic for developing nomophobia. Their developmental stage, characterized by intense peer relationships, identity formation, and susceptibility to external influences, intersects with unprecedented smartphone access. This confluence creates conditions favourable for problematic usage patterns that can interfere with academic performance, social development, sleep quality, and psychological well-being. Despite growing global concern about nomophobia, limited research has been conducted in Indian contexts, particularly at the district level focusing on high school populations. Most existing

studies have concentrated on urban college students, leaving significant gaps in understanding how nomophobia affects younger adolescents across diverse geographical and socioeconomic settings. Madurai District, with its blend of rural villages and urban centers, provides an ideal context for examining how different environmental factors shape adolescent relationships with technology.

This study addresses these knowledge gaps by investigating nomophobia prevalence among high school students in Madurai District and examining how gender and residential location influence smartphone dependency levels. Understanding these patterns is essential for developing culturally appropriate interventions and informing educational policies at local and regional levels.

2. Review of Related Literature

2.1 Conceptualizing Nomophobia

Nomophobia encompasses four primary dimensions: inability to communicate with others, losing connectedness, not being able to access information, and giving up convenience (King et al., 2013). Researchers conceptualize nomophobia as existing on a continuum from mild discomfort to severe anxiety when separated from mobile devices. Theoretical frameworks draw from addiction models, attachment theory, and fear conditioning principles, suggesting that smartphones can become objects of psychological dependency similar to behavioural addictions.

2.2 Prevalence Studies

International research documents varying nomophobia prevalence rates across populations. Studies from the United Kingdom, Spain, and Turkey report 42-77% prevalence among young adults (Yildirim & Correia, 2015). In Indian contexts, research from metropolitan cities found 56-73% prevalence among college students (Pavithra et al., 2015). However, research specifically on high school students remains limited, though available evidence suggests adolescents may be particularly susceptible due to developmental factors including heightened peer influence and lower impulse control.

2.3 Gender Differences

Research presents mixed findings regarding gender differences in nomophobia. Several studies report higher scores among females, attributing this to greater smartphone use for social communication and relationship maintenance (González-Cabrera et al., 2017). Females tend to use smartphones more for interpersonal communication, social networking, and emotional support, potentially increasing dependency and separation anxiety. However, some studies find no significant gender differences or report higher nomophobia among males when gaming and entertainment are considered.

2.4 Urban-Rural Differences

Urban environments typically offer superior telecommunications infrastructure, facilitating more constant smartphone connectivity. Urban residents often have earlier technology exposure and access to diverse applications, potentially increasing vulnerability to nomophobia (Rodríguez-García et al., 2020). However, rural environments may feature stronger community bonds and more face-to-face social interactions, serving as protective factors against excessive dependency. Research examining these differences in Indian contexts remains sparse.

3. Significance of the Study

This study makes several important contributions to understanding nomophobia among adolescents. It provides the first systematic examination of nomophobia among high school students specifically in Madurai District, extending research beyond metropolitan areas to medium-sized cities and rural contexts. By examining multiple demographic factors simultaneously, it offers nuanced understanding of who is most vulnerable to smartphone dependency and why.

The findings have direct practical implications for multiple stakeholders. School administrators can use this evidence to develop informed technology policies and digital wellness programs. Teachers gain insights into a phenomenon affecting classroom engagement and academic performance. Parents receive information guiding family conversations and rules about technology use. Mental health professionals obtain baseline data for assessment and intervention planning. Policymakers can allocate resources more effectively based on documented prevalence and risk factors. Additionally, the research contributes baseline data for monitoring trends over time and evaluating intervention effectiveness as technology continues evolving. It adds to the growing body of literature on technology addiction, providing region-specific data valuable for comparative studies and meta-analyses. Ultimately, this research supports the overall well-being and academic success of high school students in Madurai District and beyond.

4. Objectives of the Study

1. To assess the overall prevalence and severity levels of nomophobia among high school students in Madurai District.
2. To examine gender-based differences in nomophobia scores between male and female students.
3. To investigate variations in nomophobia levels across rural and urban residential areas.
4. To explore correlational relationships between demographic variables (gender and residential area) and nomophobia scores.
5. To determine if there is a significant association between Gender and Residential Area.

5. Hypotheses of the Study

H₀₁: There is no significant difference in nomophobia scores between male and female students.

H₀₂: There is no significant difference in nomophobia scores between rural and urban residential area students.

H₀₃: There is no significant correlation between gender and nomophobia scores.

H₀₄: There is no significant correlation between residential area and nomophobia scores.

H₀₅: There is no significant correlations among the demographic variables.

H₀₆: There is no significant association between Gender and Residential Area.

6. Methodology

6.1 Research Design

This study employed a quantitative, cross-sectional survey design using correlational analysis to examine relationships among variables at a single time point. This approach was selected as appropriate for establishing prevalence rates and examining associations between demographic variables and nomophobia levels.

6.2 Population and Sample

The target population consisted of high school students enrolled in 8-9th grades across Madurai District, Tamil Nadu. A sample of 410 students was recruited through purposive sampling from Government and aided schools representing rural and urban areas. The final sample comprised 170 males (41.5%) and 240 females (58.5%), with 141 rural students (34.4%) and 269 urban students (65.6%).

6.3 Data Collection Instrument

The standardized Nomophobia Questionnaire (NMP-Q) was administered to assess smartphone dependency levels. The NMP-Q evaluates four dimensions: inability to communicate, losing connectedness, inability to access information, and giving up convenience. Respondents rated items on a 5-point Likert scale, with higher total scores indicating greater nomophobia severity. Scoring interpretation follows established guidelines: absence (< 60), mild (60-99), moderate (100-139), and severe (≥ 140).

6.4 Data Collection Procedure

Following institutional approval and parental consent, questionnaires were administered in classroom settings during regular school periods. The researchers ensured proper completion and addressed questions. Students provided assent before participation. Data collection occurred over four weeks during regular school days, avoiding examination periods.

7. Statistical Analysis

Descriptive statistics characterized the sample and score distributions. Independent samples t-tests examined mean differences between genders and residential areas. Pearson correlation coefficients assessed relationship strength and direction among variables. Chi-square tests examined independence of categorical variables. Statistical significance was set at $\alpha = 0.05$.

7.1 Preliminary Data Screening

Prior to conducting primary analyses, the dataset underwent rigorous screening to ensure data quality and verify statistical assumptions. All 410 questionnaires showed complete data with no missing values in key variables (gender, residential area, total nomophobia score). This complete response pattern reflects the structured data collection environment where the researchers immediately identified and addressed incomplete responses.

The nomophobia score distribution was examined for normality and outliers. Analysis revealed slight negative skew (skewness = -0.42, SE = 0.12), a modest deviation unlikely to affect parametric test validity given the large sample size. Visual histogram inspection confirmed approximately normal distribution centered around moderate nomophobia range with few extreme scores at either tail. Levene's test for homogeneity of variance was conducted for planned group comparisons. For gender comparison, variance homogeneity was supported ($F = 3.21$, $p = 0.074$). For rural-urban comparison, variances were also acceptably similar ($F = 1.58$, $p = 0.209$). These results indicated that standard t-test procedures were appropriate without requiring variance adjustments.

7.2 Overall Nomophobia Prevalence

Table 1: Descriptive Statistics of Nomophobia Scores

Variable	Mean	Standard Deviation (SD)	Minimum	Maximum	Range
Nomophobia Score	113.68	18.95	53	185	132

Examination of the complete sample revealed substantial nomophobia prevalence among high school students in Madurai District. The mean nomophobia score was 113.68 (SD = 18.95), falling solidly within the moderate nomophobia range. Scores ranged from a minimum of 53 to a maximum of 185, representing a span of 132 points and indicating considerable variability in smartphone dependency levels across students.

Table 2
Distribution of Nomophobia Severity Levels

Severity Category	Score Range	Frequency	Percentage
Absence of Nomophobia	< 60	3	0.7
Mild Nomophobia	60-99	80	19.5
Moderate Nomophobia	100-139	317	77.3
Severe Nomophobia	≥ 140	10	2.4
Total		410	100.0

These findings reveal that fewer than one percent of students showed no signs of nomophobia, while nearly eight in ten students experienced moderate levels of smartphone dependency. The combination of moderate and severe categories accounts for 79.7% of the sample, indicating that problematic smartphone dependency is the normative experience rather than an exceptional one among these adolescents.

The relatively small percentage experiencing severe nomophobia (2.4%) suggests that while moderate dependency is widespread, progression to the most extreme levels remains less common. This distribution pattern has important implications for intervention planning, suggesting that universal preventive approaches targeting all students may be appropriate given the high overall prevalence, while also indicating need for more intensive support for the small subset experiencing severe symptoms.

7.3 Gender-Based Analysis

Descriptive Statistics by Gender

Comparison of nomophobia scores between male and female students revealed important differences. Female students demonstrated higher mean nomophobia scores compared to their male counterparts, though substantial overlap in the distributions suggested considerable individual variability within each group.

Table 3
Nomophobia Scores by Gender

Gender	N	Mean	SD	Minimum	Maximum	Range
Male	170	110.09	20.64	53	146	93
Female	240	115.32	17.70	88	185	97
Total	410	113.68	18.95	53	185	132

Female students' mean score of 115.32 placed them more firmly in the moderate nomophobia range, while males' mean of 110.09 fell at the lower boundary of this category. The 5.23-point difference in means represents approximately 0.28 standard deviations, suggesting a modest but meaningful difference.

Examination of the score ranges revealed that the maximum nomophobia level observed was substantially higher among females (185) than males (146), a difference of 39 points. This suggests that the most extreme cases of smartphone dependency occurred among female students. Conversely, the minimum score was lower among males (53) than females (88), indicating that the least nomophobia students in the sample were male.

The standard deviations showed slightly greater variability among male students (SD = 20.64) compared to females (SD = 17.70), suggesting somewhat more heterogeneous smartphone dependency levels among boys. However, both groups exhibited substantial individual differences, with scores spanning wide ranges within each gender.

7.4 Independent Samples t-test Results

An independent samples t-test was conducted to determine whether the observed mean difference between male and female students was statistically significant.

Table 4

Independent Samples t-Test: Gender Comparison

Variable	Male	Female	t	df	p	Cohen's d
	M (SD)	M (SD)				
Nomophobia Score	110.09 (20.64)	115.32 (17.70)	-2.78	408	.006**	0.27

Note. **p < 0.01

This statistically significant result ($p < 0.01$) indicates that the probability of observing a gender difference of this magnitude by chance alone, if no true population difference existed, is less than 1 in 100. We can therefore reject the null hypothesis (H_{01}) that there is no difference in nomophobia between genders.

The effect size, calculated using Cohen's d, was $d = 0.27$. This falls in the small-to-medium range, indicating that while the difference is real and statistically reliable, it is modest in magnitude. The practical interpretation is that nomophobia levels differ between genders, but gender alone accounts for a relatively small portion of the variance in nomophobia scores.

7.5 Residential Area Analysis

Descriptive Statistics by Residential Area

Comparison of rural and urban students revealed differences in nomophobia levels, though these were more modest than gender differences.

Table 5

Nomophobia Scores by Residential Area

Residential Area	N	Mean	SD	Minimum	Maximum	Range
Rural	141	112.51	19.86	53	140	87
Urban	269	114.49	18.49	53	185	132
Total	410	113.68	18.95	53	185	132

Urban students exhibited a mean nomophobia score of 114.49 compared to 112.51 for rural students, a difference of 1.98 points. Both groups fell comfortably within the moderate nomophobia range, and the difference represents only approximately 0.10 standard deviations.

The maximum score was notably higher among urban students (185) than rural students (140), suggesting that the most extreme nomophobia cases occurred in urban settings. However, the minimum scores were identical (53), indicating that both contexts included students with very low nomophobia levels.

Variability was similar between the two groups, with rural students showing slightly higher standard deviation (19.86) than urban students (18.49). This suggests comparable heterogeneity in smartphone dependency within each residential context.

7.6 Independent Samples t-test Results

An independent samples t-test assessed whether the rural-urban difference in mean nomophobia scores was statistically significant.

Table 6
Independent Samples t-Test: Residential Area Comparison

Variable	Rural	Urban	t	df	p	Cohen's d
	M (SD)	M (SD)				
Nomophobia Score	112.51 (19.86)	114.49 (18.49)	-2.05	408	.041*	0.11

Note. * $p < 0.05$

This result indicates statistical significance at the conventional $p < 0.05$ level, though the p-value (0.041) is relatively close to the threshold. We can reject the null hypothesis (H_{02}) that residential area is unrelated to nomophobia.

However, the effect size was quite small: $d = 0.11$. This indicates that while the difference is statistically reliable, it is very modest in practical terms. Residential area accounts for only a tiny fraction of the variance in nomophobia scores. The statistical significance likely reflects the large sample size, which provides power to detect even small effects, rather than a particularly strong or practically important relationship.

7.7 Correlation Analysis

To complement the group comparison analyses, correlation coefficients were calculated to examine the strength and direction of relationships among variables. Correlational analysis provides a different perspective from t-tests, assessing linear relationships on a continuous scale rather than simply comparing group means.

7.7.1 Correlation Between Gender and Nomophobia

The point-biserial correlation between gender and nomophobia scores was calculated: $r = 0.137$, $p = 0.006$.

This positive correlation indicates that higher gender codes (female) are associated with higher nomophobia scores. The correlation is statistically significant ($p < 0.01$), consistent with the t-test results showing females scoring higher than males.

However, the correlation coefficient of 0.137 is quite modest. Squaring this value ($r^2 = 0.019$) indicates that gender accounts for approximately 1.9% of the variance in nomophobia scores. This means that 98.1% of the variability in nomophobia is attributable to factors other than gender. While the relationship is real and reliable, gender is clearly not a strong predictor of nomophobia in isolation.

This finding allowing rejection of the null hypothesis (H_{03}). However, the weakness of the correlation suggests that gender's influence, while statistically detectable, is limited in magnitude.

7.7.2 Correlation Between Residential Area and Nomophobia

The point-biserial correlation between residential area and nomophobia scores yielded: $r = 0.101$, $p = 0.041$.

This positive correlation indicates that urban residence (higher code) is associated with higher nomophobia scores. The relationship is statistically significant at $p < 0.05$, consistent with the t-test showing urban students scoring higher than rural students.

The correlation coefficient of 0.101 is even weaker than the gender correlation. The squared correlation ($r^2 = 0.010$) indicates that residential area accounts for merely 1.0% of variance in nomophobia scores, leaving 99.0% unexplained by this variable alone.

This result allowing rejection of the null hypothesis (H_{04}) that there is no significant positive correlation exists between residential area and nomophobia. However, the very weak correlation indicates that residential area, while statistically related to nomophobia, has minimal practical predictive value when considered in isolation.

7.7.3 Intercorrelations Among Demographic Variables

To examine whether demographic variables were independent of each other or showed associations that might confound interpretations, correlations among the demographic variables themselves were calculated.

Table 7
Intercorrelations Among Variables

Variables	Correlation (r)	p-value
Gender × Residential Area	0.085	.089
Gender × Nomophobia	0.137	.006**
Residential Area × Nomophobia	0.101	.041*

Note. * $p < 0.05$, ** $p < 0.01$

The correlation between gender and residential area was weak ($r = 0.085$) and did not reach statistical significance ($p = 0.089$). This indicates that gender and residential area are essentially independent in this sample knowing a student's gender provides essentially no information about whether they are rural or urban, and vice versa. This independence is methodologically advantageous, as it means that the effects of gender and residential area on nomophobia are not confounded with each other.

The correlations between each demographic variable and nomophobia were both positive and significant, though weak in magnitude. This pattern leads to acceptance of Hypothesis (H_{05}), as the demographic variables did not show significant correlations with each other, though they both correlated significantly with nomophobia.

7.8 Chi-Square Analysis

To further examine relationships between categorical demographic variables, chi-square tests of independence were conducted.

Table 8
Cross-Tabulation of Gender by Residential Area

Gender	Rural	Urban	Total
	n (%)	n (%)	n (%)
Male	59 (34.7)	111 (65.3)	170 (100.0)
Female	82 (34.2)	158 (65.8)	240 (100.0)
Total	141 (34.4)	269 (65.6)	410 (100.0)

Note. $\chi^2 (1) = 0.013$, $p = .908$

Since the p-value ($p = .908$) is significantly greater than the standard alpha level of .05, it fails to reject the null hypothesis (H_{06}). This indicates that there is no statistically significant association between gender and residential area.

7.8.1 Combined Analysis: Gender and Residential Area Interactions

To explore whether the effects of gender and residential area on nomophobia operate independently or interact in complex ways, mean nomophobia scores were calculated for the four combinations of gender and residential area.

Table 9
Mean Nomophobia Scores by Gender and Residential Area

Category	N	Mean	SD
Male - Rural	59	108.17	21.65
Male - Urban	111	111.08	20.10
Female - Rural	82	115.65	17.86
Female - Urban	158	115.17	17.65

This breakdown reveals several interesting patterns. Among male students, urban residence was associated with higher nomophobia (111.08) compared to rural males (108.17), a difference of 2.91 points. However, among female students, the pattern reversed slightly, with rural females showing marginally higher scores (115.65) than urban females (115.17), though this difference of only 0.48 points is trivial and likely reflects sampling variability.

The largest difference in the table appears between rural males (108.17) and rural females (115.65), representing a gap of 7.48 points substantially larger than the overall gender difference of 5.23 points. In urban settings, the gender gap was smaller at 4.09 points, though still meaningful. It clearly showed that regardless of residential area, females show higher nomophobia than males. Similarly, the general pattern (with the exception of the trivial female rural-urban difference) suggests urban students score higher than rural students. These main effects appear more consistent and robust than any interaction patterns.

8. Findings and Discussion

8.1 Overall Prevalence: This study reveals alarming nomophobia levels among high school students in Madurai District, with 79.7% experiencing moderate to severe smartphone dependency (mean score: 113.68). Moderate nomophobia affected 77.3% of students, while severe cases comprised 2.4%. This widespread prevalence indicates nomophobia has become normative rather than isolated, consistent with research from other Indian urban contexts (56-73% among college students) but extends findings to younger adolescents in a medium-sized city.

8.2 Gender Differences: Female students demonstrated significantly higher nomophobia than males ($p = 0.006$, Cohen's $d = 0.27$). Strikingly, 90% of severe cases were female despite females comprising only 58.5% of the sample. This gender disparity likely reflects usage patterns emphasizing interpersonal communication and social networking, where smartphones function as primary relationship-maintenance tools rather than entertainment devices. However, the modest effect size indicates substantial overlap between genders.

8.3 Residential Context: Urban students showed significantly higher nomophobia than rural students ($p = 0.041$, Cohen's $d = 0.11$). All ten severe cases occurred among urban students, while rural students showed zero severe cases despite comprising 34.4% of the sample. Urban environments offer superior telecommunications infrastructure, earlier technology exposure, and daily challenges requiring smartphone solutions. Rural protective factors may include stronger community bonds, in-person interaction opportunities, and outdoor recreational access.

Gender and residential area were statistically independent ($r = 0.085$, $p = 0.089$), representing distinct pathways rather than confounded variables. However, both factors explained only small

variance portions (gender 1.9%, residential area 1.0%), indicating most individual differences arise from unmeasured personal, family, peer, and situational factors.

9. Recommendations

9.1 For Schools:

- Implement comprehensive digital wellness policies with phone-free zones during instruction and mealtimes, avoiding complete bans that increase anxiety.
- Incorporate digital literacy curricula teaching self-regulation strategies and critical examination of attention-capture app design.
- Provide teacher professional development on recognizing problematic technology use and facilitating constructive discussions.

9.2 For Parents:

- Establish family media plans with mutually agreed-upon rules applying to all members.
- Create phone-free family times and bedroom policies keeping devices from sleeping areas.
- Foster non-digital satisfaction sources through family activities and in-person social facilitation.

9.3 For Mental Health Professionals:

- Routinely assess smartphone dependency using validated instruments in adolescent evaluations.
- Employ cognitive-behavioural interventions adapted for nomophobia, including challenging irrational connectivity beliefs and developing alternative coping strategies.
- Consider group intervention formats leveraging peer support and normalizing shared experiences.
- Recognize elevated risk among female and urban students while acknowledging individual variability.

9.4 For Policymakers:

- Mandate age-appropriate digital literacy education in core curricula standards.
- Invest in school-based mental health resources with adequate counsellor-to-student ratios.
- Support intervention research evaluating different approaches to addressing nomophobia.
- Implement public awareness campaigns educating communities about smartphone dependency risks.

10. For Future Research:

- Ensure institutional diversity in sampling to compare government, aided, and private schools.
- Employ longitudinal designs clarifying developmental trajectories and causal relationships.
- Collect objective academic performance data to empirically establish links with nomophobia.
- Measure additional variables including personality traits, family dynamics, peer influences, and specific usage patterns.

11. Study Limitations

The complete absence of private school students limits generalizability to Government and aided schools only. The urban-skewed sample (65.6%) may not reflect district population distribution. Cross-sectional design prevents causal inference. Despite the study title mentioning

academic performance, no actual performance data were collected an important gap. Numerous potentially relevant variables remained unmeasured.

12. Conclusion

This study highlights nomophobia has become highly prevalent among Madurai District high school students, with nearly 80% experiencing moderate to severe smartphone dependency. The widespread nature indicates this is no longer an isolated concern but a normative adolescent experience requiring system-level responses. Female students and urban students show elevated vulnerability, though both demographic factors explain only small variance portions. Addressing this challenge requires comprehensive, multi-faceted approaches involving schools, families, mental health professionals, and policymakers. Rather than treating smartphones as inherently good or bad, the goal should be supporting adolescents in developing intentional use patterns aligned with their values and developmental needs. This requires sustained collaborative efforts promoting healthy adolescent development in an increasingly digital world. Additional longitudinal research, intervention studies, and investigations with institutional diversity are essential for understanding and effectively addressing this prevalent phenomenon.

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FUTURE-READY SKILLS: CRITICAL THINKING AND CREATIVITY IN HIGHER EDUCATION

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ABSTRACT

Higher education institutions are under growing pressure to prepare students for complicated, uncertain, and dynamic professional situations in the constantly changing global landscape of the twenty-first century. The demands of the knowledge economy cannot be met by traditional content-focused education. Rather, future-ready abilities like creativity and critical thinking have become crucial for innovation, lifelong learning, and the advancement of society. The intellectual underpinnings of critical thinking and creativity, their importance in higher education, and the pedagogical techniques needed to incorporate these abilities into curriculum are all covered in this article. It explores the challenges higher education institutions face in acquiring these abilities in greater detail and provides workable answers that align with global trends and contemporary educational reforms. The paper's conclusion highlights the significance of educators, institutions, and policy frameworks in generating graduates who are equipped to address real-world challenges.

Keywords: Critical thinking, creativity, higher education

1. INTRODUCTION

Rapid technological development, globalization, and unparalleled social and economic transformation are the hallmarks of the twenty-first century. The nature of work and education has been redefined by automation, artificial intelligence, and digital transformation. Higher education is now expected to develop students who can think critically, adapt creatively, and solve complex problems rather than just impart knowledge. In order to succeed in the modern workforce, employers and legislators are placing a greater emphasis on abilities like critical thinking, creativity, teamwork, and flexibility.

The idea of future-ready skills revolves around critical thinking and creativity in particular. These skills give students the ability to evaluate data, challenge presumptions, come up with original ideas, and use their knowledge in unfamiliar contexts. Higher education institutions are essential for developing these abilities because they are important venues for professional preparation and intellectual growth. However, opportunities for higher-order thinking and creative expression are frequently restricted by conventional lecture-based teaching methods and examination-oriented assessment systems.

The purpose of the article is to discuss the value of critical thinking and creativity in higher education as well as methods for incorporating these abilities into instruction, learning, and evaluation procedures. The study emphasizes the necessity of a paradigm shift toward learner-centered and skill-oriented education by examining theoretical stances and practical methods.

2. CONCEPTUAL UNDERSTANDING OF FUTURE-READY SKILLS

2.1 Future-Ready Skills

"Future-ready skills" are a set of transferable competencies that enable people to thrive in changing social, economic, and professional contexts. These skills include disciplinary knowledge as well as cognitive, interpersonal, and intrapersonal abilities. Future-ready skills include critical thinking, creativity, communication, teamwork, digital literacy, and adaptability, according to global education frameworks.

In order to guarantee graduates' employability and societal relevance, higher education institutions are under increasing pressure to match their curricula with these competencies. Critical thinking and creativity are fundamental among these abilities since they facilitate innovation, problem-solving, and well-informed decision-making.

2.2 Critical Thinking

The ability to logically and methodically analyze, assess, and synthesize information is a common definition of critical thinking. It entails challenging presumptions, evaluating the evidence, identifying biases, and coming to logical conclusions. Critical thinking in higher education allows students to apply theoretical knowledge to real-world situations, engage deeply with academic content, and conduct independent inquiry.

Critical thinking is a skill that can be developed through deliberate pedagogical practices rather than an innate ability. Active participation, introspection, and chances for discussion and debate are all necessary. Without these chances, students might rely more on rote memorization than on deep comprehension.

2.3 Creativity

Creativity is the capacity to generate original ideas, take into account various perspectives, and develop novel solutions. In addition to the arts, creativity is essential in all areas of higher education, including science, technology, business, and the social sciences. Creative thinking supports interdisciplinary education, entrepreneurship, and innovation. The idea that creativity is limited to a small number of people can be debunked by research showing that supportive learning environments that encourage experimentation, risk-taking, and open-ended inquiry can foster creativity.

3. IMPORTANCE OF CRITICAL THINKING AND CREATIVITY IN HIGHER EDUCATION

3.1 Enhancing Academic Learning

Critical thinking and creativity raise the standard of academic learning by promoting in-depth comprehension rather than gaining surface-level knowledge. Pupils who engage in critical and creative thinking are more adept at connecting concepts, assessing challenging issues, and developing strong arguments. These skills encourage intellectual independence and lifelong learning.

3.2 Employability and Workforce Readiness

Employers are increasingly looking for graduates who can think independently, solve problems, and innovate in uncertain situations. Critical thinking helps graduates make well-informed decisions, while creativity helps them adapt and respond to new challenges. Higher education institutions that prioritize these skills have a direct impact on employability and economic growth.

3.3 Social and Civic Engagement

Critical thinking and creativity are crucial for social responsibility and active citizenship, even beyond employability. These abilities enable students to confront injustice, engage critically with societal issues, and make innovative contributions to sustainable solutions and community development.

4. PEDAGOGICAL STRATEGIES FOR DEVELOPING FUTURE-READY SKILLS

4.1 Learner-Centred Teaching Approaches

Students are at the centre of the learning process when using learner-centered pedagogies. Students are encouraged to investigate real-world issues, work with peers, and use critical and creative thinking through methods like problem-based learning, inquiry-based learning, and project-based learning.

4.2 Active Learning and Experiential Learning

Active learning strategies that promote engagement and higher-order thinking include debates, case studies, role-playing, and simulations. Opportunities for experiential learning, such as internships, fieldwork, and service-learning, enhance creativity and problem-solving skills by combining theory and practice.

4.3 Assessment for Learning

Recall is frequently evaluated on traditional exams rather than critical or creative thinking. Students can showcase their analytical and creative skills through alternative assessment methods like research projects, presentations, reflective journals, and portfolios. In order to foster skill development, formative feedback is essential.

4.4 Role of Technology

Digital tools and platforms can promote the development of critical thinking and creativity by enabling collaborative learning, access to a range of resources, and creative modes of expression. When used properly, technology can enhance students' independence, creativity, and curiosity.

5. CHALLENGES IN PROMOTING CRITICAL THINKING AND CREATIVITY

The successful integration of critical thinking and creativity in higher education is hampered by a number of issues, despite their significance. Rigid curricula, examination-focused systems, big class sizes, inadequate faculty training, and opposition to pedagogical change are some of these. Additionally, there is frequently little opportunity for exploratory and reflective learning due to institutional emphasis on content coverage.

Systemic change, teacher professional development, and supportive legislative frameworks that place equal emphasis on skill development and academic success are all necessary to address these issues.

6. CONCLUSION

Higher education must go beyond traditional knowledge transfer to develop students' future-ready skills in a time of rapid change and uncertainty. For students to successfully navigate complexity, innovate responsibly, and make significant contributions to society, critical thinking and creativity are crucial skills. Higher education institutions can significantly improve graduates' readiness for the challenges of the twenty-first century by implementing learner-centred pedagogies, reconsidering assessment procedures, and creating supportive learning environments. In an increasingly globalized world, developing these skills is essential to higher education's mission.

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TECHNOSTRESS OF HIGHER SECONDARY TEACHERS: AGE GROUP WISE ANALYSIS

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ABSTRACT

According to Muddanagousa Patil (2016), stress is a natural aspect of modern living and is expected to rise as life becomes more complex. For teachers, technostress—which results from the unanticipated spread of technology—presents a serious obstacle. Increased workloads are a result of technology's unchecked growth and its detrimental effects on almost half of the population. Relying just on individual efforts is insufficient for employees to adapt to technology in today's world of rapid change. The objective of the study was to explore the technostress of higher secondary teachers with regard to age group. The present study was conducted on 10 schools of Tenkasi District of Tamilnadu by using descriptive survey method. The researcher had taken 300 secondary school teachers as a sample on the basis of simple random sampling. The researcher had used only one tool i.e., Technostress Scale (Tarafdar et al., 2007) to collect data for the study. The study revealed that, the higher secondary teachers who are in the age group of 36-50 have greater technostress than the higher secondary teachers who are in the age group of 35 & below 35.

Key Words: Stress, Technostress, higher secondary teachers

INTRODUCTION

For teachers, technostress which results from the unanticipated spread of technology presents a serious obstacle. Increased workloads are a result of technology's unchecked growth and its detrimental effects on almost half of the population. Relying just on individual efforts is insufficient for employees to adapt to technology in today's world of rapid change. Organizational elements and leadership techniques that help workers adjust to this technological revolution are desperately needed. According to research, effective leadership techniques, equitable responsibility distribution, employee empowerment, and supportive leadership behaviors can all help lessen the negative effects of technostress. **Stress:** As a multifaceted concept, stress has attracted a lot of attention in psychological studies, especially in the areas of emotional and cognitive functions. To begin, it is necessary to define stress. Stress can be understood as a dynamic physiological and psychological reaction to perceived dangers or difficulties. It is distinguished by a complicated interaction between emotional reactions and cognitive assessments, underscoring the need to view this event from a cognitive perspective. A person experiences stress when they believe there is a mismatch between the demands made of them and the coping mechanisms at their disposal. This disparity triggers a cognitive assessment process that establishes whether the person views the circumstance as dangerous, difficult, or controllable. (Bilal Semih Bozdemir, 333). Ruther's And Narid (1991) – Stress is defined in psychology as an organism's need to cope, adapt, or adjust. According to Muddanagousa Patil (2016), stress is a natural aspect of modern living and is expected to rise as life becomes more complex. The idea of role, which is defined as an individual's position within a system, is inherently stressful. Microstressors include everyday inconveniences like challenging coworkers, congested transit, and academic deadlines, as well as more serious social and environmental stressors like poverty and social isolation. Strong demands are placed on us and significant efforts are needed to cope with severe negative occurrences, such as the death or loss of

a loved one, a job failure, a catastrophic sickness, or becoming the victim of a terrible crime. **Technostress:** The Oxford Dictionary (2024) defines technostress as stress or psychosomatic disorders brought on by a person's use of computer technology. Technostress is an occupational condition associated with social media, the internet, and mobile devices like as smartphones, according to the APA Dictionary of Psychology (2024). Techno-complexity, techno-invasion, techno-insecurity, techno-overload, and techno-uncertainty are some of the sub-factors that make up technostress. **Techno-complexity:** The term "techno-complexity" describes the sense of difficulty that people who are attempting to adjust to evolving technologies during their ongoing process of self-improvement perceive. **Techno-invasion:** The term "techno-invasion" refers to the blurring of social and professional boundaries as a result of widespread use of technology in the workplace and the expectation that work-related tasks be completed in social contexts. **Techno-insecurity:** This refers to the danger that growing technological complexity poses to people's personal and professional obligations, resulting in worries about adjusting to new developments and anxieties about losing one's job. **Techno-overload:** Describes the increased burden, scarce resources, and requirement to work more quickly as a result of employees' heavy reliance on technology. **Techno-uncertainty:** Caused by erratic technology advancements that make it difficult for workers to keep up with the quick speed of technological advancement.

SIGNIFICANCE OF THE STUDY

Higher secondary educators strive to get a variety of credentials, including those related to classroom management, preparation for the educational process, institutional adaptability, and professional requirements. At the same time, using technology in the classroom is one of the requirements. Teachers are particularly under pressure from the usage of technology, which is undergoing a quick transition process with digital technologies and has become nearly mandatory due to its contribution. Stress among teachers has been documented as a problem globally, especially in Tamilnadu during regular school hours. Higher secondary teachers in Tamilnadu should only complete their pupils' attendance tasks online in the current school environment. Additionally, student data is exclusively uploaded electronically to the EMIS portal. Teachers are required to use smartphones and other electronic devices for these tasks. Teachers should engage in online activities connected to school activities in addition to teaching, as this could lead to tech stress. Additionally, instructors at higher secondary levels are required to use LCD projectors in their classrooms because they are more powerful. Teachers under 40 years old and those with technological expertise are free to utilize technology for both teaching and non-teaching purposes. However, the remaining educators might be experiencing technological stress. Additionally, different age groups may experience varied levels of technostress among higher secondary teachers. In light of this, the researcher wishes to examine higher secondary teachers' technostress in relation to age groups.

REVIEW OF RELATED LITERATURE

Judith C. Mustaham (2025) discovered that during the COVID-19 epidemic, DepEd teachers experienced significant levels of technostress in terms of techno-complexity, techno-invasion, techno-overload, and techno-insecurity. The DepEd teachers' level of instruction was rather acceptable. When data were pooled by sex, there was no discernible difference in the degree of technostress among DepEd teachers in terms of Techno-Overload, Techno-Invasion, and Techno-Insecurity. But there was a big difference in terms of Techno-Complexity. When data were categorized by duration of service, there was no discernible difference in the degree of technostress among DepEd teachers in terms of techno-complexity and techno-insecurity. But there was a big difference between techno-invasion and techno-overload.

According to Nur Yuhainis Ab Wahab et al. (2022), technostress among secondary school teachers in Malaysia did not significantly differ based on geography ($t(1185)=1.962, p>0.05$) or gender ($t(1185)=1.762, p>0.05$). It may be possible to lessen the possible physical and psychological harm that technostress could create by having a better understanding of how technology affects people. According to Gagandeep Kaur & Rupinderjit Kaur (2023), there are no age-related differences in teachers' perceptions of organizational support and technostress. Nonetheless, instructors in the 20–30 age range showed higher levels of computer self-efficacy, followed by those in the 30–40, 40–50, and above 50 age groups.

OBJECTIVES OF THE STUDY

- To find out the level of technostress of higher secondary teachers with regard to age group.
- To find out whether there is any significant difference among higher secondary teachers who are in the age group of 35 & below 35, those who are in the age group of 36-50, and those who are in the age group of 51 & above 51 in their technostress.

HYPOTHESIS OF THE STUDY

- There is no significant difference among higher secondary teachers who are in the age group of 35 & below 35, those who are in the age group of 36-50, and those who are in the age group of 51 & above 51 in their technostress.

METHODOLOGY

This study uses the survey method in a descriptive-quantitative research design. Because it uses statistical tools to analyze quantitative data, it is quantitative research. A representative sample of 300 higher secondary teachers from Tenkasi District's ten higher secondary schools were chosen for the current study. The current study used stratified sampling. The investigator used the mean, standard deviation and ANOVA followed by Scheffe's test of post hoc comparison.

TOOL USED

Data were collected using validated instrument namely, The Techno stress scale having 23 items is a standardized tool (Tarafdar et al., 2007), which is evaluating five dimensions of technostress techno-overload, techno-invasion, techno-complexity, techno-insecurity, and techno-uncertainty. All items were measured on a Likert scale from 1 (never) to 5 (always). The scale showed high reliability across measurement points.

ANALYSIS OF DATA

Objective: To find out the level of technostress of higher secondary teachers with respect to age group.

Table 1.1

Level of technostress of higher secondary teachers with respect to age group

Variable	Age Group	Low		Average		High	
		N	%	N	%	N	%
Technostress	35 & below 35	20	21.3	65	69.1	9	9.6
	36-50	12	8.2	106	72.1	29	19.7
	51 & below 51	11	18.6	44	74.6	4	6.8

It is inferred from the above table that with regard to the age group of 35 & below 35, 21.3% of teachers have low level, 69.1% of them have average level and 9.6% of them have high level of technostress. With regard to in the age group of 36-50, 8.2% of them have low level, 72.1% of them have average level, and 19.7% of them have high level of technostress. With regard to the age group

of 51 & above 51, 18.6% of them have low level, 74.6% of them have average level, and 6.8% of them have high level of technostress.

Hypothesis: *There is no significant difference among higher secondary teachers who are in the age group of 35 & below 35, those who are in the age group of 36-50, and those who are in the age group of 51 & above 51 in their technostress.*

Table 1.2

F-test showing the significance difference in the technostress of higher secondary teachers with respect to age group

Variable	Source of Variance	Sum of squares	df	Mean Square	Calculated F-value	Tabulated F-value	Remarks
Technostress	Between groups	631.074	2	315.537	3.324	3.04	S
	Within groups	28189.7631	297	94.915			

S-Significant difference at 5% level of significance

It is inferred from the above table that the calculated 'F' value (3.324) is greater than the table value (3.04) for df (2, 297) at 5% level of significance. Hence the null hypothesis is rejected. It shows that there is significant difference among higher secondary teachers who are in the age group of 35 & below 35, those who are in the age group of 36-50, and those who are in the age group of 51 & above 51 in their technostress.

Table 1.3

Scheffe test showing the mean difference in the technostress of higher secondary teachers with respect to type of school

35 & Below 35	36-50	51 & Above 51	Result
115.56	117.29	-	*
115.56	-	118.87	-
-	117.29	118.87	-

* *Significant difference at 5% level of significance*

The Scheffe test shows that there is mean difference between higher secondary teachers who are in the age group of 35 & below 35, and those who are in the age group of 36-50 in their technostress. And also it clearly shows that the higher secondary teachers who are in the age group of 36-50 have greater technostress than the higher secondary teachers who are in the age group of 35 & below 35.

FINDINGS OF THE STUDY

- 9.6% of higher secondary teachers who are in the age group of 35 & below 35 have high level of technostress. But, 8.2% of them have low level, 72.1% of them have average level, and 19.7% of higher secondary teachers who are in the age group of 36-50 have high level of technostress. And, also, 18.6% of them have low level, 74.6% of them have average level, and 6.8% of higher secondary teachers who are in the age group of 51 & above 51 have high level of technostress.
- There is significant difference among higher secondary teachers who are in the age group of 35 & below 35, those who are in the age group of 36-50, and those who are in the age group of 51 & above 51 in their technostress.

- The higher secondary teachers who are in the age group of 36-50 have greater technostress than the higher secondary teachers who are in the age group of 35 & below 35.

EDUCATIONAL IMPLICATION

The current study has particular educational ramifications. The results of this study can be used as a source of knowledge and direction to lessen higher secondary teachers' technostress. This study's conclusions and research findings point to a few implications: The present study revealed that the higher secondary teachers who are in the age group of 36-50 have greater technostress than the higher secondary teachers who are in the age group of 35 & below 35. In order to satisfy the demands and overcome the difficulties of every school's operation, it is recommended that higher secondary teachers between the ages of 36 - 50 receive specialized courses on improving their digital abilities and updating their computer expertise. They can lack confidence in their own digital skills or feel overpowered by the speed at which technology is evolving. Schools should place a high priority on continuing professional development and establish a welcoming environment where educators may exchange best practices and gain knowledge from one another in order to overcome this obstacle. Teachers' sense of ownership and dedication to the project can also be increased by including them in the decision-making process regarding technology integration.

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ANALYSIS OF OCCUPATIONAL STRESS AMONG SECONDARY SCHOOL TEACHERS

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ABSTRACT

Today, in the changing educational context; teachers are experiencing expanded duties and expectations in a variety in educational settings. With the continuous increase of these responsibilities of the teachers, they become over-burdened and work under stress. Occupational stress has become increasingly common in teaching profession largely because of increased occupational complexities. A general knowledge of this behaviour in higher secondary school teachers increases the understanding of them and enables them to overcome the problem of occupational stress. In the present study, an attempt has been made to measure the occupational stress of secondary school teachers. The objectives of the study were, 1) To study occupational stress of secondary school teachers based on gender variation and 2) To study the significant difference in occupational stress of secondary school teachers based on the location of the school. A sample pool of 253 secondary school teachers from various schools was randomly taken. Normative survey method was adopted. The findings were, 1) The male and female higher secondary teachers does not show significant difference in the study of occupational stress based on gender variation. 2) The secondary school teachers working in rural and urban locality does not show significant difference in the study of occupational stress based on the location of the school.

INTRODUCTION

Defining stress is a very complex matter, which is the subject of different analyses and continuous debate among experts. Beyond the details of this debate, a general consensus can be reached about a definition of stress, which is centred on the idea of a perceived imbalance in the interference between an individual, the environment and other individuals. When people are faced with demands from others or demands from the physical or psycho-social environment to which they feel unable to adequately respond, a reaction of the organism is activated to cope with the situation. The nature of this response depends upon a combination of different elements, including the extent of the demand, the personal characteristics and coping sources of the person, the constraints on the person in trying to cope and the support received from others. Occupational stress can be defined as the harmful physical and emotional responses that occur when the requirements of the job do not match the capabilities, resources, or needs of the worker. Job stress can lead to poor health and even injury. The concept of Occupational stress is often confused with challenge, but these concepts are not the same. Challenge energizes us psychologically and physically, and it motivates us to learn new skills and master our Occupations. When a challenge is met, we feel like relaxed adolescents and satisfied.

SIGNIFICANCE OF THE STUDY

Occupational stress has become increasingly common in teaching profession largely because of increased occupational complexities and increased economic pressure on individuals. A major source of distress among teachers is result of failure of school to meet the social needs and jobs demands of the teachers. School teachers face high amounts of stress during teaching and handling students; Classroom in developing countries remain overcrowded and teacher face intensive verbal

communications, prolonged standing, high volume of work load. Teachers are also over burdened with regular teaching work and non-teaching work as election duties, duty in census; populations counting etc. the teachers are often heard of complaining about. Because of the negative outcomes associated with occupational stress, many studies have attempted to better understand the phenomenon of occupational stress as it relates to education. The need for the study of occupational stress of teacher is not universally emphasized and is the formidable problem which teachers and educationists face in our country. The whole advancement of our civilization is based on advancement of our education and qualitative improvement of it. Teachers play a vital role in the educational process and in all round development of the students. It is well accepted fact that the quality of nation depends upon the quality of the education imparted to its students which in turn depends upon the quality of teachers. To meet the increasing needs of the students and to maximize the effectiveness of curriculum teachers need to develop and update their skills and competencies continuously. Today, in the changing educational context; teachers are experiencing expanded duties and expectations in a variety in educational settings. With the continuous increase of these responsibilities of the teachers, they become over-burdened and work under stress. The strategy for development of higher secondary education would have to take these trends in determining the future mission. A general knowledge of this behavior in higher secondary school teachers increases the understanding of individuals as well as of groups became, if furnishes one with certain principles. These principles help in recognition of the symptoms of distress and indicate the kind of behavior one may expect so that steps can be taken to deliberately shape the environment to elicit expected responses. But, in the education department such individual behavior cannot be easily identified, as individual performance cannot be quantitatively measured as precisely as in teaching field. Symptoms of stress take a long time to erupt. Once it erupts, it not only affects the individual concerned but also the co-workers through strained interpersonal relations and ultimately affects the students' education which forms the very core for the success of education department. Hence occupational stress situations and their perceived impact on higher secondary school teachers are taken up for the present study. The researcher has made an attempt to study the occupational stress among higher secondary school teachers.

STATEMENT OF THE PROBLEM

The role of the teacher in the educational process is pivotal because in the educational process, the teachers occupy the key position and the effectiveness of the educational system depends largely on teachers among which secondary school teachers play a vital role in the pedagogical aspect. Nowadays when there is a fierce competition in every walk of life, the teachers are more prone to stress because dealing with the students and ensuring their better performance for facing the emerging challenges of global world is itself a challenging job. The main purpose of this study is to analyze the occupational stress among secondary school teachers in terms of their gender and location of the school.

OPERATIONAL DEFINITIONS

OCCUPATIONAL STRESS: Occupational stress can be defined as the harmful physical and emotional response that occurs to the higher secondary school teachers, when the requirements of their job do not match with the capabilities, resources, or needs of the teacher.

SECONDARY SCHOOL TEACHERS: Secondary school teachers are those who are trained teachers teaching at secondary school level. In this study teachers teaching classes 9th and 10th are considered as secondary school teachers.

REVIEW OF RELATED RESEARCHES

Selvavinayagam and Kaviarasu (2019) conducted a research on the title, “A Study on Occupational Stress among the Teachers of the Primary Schools in Dharmapuri District.” The objectives were 1. To analyze the factors influencing occupational stress among the Primary school teachers. 2. To study the demographic and academic characteristics among the Primary school teachers of Government and Aided Schools. 3. To measure the levels of occupational stress among the Primary teachers of Government and Aided Schools. Survey method of research has been used in the study. The findings of the study were: primary school teachers as a whole are found to be highly stressed. The next finding of this study revealed that on the basis of type of school private school teachers face more stress than the government teachers this may be due to low salary and more burden of work in the private schools. The next finding of this study revealed that there is no significant difference in the level of occupational stress of male and female primary school teachers. Further, from the result it is clear that no significant difference has been found in the level of occupational stress of government male and government female primary school teachers. Similarly, private school, male and female primary school teachers have been found to differ non-significantly in the level of occupational stress. The private school male teachers have found to be significantly more stressed than their government school male teacher counterparts. Similarly, in case of private school male teachers, the private school female teachers have also found to be significantly highly stressed than their government school female counterparts.

Ansarul and Hasan (2014) conducted the research on the title “A Study of Occupational Stress of Primary School Teachers”. The objectives of the study were 1. To know the level of occupational stress among primary school teachers. 2. To compare the occupational stress of government and private primary school teachers. 3. To compare the occupational stress of male and female primary school teachers. 4. To compare the occupational stress of male and female teachers of government primary schools. 5. To compare the occupational stress of male and female teachers of private primary schools. 6. To compare the occupational stress of government and private primary school male teachers. 7. To compare the occupational stress of government and private primary school female teachers. The findings were i) the primary school teachers as a whole are found to be highly stressed. ii) The next finding of this study revealed that there is no significant difference in the level of occupational stress of male and female primary school teachers. iii) Private school, male and female primary school teachers have been found to differ non-significantly in the level of occupational stress. Present study is an empirical study and is exploratory in nature. To know the level of teachers’ occupational stress in primary school teachers of Tehsil-Laksar, Teachers’ Occupational Stress Scale developed by Dr.Sajid Jamal and Dr Abdul Raheem was administered.

Lokanadha Reddy and Anuradha (2013) conducted a research on the title, “Occupational Stress of Higher Secondary Teachers Working in Vellore District.” The objectives were •to develop a tool to assess the level of Occupational Stress of higher secondary teachers. • To find out the significant difference, if any, in the Occupational Stress of teachers working at higher secondary level due to variations in their Gender (men / women), Age (up to 35 yrs / 36-45 yrs / 46 yrs and above), Community (OC / BC / MBC, SC & ST), Marital status (married / unmarried), Educational qualification (PG with B.Ed. & M.Ed. / PG with M.Ed. & M.Phil.), Nature of the subject the teachers handling i.e. Languages (English, Tamil, Hindi, French) / Science (Physics, Chemistry, Botany, Zoology) / Mathematics and Computer Science / Commerce, Salary received (up to Rs.10,000/-, Rs.10,001-Rs 15,000/-, Rs 15,001/-Rs. 20,000/-, Rs.20,001/- and above), Type of school they are working-in (government / private), Location of school the teachers are working in (rural / urban) and, Years of experience (up to 15 yrs / 16 yrs and above). • To study how far and

to what extent the independent variables such as gender, age, community, marital status, educational qualification, nature of the subjects the teachers handling, salary they receive, type of school they are working-in, nature of school the teachers are working-in, and years of experience influence the occupational stress. Survey method was used in the study. The findings of the study revealed that, men and women teachers are significantly differ in their occupational stress. In case of type of school the teachers are working-in, the t-value (2.65) indicates that there exists a significant difference between government and private higher secondary teachers. Also, the mean scores show that the government school teachers (147.06) are more stressed than the private school teachers (137.93). The variable nature of subjects the teachers teaching implies that there exists a significant difference in the occupational stress of teachers handling different subjects. Also, the mean values reflect that the teachers handling mathematics (154.39) are showing higher stress followed by the teachers teaching commerce (144.44), science (138.40) and languages (136.60) respectively. The teachers also significantly differ in their stress due to variations in the salary they receive. The variable-marital status (t-value: 1.18) of teachers is not influencing the occupational stress of teachers. The variation in the educational qualification of higher secondary teachers is not showing any influence on their occupational stress. The occupational stress of teachers due to variations in the location of the school does not differ significantly as its t value (0.70) is not significant at 0.05 level. With respect to years of experience, the t-value (0.09) indicates its non-influence on occupational stress of higher secondary teachers. The variable age (t value: 0.68) is also not influencing the occupational stress of higher secondary teachers.

OBJECTIVES OF THE STUDY

The following objectives have been framed to conduct the study

- To study the occupational stress of secondary school teachers based on gender
- To study the occupational stress of secondary school teachers based on location of the school

HYPOTHESIS OF THE STUDY

The following null hypotheses have been set up for the study.

1. There is no significant difference in occupational stress of secondary school teachers based on gender variation.
2. There is no significant difference in occupational stress of secondary school teachers based on the location of the school.

RESEARCH METHOD

Descriptive Survey Method was used to conduct the study.

POPULATION AND SAMPLE

Higher Secondary school teachers constitute the population of the study. A sample of 253 secondary school teachers was selected by simple random sampling method.

LIMITATIONS

- ❖ The Higher Secondary school teachers of only fourteen schools were considered for the research.
- ❖ The samples were collected only in Tamil Nadu.
- ❖ The study was delimited to in terms of area, objectives, hypotheses, design, variables and samples
- ❖ The study is limited only to the Higher Secondary school teachers.
- ❖ It was also limited to urban and rural secondary school teachers only.

SCOPE OF THE RESEARCH

The purpose of teaching profession itself is for the all-round development of the students and teacher. So teachers are now in a position to understand stress related aspects. This research will help the higher secondary teachers to avoid stress and it will help them to make teaching as a noble profession.

TOOL

The tool consisted of 50 items. Out of these 34 are positive items and 16 are negative items. Each statement had five responses such as strongly agree, agree, partially agree, disagree, and strongly disagree. The tool was constructed and validated by the researcher.

STATISTICAL TECHNIQUE USED

Through SPSS Package 't' test and ANOVA test were used for descriptive analysis

DATA ANALYSIS

Hypotheses were tested one by one.

TESTING OF HYPOTHESIS 1

Hypothesis 1: There is no significant difference in occupational stress of secondary school teachers based on gender variation

Table - 1 mean score analysis of occupational stress based on gender

Variable	Sub Variable	N	Mean	S.D	"t" value	Remark
Gender	Male	72	149.778	16.08711	1.242	Not Significant
	Female	181	146.227	22.02571		

INTERPRETATION FOR TABLE – 1

The calculated value 1.242 is lesser than the table value 1.96 at 0.05 level of significance. So the hypothesis – 1 is accepted.

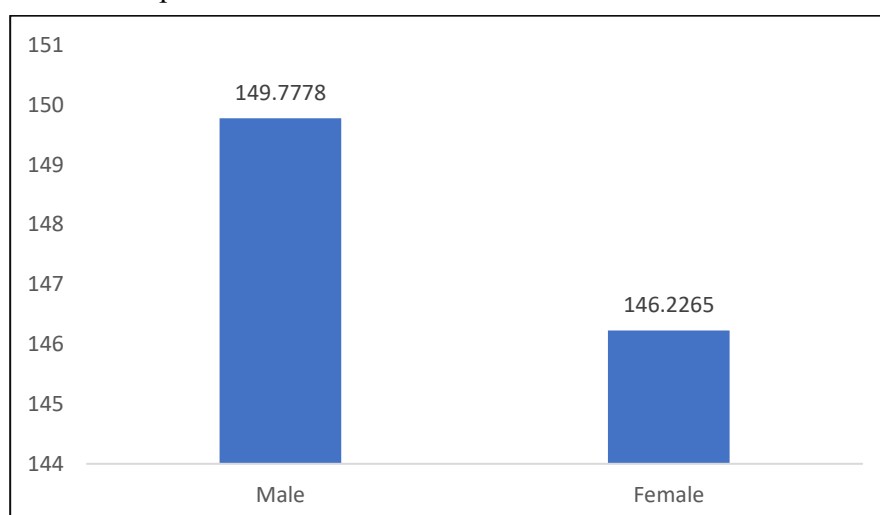


Figure-1 mean score analysis of occupational stress based on gender.

TESTING OF HYPOTHESIS 2

Hypothesis 2: There is no significant difference in occupational stress of secondary school teachers based on the location of the school.

Table - 2 mean score analysis of occupational stress based on the location of the school.

Variable	Sub Variable	N	Mean	S.D	“t” value	Remark
Locality of School	Rural School	73	144.26	19.17321	1.471	Not Significant
	Urban School	180	148.444	21.00418		

INTERPRETATION FOR TABLE – 2

The calculated value -1.471 is lesser than the table value 1.96 at 0.05 level of significance. So the hypothesis 2 is accepted.

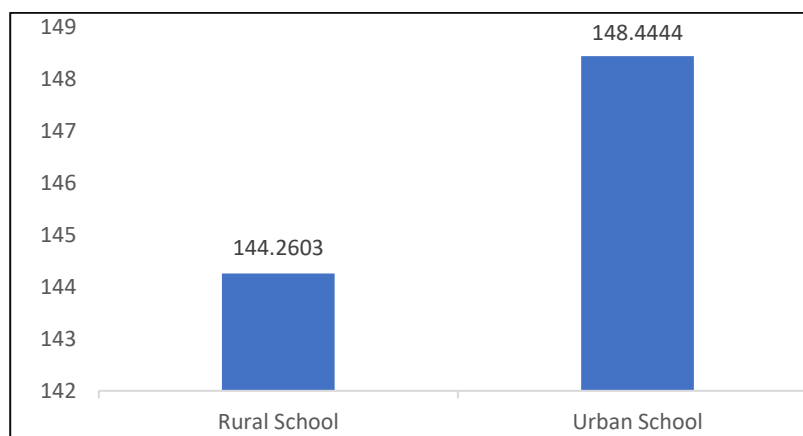


Figure-2 Mean score analysis of occupational stress of secondary school teachers based on the location of the school

FINDINGS

- The male and female higher secondary teachers do not show significant difference in the study of occupational stress based on gender variation.
- The secondary school teachers working in rural and urban locality do not show significant difference in the study of occupational stress based on the location of the school.

CONCLUSIONS

While comparing the mean scores of sub variables of gender, male teachers have high level of occupational stress than male teachers. While comparing the mean score of sub variables of locality, teachers working in urban locality have high occupational stress compared to teachers working in rural locality.

DISCUSSION

The findings of the present study were subjected to a discussion with the previous researches.

Selvavinayagam. K. and Kaviarasu.V. (2019), conducted a research on the title, “A Study on Occupational Stress among the Teachers of the Primary Schools in Dharmapuri District.” The finding of this study revealed that there is no significant difference in the level of occupational stress of male and female primary school teachers.

Ansarul Hasan, (2014) conducted the research on the title “A Study of Occupational Stress of Primary School Teachers”. The findings of this study revealed that there is no significant difference in the level of occupational stress of male and female primary school teachers.

Lokanadha Reddy. G. and Vijaya Anuradha.R. (2013), conducted a research on the title, “Occupational Stress of Higher Secondary Teachers Working in Vellore District.” The study found that, men and women teachers are significantly differ in their occupational stress. Location of the school does not differ significantly.

Shyam Swaroop Sharma (2008) conducted a research on the title a study of level of occupational stress among secondary school teachers of Karauli District of Rajasthan State. The findings of the study were No sex difference was found in level of occupational stress.

All the above researchers have found that there was no difference between male and female participants of the research. The present study also shows that there is no significant difference in occupational stress based on gender.

As per the study of Lokanadha Reddy. G. and VijayaAnuradha.R., (2013), it was revealed that, location of the school does not differ significantly. In the present study also, it was found that, there is no significant difference in the study of occupational stress based on the location of the school.

EDUCATIONAL IMPLICATIONS OF THE PAPER

The findings of the study can have the following educational implications for the qualitative improvement of the secondary school education.

- There is an urgent need to recognize that the government and the community both have big responsibility to create healthy conditions for work, motivate and inspire teachers to engage in constructive and creative activities irrespective of gender and locality.
- The findings also suggests us that there is a need for periodical stress management programmers for reducing the levels of stress among the teachers which in turn will improve their functional skills and lead to effective teaching irrespective of their locality of school, gender etc.
- As there is no significant difference in occupational stress based on gender and locality, counseling can be given to reduce their stress level without any gender bias.
- This paper has tried to give an initiative to the secondary school teachers to think about the necessity to reduce occupational stress.

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DEVELOPMENT OF EDUCATION IN INDIA FROM NPE 1986 TO NEP 2020

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Abstract

Education in ancient India was conceived not merely as the acquisition of knowledge or preparation for worldly life, but as a means for the complete realization and liberation of the self. This philosophical foundation is reflected in Shankaracharya's Advaita philosophy, Vivekananda's concept of Man-making education, Aurobindo's Integral education, and Mahatma Gandhi's Basic education. In post-Independence India, the National Policy on Education (NPE) 1968 sought to promote national development through compulsory education for children up to the age of fourteen. However, despite notable achievements, the absence of a comprehensive implementation strategy led to the formulation of the National Policy on Education 1986.

Over the decades, educational policies in India have largely focused on access and equity, often at the cost of educational quality. A significant development following NPE 1986/92 was the establishment of constitutional and legal mechanisms to achieve Universal Elementary Education (UEE), including the Right to Education Act (2009). The policy also emphasized Early Childhood Care and Education (ECCE), later reinforced by the National Curriculum Framework (2005), which advocated two years of preschool education.

The National Education Policy 2020, the first education policy of the 21st century, aims to comprehensively transform India's education system by addressing structural, philosophical, pedagogical, and technological dimensions. This paper examines the evolution of education policies in India from NPE 1986 to NEP 2020, highlighting key shifts, challenges, opportunities, and future directions in the Indian education system.

Keywords: *National Curriculum Framework (NCF), Right to Education (RTE), Early Childhood Care and Education (ECCE)*

Introduction

In ancient India, the purpose of education extended beyond the acquisition of knowledge or preparation for life after schooling; it aimed at the complete realization and liberation of the self. This vision is encapsulated in the Upanishadic aphorism "*Sa Vidya Ya Vimuktaye*"—education is that which liberates. Such a philosophy is evident in Shankaracharya's Advaita Vedanta, Vivekananda's Man-making education, Aurobindo's Integral education, and Gandhi's concept of Basic education. Mahatma Gandhi laid the foundation of indigenous education through the Wardha Scheme of Basic Education in 1937.

In post-Independence India, the National Policy on Education (NPE) 1968 was adopted to promote national progress, emphasizing compulsory education for children up to fourteen years of age and recommending an allocation of six percent of national income to education. However, due to the lack of a detailed implementation framework, the policy necessitated revision, resulting in the formulation of the National Policy on Education 1986.

A major development following NPE 1986/92 was the establishment of constitutional and legal frameworks to ensure Universal Elementary Education (UEE). The Constitution (Eighty-Sixth Amendment) Act, 2002 introduced Article 21A, making education a Fundamental Right through

the Right of Children to Free and Compulsory Education Act, 2009, which came into force in April 2010 (NEP, 2020).

National Policy on Education 1986

The National Policy on Education 1986 views education as fundamental to the holistic development of individuals—material, intellectual, and spiritual. It emphasizes the cultivation of scientific temper, independence of thought, and sensitivity, thereby strengthening the constitutional values of socialism, secularism, and democracy. Education is regarded as a critical investment in national development, human resource creation, research, and self-reliance (NPE, 1986).

The policy laid strong emphasis on equality of access as well as equality of educational outcomes. Its primary objectives were universalization of elementary education, reduction of gender and social disparities, strengthening of teacher education, and promotion of adult literacy. The policy emphasized a centralized and uniform system, aiming to bring basic education to all sections of society through initiatives such as Operation Blackboard and the establishment of Navodaya Vidyalaya.

It introduced a common educational structure of 10+2+3 and a common core curriculum across the country. A significant contribution of NPE 1986 was the recognition of Early Childhood Education, expanded to Early Childhood Care and Education (ECCE), incorporating health, nutrition, and early stimulation, particularly for children from disadvantaged backgrounds and as a support service for working women.

Programme of Action 1992

To assess the effectiveness of NPE 1986, the Acharya Ramamurthy Committee was constituted in 1990. Subsequently, the Central Advisory Board of Education (CABE) formed another committee under the chairmanship of Shri Janardhan Reddy to review and modify the policy recommendations. The resulting Programme of Action (PoA) 1992 marked a significant milestone as it provided a concrete implementation framework for the policy.

The PoA recognized early childhood (from conception to six years) as a critical stage for physical and cognitive development and positioned ECCE as a key component of human resource development and UEE. The policy emphasized quality education by addressing social, economic, regional, and gender disparities, promoting national integration, shared citizenship, value education, and overall improvement in educational standards.

National Curriculum Framework 2005

Based on policy directives, the National Council of Educational Research and Training (NCERT) developed the National Curriculum Framework (NCF) 2005 to guide curriculum design, syllabus development, and textbook preparation. NCF 2005 advocated child-centered, inclusive, and life-oriented education, reduction of academic stress, and promotion of critical thinking and skill development.

The framework emphasized two years of preschool education and recognized ECCE as essential for holistic child development, school readiness, and support for women and girls. It promoted play-based and developmentally appropriate pedagogical practices. The National Plan of Action for Children (2005) further reinforced the universalization of ECCE, focusing on integrated care and development for children aged 0–6 years.

Right to Education Act 2010

The Right of Children to Free and Compulsory Education Act was passed in 2009 and implemented in April 2010, guaranteeing free and compulsory elementary education to all children aged 6–14 years. It is the first legislation globally that places legal responsibility on the government

to ensure enrolment, attendance, and completion of elementary education. The Act aims to provide accessible, affordable, and quality education, enabling children to develop skills, values, and attitudes necessary for responsible citizenship.

National Education Policy 2020

The National Education Policy 2020 marks a paradigm shift by addressing long-standing issues of quality, relevance, and equity. This policy represents the Indian education system that moves away from rote-based, rigid, and exam-centric learning toward a flexible, multidisciplinary, learner-centred, and skill-oriented framework. It aims to align education with the goals of sustainable development (SDG 4), ensuring inclusive, equitable, and quality education while drawing upon India's rich cultural heritage and value systems.

NEP 2020 envisions transforming India into an equitable, vibrant knowledge society by fostering creativity, critical thinking, ethical values, and lifelong learning. The policy emphasizes holistic development, integrating cognitive, social, emotional, and ethical capacities. It advocates flexibility through multiple entry and exits options, multidisciplinary education, extensive use of technology, and strong research ecosystems through the establishment of the National Research Foundation (NRF).

The policy outlines guiding principles such as foundational literacy and numeracy, multilingualism, formative assessment, inclusivity, teacher empowerment, light but effective regulation, and substantial public investment in education. These reforms are critical for India's aspiration to emerge as a global knowledge economy.

Conclusion

The National Education Policy (NEP) 2020 marks a paradigm shift in India's educational landscape, replacing the three-decade-old policy of 1986. It aims to create an inclusive, multidisciplinary, flexible, and future-ready education system that equips learners with critical competencies for a 21st-century knowledge economy. The policy's reforms span, school, higher, vocational, and teacher education, and establish a foundation for lifelong learning aligning with the goals and objectives of Viksit Bharat 2047. It also proposes Viksit Bharat Shiksha Adhishthan Bill, 2025 to achieve excellence in Higher Education.

In essence, NEP 2020 represents a decolonized and culturally grounded educational framework. Unlike earlier policies that primarily adapted Western models to Indian conditions, NEP 2020 re-centers education in India's own civilizational wisdom while embracing modern scientific and technological advancements. This synthesis of tradition and modernity positions NEP 2020 as a transformative policy rooted in the Indian Knowledge System and responsive to contemporary global challenges.

COGNITIVE AND ACADEMIC OUTCOMES OF HARMONIC LEARNING USING BINAURAL BEATS

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Abstract

The potential use of binaural beats, a sound illusion created by presenting each ear with two slightly different frequencies, in educational contexts has been explored. This essay examines the importance of binaural beats in enhancing cognitive abilities, including attention, memory, and emotional well-being, as well as their connection to improved academic achievement. The analysis of the reviewed literature clarifies the psychological advantages, practical consequences for educators, and mechanics underlying the operation of binaural beats. Its findings may prove that educational practice can improve when binaural beats are applied.

Keywords: Binaural beats, Education, Cognitive function, academic outcomes

Introduction

Teachers are looking for different ways to enhance students' learning and engagement in this competitive learning environment. Binaural beats are one of these methods. It's when two tones of different frequencies are played into each ear to generate a third tone that is perceived as the difference between those two tones (Hirsch & Anderson, 2020). This is fascinating because it is said to affect the brainwave pattern and cognitive functions; hence, it can become a persuasive domain in educational psychology.

This paper delves into the role of binaural beats in education by looking at their effects on cognition and academic performance. It also considers the psychological advantages of listening to binaural beats and finally offers some guidelines for teachers on how to integrate this auditory technique into their teaching practices.

Mechanisms of Binaural Beats

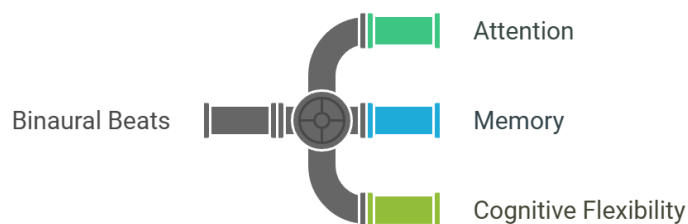
Binaural beats are believed to influence brainwave activity by entraining neural oscillations to specific frequency ranges (Oster, 1973). The brain responds to auditory stimuli by synchronising its electrical activity with the frequency of the binaural beat. This synchronization can produce various brainwave states:

- ✚ Delta waves (0.5-4 Hz): Associated with deep sleep and restorative processes.
- ✚ Theta waves (4-8 Hz): Linked to relaxation, creativity, and light sleep.
- ✚ Alpha waves (8-12 Hz): Related to relaxed alertness and calmness.
- ✚ Beta waves (12-30 Hz): Associated with active thinking and focus.
- ✚ Gamma waves (30 Hz and above): Linked to high-level cognitive functioning and information processing.

Studies show that certain frequency bands might strengthen a particular cognitive function. For example, gamma waves are related to the enhancement of memory recall and cognitive flexibility (Colzato et al., 2017).

Impact on Cognitive Functions

Exploring Cognitive Benefits of Binaural Beats



Attention

When binaural beats are present, attentiveness is the most crucial cognitive function. Binaural beat exposure improves attentional focus when completing activities requiring sustained concentration. For example, Lane et al. (1998) discovered that exposed individuals performed significantly differently from unexposed persons on attention-related activities.

Memory

Enhanced memory is another leading benefit attributed to binaural beats. Binaural rhythm exposure has been shown to help with both short-term and long-term memory recall. Theta frequency binaural beats improved participants' performance in a memory recall test as compared to those who were not exposed to the beats, according to a study by Gunter and Bodner (2008). This suggests that binaural beats may create the perfect mental environment for knowledge encoding and retrieval.

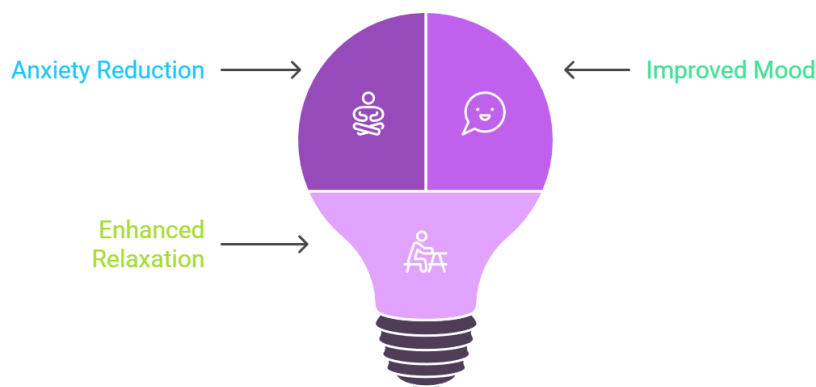
Cognitive Flexibility

Cognitive Flexibility refers to the ability to change one's mind in response to either situational or information changes. Recent evidence shows that binaural beats can increase cognitive flexibility in an individual through making the individual feel relaxed and yet alert, which is good for creative problem-solving. In contrast to people who were not subjected to audio stimulation, Fischer & Hommel (2012) discovered that people who had been exposed to gamma frequency binaural beats exhibited more cognitive flexibility during dual-task situations.

Psychological Benefits

Binaural beats provide several psychological advantages that can improve learning settings in addition to their cognitive benefits. Among these advantages are:

Psychological Benefits of Binaural Beats



Anxiety Reduction

Anxiety is not only detrimental to academic performance but also hampers students in almost all aspects of their lives. Evidence shows that binaural beats can lower anxiety levels and create a learning environment conducive to studying. According to a study by Bradt & Dileo (2014), participants who were exposed to binaural beats reported lower anxiety levels compared to participants in silence or those who listened to other forms of auditory stimulation.

Improved Mood

Additionally, binaural beats have been linked to listeners' improved mood states. A happier attitude increases motivation and improves participation in educational activities. In one study led by Chaieb et al. (2015), participants were tested for alpha-frequency binaural beats and were shown to report more positive affect than their counterparts not exposed to auditory stimulation.

Enhanced Relaxation

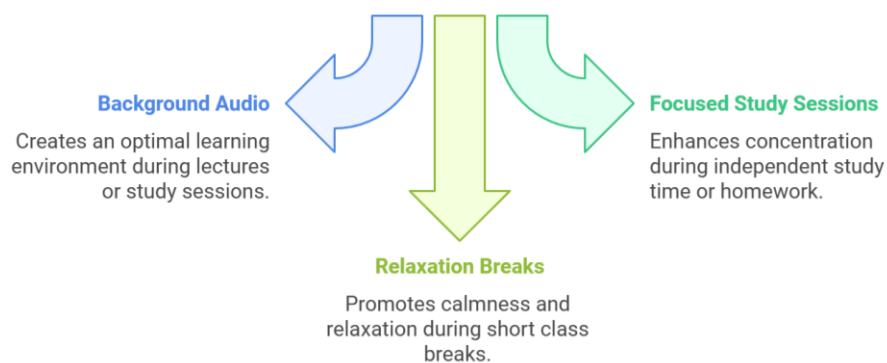
The use of binaural beats promotes relaxation, especially in learning contexts where stress is high among students. This audio input helps students study more comfortably, which improves their ability to concentrate on their academics (Hirsch & Anderson, 2020).

Applied Suggestions for Educators

Having promised empirical results on binaural beats' gains, both on cognitive potential and psychological well-being, it can be advocated for incorporation as part of teaching techniques. Here are a few realistic suggestions:

Classroom Integration

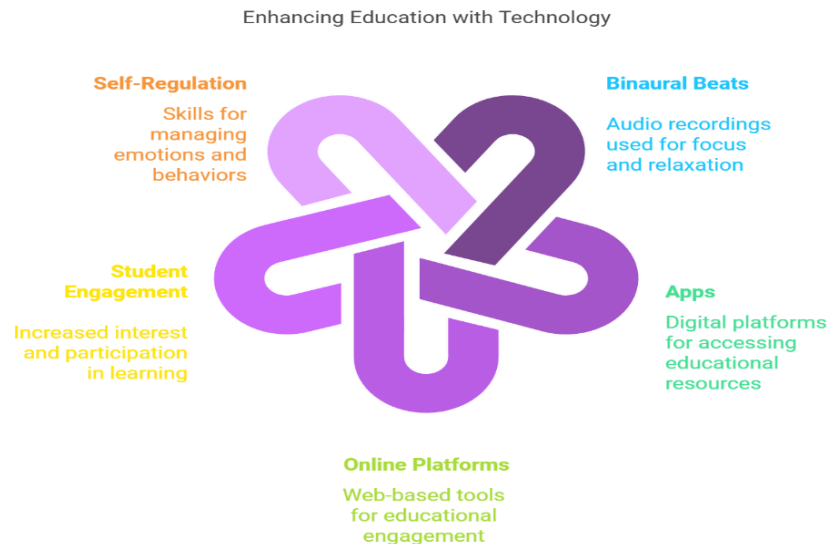
1. **Background Sound:** Used as background binaural beat audio to supplement lectures or study times.
2. **Focused Study Sessions:** Inspiring and encouraging students to use binaural beats while studying alone or doing their homework.
3. **Relaxation Breaks:** Have brief pauses in class when students may listen to relaxing binaural beats.



Technology Utilization

For example, thanks to the advancement of technology, it is very easy for educators to access a number of binaural recordings through applications or websites. One of the ways to engage students and equip them with the tools to self-regulate is by using technology in the classroom.

Things like these advancements in technology have made it so easy for educators to access a lot of binaural recordings either via an app or online. One of the ways you engage students and equip them with self-regulation strategies is by bringing technology into the classroom.



Conclusion

The contribution of binaural beats in education occurs amidst their enhancement of cognitive functions: for example, attention, as well as memory and cognitive flexibility, while acting as psychological uses like reductions in anxiety and improvement in mood. There exist innovation demands in the form of new avenues to improve student learning outcomes. This forms an exciting area of operation in further development towards a better educational environment.

Upcoming research should be aimed at the long-term effects of binaural beat exposure on academic performance in various educational settings. This may give the educator the possibility of improving engagement and success among students in a highly demanding academic world.

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ANXIETY AND ACADEMIC ACHIEVEMENT AMONG HIGHER SECONDARY SCHOOL STUDENTS

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Abstract

This study investigates the relationship between anxiety and academic achievement among higher secondary school students using a normative survey approach with a sample of 200 students from government, aided, and private schools selected through simple random sampling. Data collection employed Manju Rani Aggarwal's Anxiety Scale (reliability coefficient = 0.826) alongside academic achievement scores from school records, revealing that 65.5% of students experience moderate anxiety (low: 19.5%, high: 15.0%) and 62.5% demonstrate moderate academic achievement (low: 18.0%, high: 19.5%). Analysis showed no significant gender or rural-urban differences in anxiety levels, but rural students significantly outperformed urban counterparts in achievement (mean: 470.52 vs. 427.24; $t=2.759$, $p<0.05$), underscoring anxiety's role as an emotional factor influencing performance and the need for targeted interventions like stress management programs.

Key Words: Anxiety, Academic Achievement and Higher Secondary School Students

Introduction

Higher secondary education represents a crucial transitional stage in students' academic and personal development. During this phase, students experience increased academic demands, parental expectations, and career-related pressures, which often lead to heightened anxiety. Anxiety, when excessive, can negatively influence students' emotional stability, concentration, and academic performance. Academic achievement, a key indicator of educational success, is shaped not only by intellectual ability but also by emotional and environmental factors. Among these, anxiety plays a significant role in determining students' learning outcomes. Hence, understanding the relationship between anxiety and academic achievement among higher secondary school students is essential for fostering a healthy educational environment.

Need and Significance of the Study

In the present competitive educational system, students are exposed to heavy syllabi, examination pressure, and constant evaluation. Such conditions frequently generate stress and anxiety, adversely affecting students' academic performance and psychological well-being. Although academic achievement has been widely studied, limited attention has been given to the emotional factors influencing it, particularly anxiety among higher secondary students. This study is significant as it identifies the level of anxiety among students and examines its relationship with academic achievement. The findings will help teachers, parents, counselors, and policymakers design appropriate interventions to reduce anxiety and enhance academic success.

Objectives of the Study

1. To find out the level of anxiety among higher secondary school students.
2. To find out the level of academic achievement among higher secondary school students.
3. To study the difference in anxiety of higher secondary school students with respect to selected background variables.

4. To study the difference in academic achievement of higher secondary school students with respect to selected background variables.

Hypotheses

1. There is no significant difference in anxiety among higher secondary school students with respect to selected background variables.
2. There is no significant difference in academic achievement among higher secondary school students with respect to selected background variables.

Review of Related Studies

Goswami (2010) studied achievement motivation and anxiety among secondary school students and found variations in anxiety levels based on parental background. Alam (2001) revealed a negative relationship between anxiety and academic achievement among school children, indicating that higher anxiety leads to lower academic performance. These studies support the need to further investigate anxiety as a crucial emotional factor influencing academic achievement among higher secondary students.

Hemamalini (2015) conducted a study on English Language Anxiety in relation to English Achievement among the High School Students. The major finding of this study was that there was significant relationship between anxiety and English achievement among the high school students of Ramanagaram city.

Methodology

The study adopted a **normative survey method** to examine anxiety and academic achievement among higher secondary school students.

Population

The population consisted of higher secondary school students studying in government, aided, and private schools.

Sample and Sampling Technique

A sample of **200 higher secondary school students** was selected using the **simple random sampling technique**.

Tools Used

- Personal Data Sheet
- Anxiety Scale (Manjurani Aggarwal's Multidimensional Personality Inventory – Anxiety Dimension)
- Academic Achievement scores obtained from school records

Reliability and Validity

The Anxiety Scale was validated through expert judgment to establish face validity. Reliability was established using the test–retest method, yielding a reliability coefficient of **0.826**, indicating high reliability.

Statistical Techniques Used

Mean, Standard Deviation, t-test, ANOVA, and correlation analysis were employed to analyze the data.

Analysis and Interpretation

1. To find out the level of anxiety among higher secondary school students

Table 1
Level of Anxiety among Higher Secondary School Students

Level of Anxiety	Number of Students	Percentage
Low	39	19.5%
Moderate	131	65.5%
High	30	15.0%

The majority of higher secondary school students (65.5%) experience a moderate level of anxiety, indicating that anxiety is a common emotional concern at this stage of education.

- To find out the level of academic achievement of higher secondary school students

Table 2
Level of academic achievement of higher secondary school students

Academic Achievement of Higher Secondary School students	Low		Moderate		High	
	N	%	N	%	N	%
	36	18.0	125	62.5	39	19.5

It is inferred from the above table that 18.0% of higher secondary school students have low, 62.5% of them have moderate and 19.5% of them have high level of academic achievement.

NULL HYPOTHESIS 1

- There is no significant difference between male and female students in their anxiety

Table 3
Difference between male and female students in their anxiety

Anxiety of Higher Secondary School students	Category	Count	Mean	S.D.	Calculated 't' value	Remarks at 5% level
	Male	110	83.755	11.6864	0.844	NS
	Female	90	85.067	10.2867		

It is inferred from the above table that the calculated 't' value is less than the table value at 5% level of significance. Hence null hypothesis is accepted that there is no significant difference between male and female students in Anxiety.

NULL HYPOTHESIS 2

- There is no significant difference between rural and urban school in their anxiety

Table 4
Difference between rural and urban school students in their anxiety

Anxiety of Higher Secondary School students	Category	Count	Mean	S.D	Calculated 't' value	Remarks at 5% level
	Rural	121	83.504	11.9570	1.332	NS
	Urban	79	85.633	9.4844		

It is inferred from the above table that the calculated 't' value is less than the table value at 5%

level of significance. Hence null hypothesis is accepted that there is no significant difference between rural and urban school in their Anxiety of higher secondary school students.

NULL HYPOTHESIS 3

5. There is no significant difference between male and female students in their Academic Achievement.

Table 5

Difference between male and female students in their academic achievement

Academic Achievement of Higher Secondary School Students	Category	Count	Mean	S.D	Calculate d 't' value	Remarks at 5% level
	Male	110	454.191	119.6715	0.108	NS
	Female	90	452.489	98.1079		

It is inferred from the above table that the calculated 't' value is less than the table value at 5% level of significance. Hence null hypothesis is accepted that there is no significant difference between male and female students in Academic Achievement.

NULL HYPOTHESIS 4

6. There is no significant difference between rural and urban students in their Academic Achievement.

Table 6

Difference between rural and urban school students in their academic achievement

Academic Achievement of Higher Secondary School Students	Category	Count	Mean	S.D	Calculated 't' value	Remarks at 5% level
	Rural	121	470.521	93.6623	2.759	S
	Urban	79	427.241	127.8800		

It is inferred from the above table that the calculated 't' value is greater than the table value at 5% level of significance. Hence null hypothesis is rejected that there is a significant difference between rural and urban students in their academic achievement of higher secondary school students. While comparing their mean score rural (470.52) and urban (427.24) higher secondary school students. The rural school students are better than the urban school students.

Results and Discussion

- The study reveals that 19.5% of higher secondary school students have low, 65.5% of them have moderate and 15.0% of them have high level of anxiety.
- The study reveals that 18.0% of higher secondary school students have low, 62.5% of them have moderate and 19.5% of them have high level of academic achievement.
- The study reveals that that there is no significant difference between male and female students in anxiety.
- The study reveals that there is no significant difference between rural and urban school in their anxiety of higher secondary school students.
- The study reveals that that there is no significant difference between male and female students in academic achievement.

- The study reveals that there is a significant difference between rural and urban school in their academic achievement of higher secondary school students. While comparing their mean score rural (470.52) and urban (427.24) higher secondary school students. The rural school students are better than the urban school students.

Recommendations

1. School-Level Interventions
 - Implement weekly counseling sessions focusing on exam anxiety management
 - Train teachers in stress recognition and supportive communication
 - Create "Quiet Zones" during exam preparation periods
2. Curriculum Integration
 - Include Life Skills Education (stress management, time management) as compulsory subject
 - Develop Mindfulness Programs (10 minutes daily breathing exercises)
 - Introduce Progressive Evaluation Systems reducing exam dependency
3. Parental Engagement
 - Conduct quarterly parent workshops on realistic expectation setting
 - Create Parent-Student-Teacher Committees for early anxiety detection
 - Distribute "Stress Management Handbook" for home use
4. Rural-Urban Equity Measures
 - Resource Equalization: Provide urban-quality learning materials to rural schools
 - Teacher Training Exchange Programs between rural-urban schools
 - Mobile Counseling Units for remote rural schools
5. Policy Recommendations
 - Mandate Mental Health Officers in every higher secondary school
 - Reduce exam frequency from quarterly to bi-annual assessments
 - Establish "Student Well-being Index" as key school performance indicator

Conclusion

The investigation confirms anxiety as a significant emotional determinant of academic achievement among higher secondary students, with moderate anxiety levels predominant (65.5%) across the sample. Notably, rural students outperformed urban counterparts (470.52 vs 427.24) despite similar anxiety profiles, suggesting environmental and resource factors play crucial roles. Absence of gender differences underscores the universal nature of academic stress, while rural resilience highlights adaptive coping mechanisms worth studying further. These findings validate the need for proactive mental health interventions in schools. Educational stakeholders must prioritize anxiety mitigation strategies through counseling infrastructure, teacher capacity building, and curriculum reform. Holistic student development—balancing academic rigor with emotional well-being emerges as the cornerstone of sustainable educational success.

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RESEARCH ETHICS AND RESPONSIBLE PUBLICATION IN THE AI ERA: PRINCIPLES, CHALLENGES, AND BEST PRACTICES

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Abstract

The rapid integration of Artificial Intelligence (AI) into academic research and publishing has introduced new ethical complexities that extend beyond traditional concerns of authorship, plagiarism, fabrication, and peer review misconduct. This paper examines the evolving landscape of research ethics and responsible publication in the AI era, emphasizing how AI-generated content, algorithmic bias, automated data processing, and digital dissemination reshape scholarly responsibilities. It highlights the dual nature of AI as both a catalyst for research advancement and a potential source of ethical risk. Key issues explored include the transparent use of AI tools, safeguarding data integrity, ensuring human accountability, preventing manipulation of AI-based metrics, and strengthening ethical guidelines for publishers and institutions. The paper proposes a framework of best practices to uphold integrity, foster responsible authorship, and promote trust in scholarly communication. Ultimately, it argues that the ethical use of AI is not merely a technical requirement but a foundational principle for maintaining credibility in global research ecosystems.

Keywords: Research ethics, AI in academia, Responsible publication, Academic integrity, Scholarly communication

INTRODUCTION

The evolution of digital technologies has profoundly transformed academic research and academic communication. Among these technologies, Artificial Intelligence (AI) stands out as the most influential in reshaping how knowledge is produced, validated, and disseminated. AI-powered tools now assist scholars in literature reviews, data analysis, plagiarism detection, content generation, citation management, and even peer-review processes. While these tools enhance efficiency, accuracy, and global accessibility, they simultaneously introduce complex ethical challenges that demand critical scrutiny. Responsible publication in the AI era, therefore, requires not only adherence to traditional norms of academic integrity but also an understanding of how AI technologies alter authorship, accountability, transparency, and epistemic trust. This paper examines the principles, challenges, and best practices of research ethics in the era of AI. It argues that ethical scholarly communication must evolve in response to AI-driven transformations, and that institutional, editorial, and individual responsibilities must be strengthened to ensure integrity and fairness in the rapidly changing research landscape.

PRINCIPLES OF RESEARCH ETHICS IN THE AI ERA

In the era of artificial intelligence, the core values of research ethics continue to serve as guiding norms. Yet, they must be reinterpreted and broadened to respond to the complexities introduced by advanced technologies. Transparency and disclosure are central to ethical scholarship, requiring researchers to explicitly state the nature and extent of AI involvement in tasks such as drafting texts, analyzing data, translating materials, or generating images, thereby enabling readers to clearly distinguish between human intellectual input and automated assistance. Despite the supportive role of AI, full responsibility rests with the researcher, who must ensure the accuracy, originality, and academic credibility of the work, as machines cannot assume moral or scholarly accountability. Maintaining integrity and authenticity is equally critical, as the use of AI-generated content should

not undermine genuine scholarly contribution; researchers are therefore obliged to critically verify outputs, avoid deceptive representations, and preserve the primacy of human creativity and reasoning. Ethical rigor also requires sensitivity to issues of fairness, since AI systems may reproduce or amplify biases embedded in their training data, making it essential to critically evaluate algorithmic limitations and transparently acknowledge potential distortions in AI-assisted findings. Furthermore, respect for intellectual property gains renewed importance in the AI context, as uncertainties surrounding copyright and ownership demand careful attention to permissions, proper attribution, and the avoidance of unauthorized reproduction of AI-generated material in academic publications.

ETHICAL CHALLENGES IN RESEARCH AND PUBLICATION IN THE AI ERA

The growing integration of artificial intelligence into research and academic publishing has created a range of ethical challenges that directly affect the credibility and trustworthiness of scholarly communication. One major concern is AI-generated plagiarism, as automated systems can produce content closely resembling existing literature, making unintentional duplication difficult to detect through conventional plagiarism-checking tools. Authorship and attribution also raise ethical dilemmas, since AI applications can draft substantial portions of manuscripts; assigning authorship to a machine is inappropriate, yet failing to disclose AI assistance may mislead readers and editors. Data integrity presents another serious challenge, as AI tools can generate synthetic datasets or alter empirical data, creating opportunities for accidental misuse or deliberate manipulation of research outcomes. In addition, the use of AI in peer review and editorial decision-making may unintentionally reinforce linguistic, cultural, or institutional biases, potentially disadvantaging scholars from marginalized regions or non-English academic contexts. Ethical concerns further extend to the growing dependence on algorithmic metrics, such as citation counts and automated rankings, which may prioritize productivity over scholarly depth and originality. Finally, the handling of sensitive research data through AI systems introduces privacy and security risks, as inadequate safeguards can lead to data breaches, unauthorized access, or violations of participant confidentiality and institutional research policies.

RESPONSIBLE PUBLICATION PRACTICES IN THE AI ERA

To preserve credibility and confidence in academic publishing, responsible publication practices must evolve to address both established ethical standards and the emerging challenges posed by artificial intelligence. Clear disclosure of AI involvement is essential, requiring authors to openly specify how such tools have been used in writing, editing, data management, or visual representation, while journals should formalize these expectations within their submission policies. The peer review process must also be reinforced by equipping reviewers with the skills needed to recognize AI-generated content, inappropriate automation, and embedded algorithmic biases, with combined human and AI-assisted review models offering greater evaluative depth. Ensuring transparency and reproducibility of research demands careful documentation of data workflows, including the specific AI models and techniques applied, alongside the promotion of open data and open-source practices where feasible. Ethical engagement with generative AI further requires that such tools enhance, rather than substitute, critical thinking, with researchers taking responsibility for verifying outputs and preserving interpretive authority. Finally, institutions and publishers share collective responsibility in establishing clear ethical frameworks for AI use, supported by editorial oversight mechanisms that integrate automated checks with informed human judgment to uphold academic integrity and fairness.

FRAMEWORK OF BEST PRACTICES

A comprehensive framework of best practices is essential to guide researchers, academic institutions, and publishers in navigating the ethical use of artificial intelligence in scholarly work. Central to this framework is the adoption of clear transparency policies that require authors to disclose the nature and extent of AI involvement in their research and publications. Human oversight must remain paramount, ensuring that all AI-assisted content is carefully reviewed, validated, and intellectually owned by the author. In parallel, systematic evaluation of AI tools for embedded biases should be conducted before their application in research design, data analysis, or peer review, thereby reducing the risk of unfair or distorted outcomes.

Equally important is the role of education and institutional responsibility in sustaining ethical research cultures. Regular training programs and workshops on research ethics, AI literacy, and responsible data management can equip scholars and editors with the skills needed to engage critically with emerging technologies. Editorial processes should be strengthened through a balanced integration of automated screening tools and rigorous human assessment, particularly during peer review. Robust data protection measures must also be enforced when using AI-driven or cloud-based research systems to safeguard sensitive information. Finally, continuous integrity monitoring—supported by AI tools for identifying plagiarism, manipulated visuals, or irregular data patterns, and confirmed through human judgment—helps ensure accountability, reliability, and trust in scholarly communication in the AI era.

CONCLUSION

As AI continues to transform academic research and publication, it is imperative to update ethical standards to address new challenges and opportunities. Responsible publication in the AI era requires a balance between technological innovation and adherence to foundational principles of transparency, fairness, accountability, and integrity. Scholars must remain critical users of AI tools, ensuring that human insight and ethical awareness guide the research process. Institutions and journals likewise carry a significant responsibility to formulate robust guidelines and support researchers in navigating ethical complexities. Ultimately, maintaining academic credibility in the AI-driven future depends on our collective commitment to ethical scholarship, informed decision-making, and responsible publication practices.

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**SUBTHEME: USE OF EMERGING TECHNOLOGIES
(AI, DIGITAL LEARNING) IN INNOVATIVE PEDAGOGY TEACHER
EDUCATORS INSIGHTS ON AI: ENHANCING EFFICIENCY**

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Abstract

This study examines Teacher Educators perceptions of Artificial Intelligence (AI) in education, with a specific focus on its potential to enhance productivity in school settings. Grounded in constructivist learning theory, cognitive load theory, the Technology Acceptance Model, and socio-technical systems theory, the research explores how AI supports instructional practices, time management, personalization, and inclusivity while also raising concerns about ethics, privacy, and professional roles. Using a descriptive survey design, data were collected from Teacher Educators through a structured questionnaire and analysed quantitatively to identify trends and level of agreement across key domains. The findings reveal very high levels of agreement that AI can improve educational outcomes, support lesson planning, enable data-driven monitoring of student progress, and enhance student engagement, alongside generally positive overall perceptions of AI's benefits. At the same time, respondents report only moderate familiarity with AI and express notable concerns regarding job replacement, data privacy, and security, indicating a gap between perceived potential and practical readiness. The study concludes that effective AI integration requires a balanced approach in which AI complements, rather than replaces, human teaching, supported by targeted professional development, institutional support, and clear policy guidelines to address ethical and equity issues.

Key Words: Teacher Educators, Insights, AI, Efficiency

INTRODUCTION

The integration of Artificial Intelligence (AI) into education is transforming teaching and learning practices across the globe. As AI technologies advance, they offer immense potential to improve various dimensions of the educational experience—from enabling personalized learning to enhancing administrative efficiency. AI has already demonstrated its capacity to boost productivity, automate repetitive tasks, and foster more interactive and adaptive learning environments. Yet, limited research has explored how teachers perceive the impact of these innovations on their own productivity.

This study seeks to investigate Teacher Educators perceptions of AI's role in enhancing productivity within school environments. In this context, productivity enhancement encompasses not only the effectiveness and efficiency of instructional practices but also the management of administrative duties, communication processes, and student engagement. As schools increasingly implement AI-powered tools such as virtual assistants, automated grading systems, and adaptive learning platforms, understanding educators' viewpoints becomes essential in assessing how these technologies influence their work efficiency and instructional quality.

Teachers remain at the heart of the educational process, and their acceptance or scepticism significantly shapes how AI is integrated into classrooms. While AI promises to improve educational outcomes by alleviating administrative workloads and enabling more tailored teaching

approaches, it is equally critical to understand whether teachers view these technologies as supportive or disruptive to their professional roles.

AI in education creates significant opportunities to improve personalization, efficiency, and learning outcomes across schools and universities. It supports both students and teachers by tailoring instruction, automating routine work, and enabling data-informed decisions.

Personalized learning

- AI systems adapt content, pace, and difficulty based on each learner's performance, strengths, and weaknesses, creating individualized learning paths.
- Intelligent tutoring systems provide real-time feedback, hints, and explanations similar to one-to-one tutoring, which can raise achievement and deepen understanding.

Enhanced teaching and productivity

- Automated grading, quiz generation, attendance tracking, and basic feedback reduce Teacher Educators administrative workload, freeing more time for lesson design and student interaction.
- AI tools analyze class performance data to highlight who is struggling and on which topics, helping teachers target interventions more efficiently.

Data-driven insights and support

- Learning analytics dashboards reveal patterns in engagement, progress, and misconceptions, allowing educators to refine curricula and teaching strategies.
- AI can flag at-risk students early by predicting outcomes from performance and behavior data, supporting timely academic and pastoral interventions.

Accessibility and inclusion

- AI supports text-to-speech, speech-to-text, translation, captioning, and reading support tools, improving access for students with disabilities and multilingual learners.
- Adaptive platforms help ensure no student is held back or left behind by a single pace, making classrooms more inclusive for diverse learning needs.

Continuous availability and engagement

- Chatbots and virtual tutors give students 24/7 academic help, answering questions and providing practice outside classroom hours.
- Interactive, adaptive content (quizzes, simulations, gamified tasks) tends to increase motivation and time-on-task, which is linked to better learning outcomes.

AI in education can be anchored in several well-established learning and organizational theories that explain its potential to enhance teaching and productivity. These frameworks help justify AI's use not just as a technical innovation but as a pedagogically and socially informed tool in schools.

Constructivist learning theory

- Constructivism views learners as active agents who build knowledge through interaction, exploration, and reflection.
- AI-driven adaptive learning systems, intelligent tutoring systems, and chatbots support constructivist principles by offering interactive, personalized tasks, ongoing feedback, and opportunities for self-paced exploration that foster active knowledge construction.

Cognitive Load Theory

- Cognitive Load Theory argues that learning improves when instructional design reduces extraneous load and supports meaningful processing of content.
- AI tools can help manage cognitive load by breaking content into manageable chunks, adapting task difficulty in real time, and automating routine tasks or feedback, enabling both students and teachers to focus on deeper learning activities.

Technology Acceptance Model (TAM)

- TAM posits that perceived usefulness and perceived ease of use are key predictors of whether educators adopt new technologies.
- Studies on AI in education show that teachers are more likely to use AI tools when they believe these tools genuinely improve instructional quality, student engagement, and productivity, and when the tools are straightforward to integrate into daily practice.

Socio-Technical Systems Theory

- Socio-Technical Systems theory highlights the interdependence between technological tools and the human, organizational, and cultural context in which they are used.
- For AI in schools, this means successful, productivity-enhancing implementation requires not only technically sound systems, but also supportive leadership, professional development, alignment with workflows, and attention to Teacher Educators roles, values, and collaboration patterns.

AI is increasingly essential in education because it supports more personalized, efficient, and inclusive teaching and learning in a rapidly changing, technology-driven world. Its importance lies in enhancing both student outcomes and Teacher Educators productivity while preparing learners for AI-rich futures.

Meeting contemporary educational needs

- AI helps education systems cope with large, diverse student populations by tailoring instruction instead of relying only on one-size-fits-all teaching.
- It supports continuous, flexible learning (in-person, online, hybrid), which is increasingly necessary in post-pandemic and lifelong learning contexts.

Enhancing teaching effectiveness and productivity

- AI automates routine tasks such as grading, attendance, quiz creation, and basic feedback, giving teachers more time for planning, mentoring, and higher-order instruction.
- Analytics from AI systems highlight learning gaps and progress, helping teachers make data-informed decisions and target support where it is most needed.

Personalization and improved learning outcomes

- AI adapts content, pace, and difficulty to each learner's strengths and weaknesses, which can increase understanding, motivation, and retention.
- Instant feedback from intelligent tutoring systems and learning apps allows students to correct errors quickly and build confidence.

Accessibility, inclusion, and global reach

- AI-powered tools (translation, text-to-speech, speech-to-text, adaptive interfaces) make learning more accessible for students with disabilities, language barriers, or those in remote areas.

- Real-time translation and online AI platforms connect learners and educators across regions and countries, helping to globalize education.

Preparing students for an AI-driven future

- Integrating AI into curricula helps students build digital literacy, problem-solving, and AI-related skills needed in future labour markets.
- Understanding and using AI responsibly in school supports awareness of ethics, privacy, and algorithmic bias, which are critical civic and professional competencies.

OBJECTIVES OF THE STUDY

1. To examine Teacher Educators perceptions of AI's role in enhancing productivity.
2. To identify the benefits and challenges of AI integration in schools

METHOD OF STUDY

Descriptive survey research is a suitable approach for investigating Teacher Educators perceptions of AI in education. It is commonly employed in both quantitative and qualitative studies to systematically gather data, describe trends, and examine relationships between variables.

In quantitative research, a descriptive survey centres on collecting numerical data from a relatively large sample to identify patterns, trends, and associations. The aim is to measure Teacher Educators perceptions in an objective manner using structured questionnaires and subsequent statistical analysis.

In this study, a structured questionnaire is administered to teachers to capture their views on the contribution of AI to productivity enhancement. The resulting data are analysed using statistical techniques to identify trends and differences across groups, for example by teaching experience, subject specialization, and level of familiarity with AI tools.

A sample of 100 Teacher Educators from the Pune region were selected using random sampling, based on their availability and willingness to participate.

INFERENCES

1. High agreement (88.9%) indicates that teachers have strong confidence in using AI analytics to monitor students' progress and identify their learning needs.
2. Teachers demonstrate strong confidence (91.7% agreement) in AI's potential to support lesson planning and deliver personalized instruction.
3. Teachers express strong belief (97.2% agreement) that AI can significantly enhance educational outcomes.
4. A large majority (72.2% agree, 25% strongly agree) demonstrates significant confidence in AI's role in enhancing education.
5. Most respondents (94.5%) hold a positive perception of AI's benefits in education.
6. Most teachers (86.1%) report moderate familiarity with AI, suggesting awareness but limited expertise.
7. Most respondents (86.1%) report a moderate level of familiarity with AI, indicating awareness of its applications in education but suggesting their understanding remains limited or still developing.
8. High agreement (88.9%) indicates strong confidence in AI analytics for monitoring student progress and learning needs.
9. Teachers show strong agreement (80.6%) that AI plays a significant role in enhancing student engagement.

10. Teachers demonstrate strong confidence (86.1% agreement) in AI's role in promoting inclusivity.
11. A majority (63.9%) of educators' express concern about AI replacing certain teaching aspects.
12. A majority (58.3%) of educators recognize privacy and data security as valid concerns in AI usage.
13. A significant 63.9% of respondents agree.
14. A strong majority (91.7%) of teachers are open to adopting AI in their teaching.

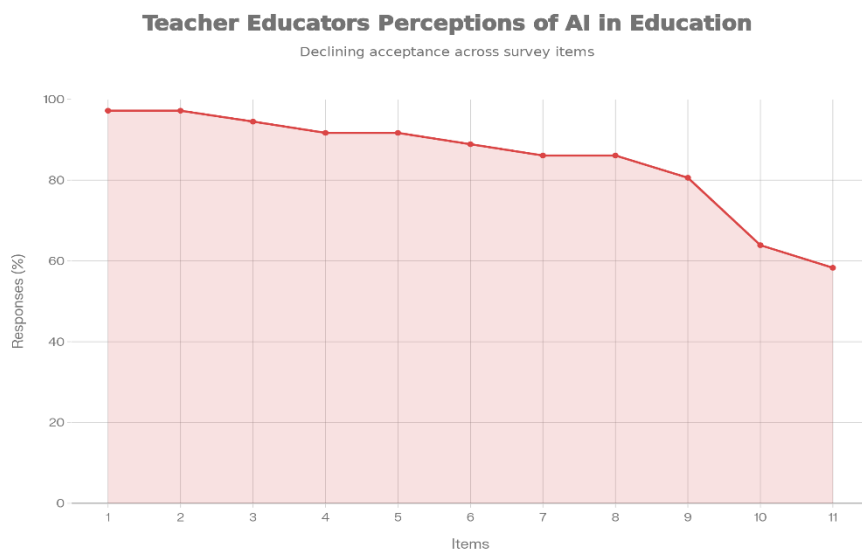
Table: 1 -Teacher Educators Perceptions of AI in Education

Domain Category	Responses (%)
AI Enhances Educational Outcomes	97.2
AI Role in Enhancing Education	97.2
Positive Perception of AI Benefits	94.5
AI for Lesson Planning & Personalization	91.7
Open to Adopting AI	91.7
AI Analytics for Progress Monitoring	88.9
Moderate Familiarity with AI	86.1
AI Promotes Inclusivity	86.1
AI Enhances Student Engagement	80.6
Concern AI Replacing Teaching	63.9
Concern Privacy/Data Security	58.3

Fig: Graphical representation Teacher Educators Perceptions of AI in Education

FINDINGS

AI improves learning efficiency, personalization, and automation, potential risks including overuse, data privacy concerns, equity gaps, and ethical dilemmas demand careful consideration. Effective integration of AI in education calls for a balanced approach that prioritizes human interaction, critical thinking, and fairness as central elements of the learning process.



CONCLUSION

The study on Artificial Intelligence in Education: A Survey of Teacher Educators Perceptions on Productivity Enhancement in School offers important insights into the role of AI in contemporary educational practice. The findings indicate that AI-driven tools can enhance productivity by automating administrative tasks, supporting data-informed decision-making, and enabling more personalized learning experiences; however, their effectiveness depends heavily on Teacher Educators awareness, acceptance, and willingness to adapt to technological change.

The results show that many educators acknowledge AI's potential to increase efficiency and reduce workload, yet they also express concerns about technical complexity, ethical issues, data security, and the adequacy of professional development opportunities. Addressing these issues through targeted training, strong institutional support, and clear policy frameworks is essential for fostering meaningful and sustainable AI adoption in schools.

The study further emphasizes the need for a balanced integration of AI, in which technology complements rather than replaces traditional pedagogy. Human interaction remains a core element of effective teaching and learning, and AI should be positioned as a supportive resource that strengthens, rather than diminishes, the professional role of educators.

Overall, the research contributes to ongoing discussions on AI in education by highlighting both its promise and its challenges, and by proposing directions for effective implementation. By proactively addressing Teacher Educators concerns and enhancing their technological readiness, AI can be integrated strategically to create more efficient, adaptive, and innovative learning environments.

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ARCHITECTING NEW PEDAGOGICAL IDENTITIES IN THE AGE OF GENERATIVE AI

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INTRODUCTION

As Artificial Intelligence (AI) becomes more sophisticated, it's expected to significantly change the job market, requiring workers to adapt and learn new skills. One study suggests that by 2030, Artificial Intelligence could eliminate up to 800 million jobs globally, while concurrently creating a need for human skills like creativity, empathy, leadership, and entrepreneurship. Education must prepare students with interdisciplinary knowledge and adjustable skills so they can thrive and innovate alongside increasingly powerful Artificial Intelligence. However, the current education systems are often not aligned with the skills required for an Artificial Intelligence-driven world. Designed for the industrial era, they focused on preparing workers for routine tasks. Since AI excels at automating these kinds of functions, memorization and specialized training are less important. Today's students require a broad, liberal arts education to develop higher-order thinking. They also need practice in ethics and philosophy to understand how new technologies might change society. Skills like teamwork, creativity, complex communication, and computational thinking must be integrated across all subjects and grade levels. Educational leaders have a critical role in enacting systemic changes to foster the adaptable, human-centered, and interdisciplinary learning essential for the AI age.

Approach 1- Guide and Facilitate Active Learning Over Passive Lecturing

As the core competencies needed for the AI era involve higher-order skills like critical thinking, communication, and problem-solving, pedagogy must shift from passive content delivery to active learning experiences. Rather than lecturing students as empty vessels to be filled with information, teachers should design interactive learning activities and coach students through collaborative critical inquiry. Active learning places the learners in thought-provoking situations that require engagement, analysis, and synthesis. Techniques like project-based learning, case studies, simulations, Socratic dialogue, and discovery learning give students agency in constructing their understanding. Teachers provide scaffolding and then gradually transfer more responsibility as student skills develop. Open-ended explorations and discussions allow students to derive evidence-based conclusions using an analytical lens.

Active Learning Components

Category	Component	Description	Purpose
Active Learning Strategies	Collaborative Projects	Students work together on a shared task.	Develop teamwork, communication, and problem-solving skills.
	Simulations	Students engage in simulated real-world scenarios.	Apply knowledge in a safe environment, and explore consequences.

	Design Challenges	Students tackle open-ended design problems.	Foster creativity, innovation, and critical thinking.
	Socratic Discussion	The teacher facilitates discussion through questioning.	Encourage critical thinking, analysis, and articulation of ideas.
Supporting Structures	Scaffolding & Lesson Plans	Providing support for active learning activities.	Ensure student success and engagement.
Assessment & Feedback	Formative Assessment	Ongoing assessment of student learning.	Identify student needs, misconceptions, and progress to inform instruction.
Student-Centered Learning	Student-Centered Lessons	Lessons focused on big ideas, conceptual understandings, and inquiry.	Promote deep learning and student ownership of learning.
	Higher-Order Questions	Discussion questions that require critical thinking.	Encourage analysis, evaluation, and synthesis of information.
	Classroom Norms	Expectations for student behavior and interaction.	Create a safe and supportive learning environment where students take risks, learn from mistakes, and collaborate.
	Reflection & Metacognition	Time for students to reflect on their learning.	Develop self-awareness and metacognitive skills.
	Customized Support	Adapting instruction to meet individual needs.	Address diverse learning styles and needs.
Continuous Improvement	Facilitation Methods	Teacher's strategies for guiding learning.	Enhance teaching effectiveness through self-assessment and peer feedback.

Approach 2- Foster Intrinsic Motivation and Growth Mindsets

For students to gain lifelong learning skills, education must cultivate intrinsic motivation: the drive to learn based on interest, purpose, and agency. Extrinsic motivators like grades, consequences, and rewards have limited power. Real engagement comes when students' curiosity and self-direction propel discovery. Growth mindsets equally empower the learners to persevere, take risks, and improve continuously. However, psychological research shows exterior pressures often undermine motivation. Severe performance goals incentivize cutting corners, while failure can discourage effort. Praise for intelligence nurtures fixed mindsets, as students fear losing perceived smartness. However, focusing on effort over innate talent inspires growth mindsets. Teachers should carry those abilities that develop incrementally through practice. Modeling grit, flexibility, and self-improvement is powerful. Classroom cultures should stimulate exploration driven by

purpose, autonomy, and mastery. Interest-based projects tap personal passions to direct learning through inquiry. Co-designing rubrics and assessments makes objectives transparent. Choice provides agency, while scaffolding fosters self-efficacy. Cooperative learning builds social motivation, with team members encouraging each other's efforts. Multimedia technology can capture learning creatively, not just deliver content passively. Regular reflection makes progress visible.

Fostering Student Engagement and Motivation

Category	Strategy	Description	Purpose
Student Voice	Welcoming Input & Questions	Actively soliciting student feedback and incorporating it into lesson planning.	Increase student ownership and engagement in learning.
Growth Mindset	Communicating Belief in Potential	Expressing confidence in every student's ability to learn and grow.	Foster a positive self-image and encourage perseverance.
	Highlighting Effort & Teamwork	Emphasizing the importance of hard work, collaboration, and resilience over grades.	Promote a growth mindset and reduce anxiety around assessment.
Choice & Agency	Offering Project Choices	Providing students with options in project topics and formats.	Cater to diverse skills, interests, and learning styles.
Creative Exploration	Encouraging Creativity & Collaboration	Creating opportunities for students to explore ideas, solve problems creatively, and work together.	Develop critical thinking, innovation, and teamwork skills.
Support & Mentorship	Providing Mentoring Relationships	Establishing supportive connections between students and mentors (teachers, peers, community members).	Offer guidance, encouragement, and personalized support.
Real-World Connection	Conveying Relevance & Purpose	Explaining the real-world applications and social significance of lessons.	Increase student motivation and understanding of the value of learning.
Self-Direction	Helping Students Chart Progress & Set Goals	Guiding students in tracking their learning and setting personalized goals.	Develop self-awareness, metacognition, and ownership of learning.
Celebrating Learning	Celebrating Curiosity & Inquiry	Recognizing and valuing students' curiosity, questions, and diverse approaches to problem-solving.	Foster a love of learning and encourage intellectual risk-taking.

Approach 3: Promote Collaboration and Team-based Learning

As workplaces require more complex collaboration, institutions must foster teamwork skills essential for human-AI cooperation and collective innovation. Beyond core content, students need experiences collaborating on projects that build communication, perspective-taking, and conflict resolution. Teachers can promote collaboration by designing group assignments, facilitating diverse teams, and coaching team dynamics. Effective collaboration depends on interpersonal awareness, inclusion, and collective purpose. Groups should first establish norms of respectful listening, equitable contributions, and consensus building. Teachers might provide rubrics on dimensions like participation, cooperation, and work quality. Peer feedback cultivates metacognition in team behaviours. Rotating roles allows for experiencing both leadership and supporting positions. Carefully structured team projects apply collaborative competencies. For instance, an ecology assignment could task groups with proposing policies to reduce local water pollution. Students share research, discuss options, weigh trade-offs, and deliver joint presentations synthesizing viewpoints. The process requires communication, compromise, resource allocation, and playing to strengths. Teachers facilitate by establishing team composition, milestones, and checkpoints. Scaffolding helps translate ideas into organized action plans. Circulating to observe and advise teams personalizes guidance. Allowing some self-directed learning develops autonomy. Teachers should conclude projects with reflections on team dynamics and lessons learned.

Effective Collaborative Learning Strategies

Category	Strategy	Description	Purpose
Group Dynamics	Fostering Positive Interdependence	Structuring group work so that all members rely on each other for success.	Encourage teamwork, shared responsibility, and mutual support.
Conflict Resolution	Modeling Conflict Resolution & Compromise	Demonstrating effective strategies for managing disagreements and incorporating diverse perspectives.	Develop students' conflict resolution and communication skills.
Metacognition & Assessment	Building Self & Group Assessment Tools	Creating tools for students to reflect on their individual and group processes.	Promote self-awareness, metacognition, and continuous improvement.
Role Distribution	Rotating Roles	Assigning different roles to group members (facilitator, note-taker, reporter, etc.).	Provide opportunities for students to develop various skills and share leadership.
Differentiation	Considering Diverse Learners' Needs	Taking into account individual learning styles, needs, and abilities when forming groups and	Guarantee equitable contribution and maximize learning for all students.

		providing support.	
Technology Integration	Incorporating Technology Collaboratively	Using technology to enhance group work for research, collaboration, and presentation.	Improve efficiency, access to information, and communication.
Group Processes	Regularly Revisiting Goals, Processes & Norms	Encouraging groups to periodically review their objectives, working methods, and agreed-upon guidelines.	Maintain focus, improve the group functioning, and address any issues.
Accountability	Balancing Teamwork with Individual Accountability	Ensuring that the individual contributions are recognized and assessed alongside group outcomes.	Promote individual responsibility and prevent social loafing.
Group Size	Keeping Groups Small	Limiting group size to ensure meaningful participation and interaction.	Maximize engagement and facilitate communication.
Creative Expression	Allowing Creativity in Team Dynamics	Giving groups flexibility in how they organize themselves, communicate, and express their learning.	Foster creativity, innovation, and ownership of the learning process.

Approach 4- Integrate Technology Thoughtfully Based on Learning Objectives

As educational institutions adopt learning technologies, the purpose should drive integration, not the tools themselves. Technology can supplement education, but only if implementation aligns with pedagogical goals and curriculum. Effective integration considers objectives, evidence-based practices, and responsive teaching to enhance learning. Learner-centered learning objectives, not technologies, should direct integration. For example, personalized tutors may help English learners master vocabulary, while coding software aids computer science scaffolding. Virtual reality could bring immersive science simulations if funding and teacher training support adoption. In all cases, the learning goals determine which tools have potential if thoughtfully implemented. Integrating technology requires evaluating claims critically. Multimedia does not fundamentally improve learning over thoughtfully designed traditional instruction. Proponents often pitch edtech products as turnkey solutions, but effective implementation involves adaptation and input. Teachers should consider how technologies serve diverse learner needs and supplement (not replace) practices proven effective, like tutoring, explicit instruction, and collaborative learning. Ongoing assessment should examine technology's impacts and guide adjustments. Multiple measures like observational data, student surveys, and assignment analytics provide insights. Is the technology enhancing engagement? How are different learners responding? Is it improving learning outcomes? Reflection

notifies refinements to comprehend the technology's promise. Thoughtful tech incorporation also plans teacher support for new learning curves and troubleshooting. Quality professional development shapes staff capacity and activity. Educators can collaboratively design lesson plans, model usage, and share know-how. Curating educator communities reduces re-inventing the wheel separately.

Effective Technology Integration in Education

Category	Strategy	Description	Purpose
Purposeful Adoption	Letting Learning Goals Drive Adoption	Selecting and implementing technology based on its alignment with specific learning objectives and responsive teaching practices.	Ensure that technology serves pedagogical goals, not the other way around.
Educator Involvement	Involving Educators Early & often	Making the teachers involved in the process of tool selection, application, and assessment.	Leverage educators' expertise, build buy-in, and ensure practical usability.
Professional Development	Providing Quality Professional Development	Offering comprehensive training and ongoing support for educators in using technology effectively.	Maximize teachers' ability to integrate technology seamlessly into their instruction.
Evaluation & Assessment	Assessing Effectiveness Empirically	Measuring the impact of technology on student learning through multiple data sources (e.g., test scores, student work, surveys).	Determine the effectiveness of technology interventions and make data- driven decisions.
Equity & Access	Ensuring Equitable Access	Providing all learners with equal access to technology, resources, and support, regardless of background or circumstance.	Close achievement gaps and create a level playing field for all students.
Learning Focus	Supporting Creation & Knowledge Construction	Using technology to facilitate active learning, creation of knowledge, and higher-order thinking, rather than passive consumption of information.	Promote deeper learning and develop students' critical thinking and problem-solving skills.
Ethical Considerations	Maintaining Data Privacy & Digital Literacy	Protecting student data privacy and teaching students how to use technology responsibly and ethically.	Ensure ethical use of technology and develop students' digital citizenship skills.
Cost & Sustainability	Considering Total Costs	Taking into account all costs associated with technology, including hardware, software,	Ensure long-term sustainability and avoiding unexpected

		technical support, and upgrades, when making purchasing and implementation decisions.	expenses.
Equity & Access	Ensuring Equitable Access	Providing all learners with equal access to technology, resources, and support, regardless of background or circumstance.	Close achievement gaps and create a level playing field for all students.
Learning Focus	Supporting Creation & Knowledge Construction	Using technology to facilitate active learning, creation of knowledge, and higher-order thinking, rather than passive consumption of information.	Promote deeper learning and develop students' critical thinking and problem-solving skills.
Ethical Considerations	Maintaining Data Privacy & Digital Literacy	Protecting student data privacy and teaching students how to use technology responsibly and ethically.	Ensure ethical use of technology and develop students' digital citizenship skills.
Cost & Sustainability	Considering Total Costs	Taking into account all costs associated with technology, including hardware, software, technical support, and upgrades, when making purchasing and implementation decisions.	Ensure long-term sustainability and avoiding unexpected expenses.

Approach 5- Provide Ongoing Feedback Through Formative Assessment

Rather than relying solely on high-stakes summative tests, regular formative assessments should provide meaningful feedback guiding teaching and learning. Formative assessment refers to continuous monitoring of student progress towards objectives, informing responsive instructional adjustments, remediation, and enrichment. Feedback collected through regular low-stakes quizzes, discussions, and assignments shapes teaching plans. Identifying class-wide knowledge gaps, skill deficiencies, and misconceptions allows targeting lessons at the appropriate level. For example, finding many students struggling with graphing data may prompt reteaching the skill before advancing. Individual needs can also be addressed through assignments offering personalized growth opportunities. Rich qualitative feedback personalizes learning beyond letter grades. Comments like "Explain your reasoning" or "Provide an example" encourage metacognition and critical thinking. Students should practice or train themselves in self-assessment by using co-developed rubrics aligned with standards. Peer feedback fosters perspective and reflection. Celebrating progress, effort, and improvement motivates perseverance. Technology expands formative assessment options, from interactive learning apps providing instant feedback

to collaborative annotation tools facilitating peer discussions. But automation risks losing nuance, so teacher monitoring remains essential. Potential risks like bias in algorithmic scoring should be mitigated. Data privacy must be ensured.

Effective Assessment Practices

Category	Practice	Description	Purpose
Alignment & Clarity	Clear Learning Objectives, Standards Alignment, & Success Criteria	Assessments are directly aligned with clearly defined learning goals, relevant standards, and explicit success criteria.	Ensure assessments measure what they are intended to measure and provide students with a clear understanding of expectations.
Revealing Student Thinking	Questions & Activities Revealing Student Thinking & Progress	Assessments include tasks and questions designed to elicit students' thought processes and demonstrate their learning progress.	Gain insights into student understanding, identify misconceptions, and inform instruction.
Self-Reflection & Goal Setting	Prompting Reflection, Self-Assessment, & Goal Setting	Assessments encourage students to reflect on their learning, evaluate their own work, and set future learning goals.	Develop metacognitive skills, promote self-directed learning, and fostering a growth mindset.
Open-Ended Tasks	Open-Ended Scenarios Allowing Multiple Solution Paths	Assessments include open-ended tasks and scenarios that allow for multiple valid approaches and solutions.	Encourage critical thinking, problem-solving, creativity, and application of knowledge.
Multimodal Assessment	Multimodal Assessments Accepting Diverse Needs & Styles	Assessments are offered in various set-ups (e.g., written, oral, visual, kinesthetic) to accommodate diverse learning styles, needs, and abilities.	Ensure equitable assessment and allow students to demonstrate their learning in ways that best suit them.
Feedback	Timely, Specific Qualitative Feedback Promoting Growth	Students receive timely, specific, and qualitative feedback that focuses on their strengths, areas for improvement, and strategies for growth.	Guide student learning, provide actionable insights, and promote continuous improvement.

Metacognitive Coaching	Coaching & Modeling Metacognition	Teachers provide coaching and modeling on metacognitive strategies, helping students understand how they learn and how to approach challenges.	Develop students' metacognitive awareness and learning skills.
Data-Driven Instruction	Reviewing Aggregate & Individual Learning Data	Teachers analyze assessment data (both individual and class-wide) to inform their instructional decisions and adjust their teaching strategies.	Use data to personalize instruction, address learning gaps, and improve teaching effectiveness.
Student Understanding of Assessment	Ensuring Students Understand How Assessments Support Their Learning	Teachers communicate clearly to students how assessments are used to support their learning and provide valuable feedback.	Increase student understanding of the purpose of assessment and promote student buy-in.

CONCLUSION

As AI systems grow more capable across a range of cognitive tasks, the foundations of education must adapt. Content knowledge and repetitive skills hold less value when intelligent machines can promptly recall information and systematize repetitive work. Instead, institutions must foster distinctly human strengths like creativity, critical thinking, communication, collaboration, and ethics. Teaching methods must stimulate the learners to be creators and critical thinkers, and not to be passive recipients. Teachers become facilitators guiding active inquiry through techniques like discovery learning, simulations, Socratic dialogue, and design thinking. These approaches teach through the lived experience of constructing knowledge by iteratively developing ideas, testing assumptions, collaborating on solutions, and building communication skills. The hearts and minds of the next generation depend on the reforms we set in motion today. By rising to this occasion with wisdom and conviction, we can author an AI future aligned with human dignity, creativity, and justice.

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EMPOWERING LEARNERS THROUGH LEGAL LITERACY: A MULTIDISCIPLINARY EDUCATIONAL APPROACH TO PREVENTING WOMEN'S VICTIMIZATION

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ABSTRACT

Legal literacy is a critical component of multidisciplinary education aimed at preventing the victimization of women and promoting social justice. This paper examines how integrating legal awareness within education can empower learners to recognize, resist, and report various forms of victimization, including physical, sexual, psychological, economic abuse, and human trafficking. Drawing from criminology, victimology, human rights, and education, the study highlights the importance of awareness of national and international legal frameworks such as POSH, POCSO, Domestic Violence Act, and CEDAW. The paper emphasizes education as a preventive tool that strengthens personal safety, informed decision-making, and collective responsibility. By embedding legal literacy across educational curricula, institutions can foster gender equality, resilience, and a culture of lawful and ethical citizenship.

Keywords: *Women Victimization; Multidisciplinary Education and Crime Prevention.*

INTRODUCTION

Women's victimization remains a persistent and multifaceted social problem cutting across cultural, economic, educational, and legal boundaries. Despite constitutional guarantees and international human rights commitments, women continue to experience diverse forms of victimization such as physical abuse, sexual violence, domestic violence, trafficking, child marriage, cyber exploitation, acid attacks, honour killings, and economic abuse. These experiences not only violate fundamental human rights but also undermine women's dignity, safety, and participation in social development. Addressing this issue requires more than punitive legal measures; it necessitates preventive strategies rooted in education, awareness, and empowerment.

The United Nations Declaration of Basic Principles of Justice for Victims of Crime (1985) defines a victim as any person who has suffered physical, mental, emotional, or economic harm due to acts or omissions that violate criminal law. Victimization, therefore, is not merely an isolated incident but a process involving exploitation, oppression, abuse, and deprivation of rights. Women and children, due to social vulnerabilities and power imbalances, are disproportionately affected. The presentation highlights a wide spectrum of victimization, including sexual assault, trafficking, domestic violence, cyber bullying, forced marriage, child labour, and psychological abuse, all of which demand informed and proactive responses.

In this context, legal literacy emerges as a powerful tool for prevention and protection. Legal literacy refers to the awareness and understanding of laws, rights, legal remedies, and institutional mechanisms available to individuals. Many instances of women's victimization continue not solely because of the absence of laws, but due to lack of awareness about existing legal safeguards such as the Protection of Women from Domestic Violence Act (2005), POSH Act (2019), POCSO Act (2012), Dowry Prohibition Act (1961), Immoral Traffic (Prevention) Act (1956), and international

frameworks like CEDAW. Ignorance of these legal provisions often leads to silence, underreporting, and normalization of abuse.

Education plays a crucial role in bridging this gap between law and lived experience. A multidisciplinary educational framework that integrates legal literacy with criminology, victimology, sociology, psychology, and human rights education can equip learners with the knowledge and skills necessary to identify victimization, challenge harmful social norms, and seek timely intervention. These insights underscore the need for education that is practical, contextual, and preventive in nature.

Furthermore, legal literacy within education fosters critical thinking, confidence, and self-efficacy among learners, particularly young women. Awareness of legal rights related to marriage, consent, workplace safety, and bodily autonomy empowers individuals to make informed decisions and resist coercion. It also promotes collective responsibility by encouraging reporting, peer support, and community engagement in preventing victimization. As highlighted in the presentation, empowerment is not only about legal knowledge but also about psychological strength, social participation, and ethical citizenship.

REVIEW OF LITERATURE

The United Nations (1985) defined victimization as harm suffered physically, psychologically, emotionally, or economically due to violations of criminal law. This definition broadened the scope of victimology by recognizing non-physical harms and forms the conceptual base of the present study, which treats legal literacy as essential for recognizing and preventing rights violations against women.

Heise (1998) explained that violence against women is rooted in gender inequality, social norms, and power imbalances rather than individual behavior alone. This structural understanding supports the present study's emphasis on preventive education that addresses societal attitudes through legal awareness.

Walklate (2007) argued that victimization must be examined through an interdisciplinary framework integrating criminology, law, sociology, and victimology. This perspective directly informs the present study's multidisciplinary educational approach to legal literacy.

UNICEF (2014) demonstrated that limited awareness of legal rights significantly increases women's and children's vulnerability to abuse and exploitation. This finding reinforces the present study's argument that legal literacy acts as a protective factor against victimization.

Sen (2005) emphasized that empowerment is achieved through education and informed choice rather than welfare measures alone. This view underpins the present study's goal of empowering learners through knowledge of legal rights and remedies.

Ali (2024) analyzed institutional responses to sexual violence in higher education and found that inadequate awareness and implementation of legal frameworks weaken victim protection. This study highlights the necessity of integrating legal literacy into educational institutions, a core focus of the present research.

Alhadidi, Nweiran, and Hilal (2024) found that higher levels of legal awareness among university students significantly influenced responsible behavior in digital environments. This supports the present study's emphasis on legal literacy as a means to prevent cyber-based victimization.

Sharma, Dawra, and Sehrawat (2025) highlighted that cyber violence against women persists despite legal reforms due to socio-cultural and awareness gaps. This aligns with the present study's argument that education must complement legal frameworks for effective prevention.

Kelly (1988) conceptualized sexual violence as a continuum affecting women across different stages of life. This framework supports the present study's emphasis on sustained legal literacy across educational stages rather than isolated awareness efforts.

CEDAW (1979) mandates state parties to promote legal awareness and eliminate discrimination through education. This international framework provides normative and legal justification for integrating legal literacy into educational curricula.

World Health Organization (2013) identified physical, sexual, psychological, and economic abuse as major forms of violence against women globally. This classification supports the present study's comprehensive approach to legal literacy addressing multiple dimensions of victimization.

METHODOLOGY

RESEARCH DESIGN

The present study adopts a theoretical and qualitative research design to examine the significance of legal literacy within a multidisciplinary educational framework in preventing women's victimization. The study is conceptual in nature and is supported by case study analysis to contextualize theoretical insights within real-life situations.

SOURCES OF DATA

The research is based exclusively on secondary sources of data. These include scholarly books, peer-reviewed journal articles, national legislations, international conventions, policy documents, and reports published by governmental and international organizations related to women's rights, victimization, legal literacy, and education. Sources were selected based on their relevance, credibility, and contribution to the objectives of the study.

CASE STUDY SELECTION

Illustrative case studies were selected using a purposive sampling technique. The selected cases represent various forms of women's victimization such as domestic violence, sexual abuse, child marriage, workplace harassment, human trafficking, and cyber violence. The selection was guided by the extent to which the cases reflected the role of legal awareness or legal illiteracy in influencing victim outcomes.

METHOD OF ANALYSIS

The selected case studies were analysed using a thematic content analysis approach. Key themes such as nature of victimization, awareness of legal rights, institutional response, and educational gaps were identified and systematically examined. This method facilitated meaningful linkage between theoretical perspectives and empirical illustrations.

THEORETICAL FRAMEWORK

The analysis was guided by theoretical perspectives drawn from victimology, feminist criminology, empowerment theory, and critical pedagogy. These frameworks enabled interpretation of case studies in terms of structural inequalities and the preventive role of education-based legal literacy.

ETHICAL CONSIDERATIONS AND LIMITATIONS

As the study relies solely on secondary data and publicly available cases, no direct interaction with human subjects was involved. Ethical sensitivity was maintained in discussing victim

experiences. The study is limited by the absence of primary data; however, it contributes significantly to theoretical understanding and policy-oriented educational discourse.

RESULTS AND DISCUSSION

The theoretical analysis and examination of selected case studies reveal several interrelated themes that highlight the significance of legal literacy as a preventive and empowering mechanism within education. The findings are discussed under the following sub-themes.

LEGAL ILLITERACY AND CONTINUED VICTIMIZATION

The analysis reveals that limited legal awareness contributes significantly to prolonged victimization by delaying recognition and response to abuse.

PREVENTIVE ROLE OF LEGAL LITERACY

Legal knowledge enables early identification of violations and strengthens resistance against exploitation.

SIGNIFICANCE OF MULTIDISCIPLINARY EDUCATION

Integrating legal literacy with social sciences enhances empowerment and contextual understanding of victimization.

IMPROVED REPORTING AND ACCESS TO JUSTICE

Awareness of legal rights increases confidence in approaching formal justice institutions.

EDUCATIONAL AND INSTITUTIONAL GAPS

Despite strong legal frameworks, absence of structured legal education limits preventive outcomes.

CONCLUSION

The present theoretical study highlights that women's victimization persists not merely due to the absence of legal provisions, but largely because of inadequate legal awareness and limited preventive education. Despite the existence of comprehensive national and international legal frameworks, gaps in legal literacy continue to restrict women's ability to recognize violations, resist exploitation, and access justice. The analysis demonstrates that legal literacy, when integrated within a multidisciplinary educational framework, serves as a powerful tool for prevention, empowerment, and social transformation. Education that incorporates legal awareness enhances self-efficacy, informed decision-making, and collective responsibility, thereby reducing vulnerability to various forms of victimization. The study concludes that embedding legal literacy across educational systems and social institutions is essential for promoting gender justice, strengthening crime prevention, and building a rights-conscious society.

POLICY IMPLICATIONS AND RECOMMENDATIONS

GOVERNMENT

Strengthen legal literacy initiatives through education policy, community outreach, and inter-institutional coordination.

EDUCATIONAL INSTITUTIONS

Embed legal literacy across curricula using participatory and experiential learning methods.

PUBLIC AND COMMUNITY

Encourage collective responsibility, reduce stigma, and promote supportive environments for reporting.

NON-GOVERNMENTAL ORGANIZATIONS

Implement grassroots legal awareness programs and provide comprehensive victim support services.

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EXPLORING THE DEVELOPMENT OF REASONING & CRITICAL THINKING AMONG STUDENTS: FACTORS, CHALLENGES, AND EDUCATIONAL IMPLICATIONS

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ABSTRACT

Reasoning ability is a crucial cognitive skill that develops throughout the school and college years, contributing significantly to students' academic success, problem-solving capacities, and decision-making processes. This article explores the development of reasoning ability among students, analyzing the factors that shape its growth, including cognitive developmental stages, genetic and neurological influences, educational environment, and cultural and socioeconomic contexts. It also identifies key challenges that hinder the development of reasoning skills, such as cognitive overload, misconceptions, language barriers, and lack of motivation. Furthermore, the article discusses the educational implications of fostering reasoning ability, emphasizing the importance of incorporating critical thinking into the curriculum, employing differentiated instruction, and implementing assessment practices that measure reasoning effectively. Finally, the need for professional development for educators and the creation of inclusive learning environments are highlighted as essential components for supporting students' cognitive development and reasoning skills.

Keywords: 1. Reasoning ability 2. Critical thinking & 3. Problem-solving.

INTRODUCTION

Reasoning ability is one of the most critical cognitive functions that contribute to academic success, problem-solving, and decision-making in everyday life. As students progress through their schooling and college, their ability to think logically, draw inferences, and evaluate information develops, equipping them with the skills needed for higher-order thinking. The development of reasoning is not only essential for academic achievement but also for fostering critical and analytical thinking, which are fundamental for addressing real-world challenges.

This article delves into the factors that influence the development of reasoning ability among school students, the challenges they face in honing these skills, and the educational strategies that can be employed to promote cognitive growth in this area. Additionally, the article examines the educational implications of reasoning development, focusing on how teachers, curriculum developers, and policymakers can support students in becoming proficient reasoners.

Reasoning Ability refers to the cognitive process that allows individuals to think logically, make inferences, and draw conclusions based on available information. It is essential for problem-solving, decision-making, and understanding relationships between concepts or facts. Reasoning ability involves the capacity to process and analyze information, consider various possibilities, and arrive at sound judgments.

Key Aspects of Reasoning Ability

Logical Thinking: The ability to follow a structured process of thinking that adheres to rules of logic, ensuring conclusions are based on valid premises.

Problem-Solving: Using reasoning to approach challenges, identify solutions, and resolve issues effectively.

Critical Thinking: Evaluating information, questioning assumptions, and considering evidence to make well-informed decisions.

Inference: Drawing conclusions based on observations or known information.

Abstract Thinking: Understanding complex concepts that may not have a direct physical representation.

TYPES OF REASONING

1. Deductive reasoning:

Deductive reasoning is a method of proving a theory or hypothesis using formal logic and observations. Deductive reasoning starts with a hypothesis that is then supported or disproved through observations or rational thought.

A marketing division, for example, analyses data and confirms that their company's most important demographic is young parents. They opt to give more of the marketing money to social media channels that target that category based on this information.

2. Inductive reasoning:

To validate observations, inductive reasoning employs theories and assumptions. It's the polar opposite of deductive reasoning in that it requires deducing a general rule from a specific case or cases.

Because it employs conclusions from observations to make generalisations, the outcomes of inductive reasoning are not always certain. Extrapolation, forecasts, and part-to-whole arguments all benefit from inductive reasoning.

3. Analogical reasoning:

Analogical reasoning is a style of reasoning that looks for similarities between two or more objects and then uses those similarities to find other properties they share. It is based on the brain's tendency to notice patterns and make connections.

4. Abductive reasoning:

Abductive reasoning is a style of reasoning that reaches a logical conclusion based on an observation or group of observations. Abductive reasoning is similar to inductive reasoning, but it allows you to make the greatest estimates to get the simplest conclusions. Abduction can help with both troubleshooting and decision-making, especially when dealing with uncertainties.

5. Cause-and-effect reasoning:

Cause-and-effect reasoning is a style of reasoning in which the relationship between two events is demonstrated. This logic is used to describe what might happen if a certain action is taken or why certain things happen when certain circumstances are met. When people draw on personal experience and a drive to improve, this form of reasoning is frequently used to guide daily decision-making.

6. Critical thinking:

Critical thinking entails delving deeply into a topic's rationale in order to reach a definitive conclusion. Computing, engineering, social sciences, and logic all benefit from it. When it comes to problem-solving, critical thinking is especially important when dealing with technological challenges. It's used to determine the validity of artworks, literature, films, and other forms of art.

7. Decompositional reasoning:

Decompositional reasoning is the process of breaking things down into their basic components in order to comprehend how each component contributes to the overall functionality of the object. Decompositional reasoning allows an observer to derive powerful conclusions about the total by evaluating each portion separately.

FACTORS INFLUENCING THE DEVELOPMENT OF REASONING ABILITY

Genetics: Research shows that reasoning ability has a genetic component. While reasoning can be improved through education and practice, some individuals may have a natural predisposition for high cognitive ability. Twin studies have demonstrated that intelligence and reasoning abilities have heritable factors.

Educational Practices: Reasoning skills can be fostered through education that emphasizes critical thinking, problem-solving, and inquiry-based learning. Subjects such as mathematics, science, and philosophy naturally lend themselves to developing reasoning skills, as they require students to apply logic, form hypotheses, and analyze data.

Socioeconomic Factors: Students from lower socioeconomic backgrounds may face environmental stressors, such as lack of access to quality education, limited cognitive stimulation at home, and fewer opportunities for extracurricular learning, all of which can hinder the development of reasoning skills. However, with targeted interventions and support, these gaps can be addressed.

Cultural Differences: Reasoning is also influenced by cultural factors. Different cultures may emphasize various forms of reasoning, such as collective versus individualistic approaches to problem-solving. In some educational systems, a more memorization-based approach may be prioritized, which can impact the development of reasoning compared to systems that encourage critical thinking and inquiry.

COMMON CHALLENGES IN DEVELOPING REASONING ABILITY

Cognitive Biases: Reasoning can be obstructed by cognitive biases, which are systematic thinking errors. For instance, confirmation bias causes students to seek out information that supports their pre-existing beliefs while disregarding opposing evidence. Educators need to teach students how to identify and overcome these biases to foster more objective reasoning.

Misconceptions: Students often hold misconceptions in subjects like science and math, which can interfere with logical reasoning. Addressing these misconceptions through targeted instruction and hands-on learning experiences can help students correct faulty reasoning.

Lack of Engagement: Reasoning tasks demand mental effort, and students who are disengaged from the learning process may find it difficult to apply logical thinking. Designing engaging, relevant, and meaningful learning experiences can encourage students to invest more in reasoning tasks.

Language Barriers: Students learning in a second language may face particular challenges with reasoning tasks, as they might struggle to comprehend complex instructions or articulate their thoughts clearly. Offering language support and scaffolding can aid these students in developing their reasoning skills without being impeded by language proficiency.

The Importance of Reasoning in the 21st Century

In today's rapidly changing world, reasoning ability is more important than ever. The complexity of global challenges, from climate change to technological innovation, requires

individuals who can think critically, analyze information from multiple perspectives, and make well-informed decisions. In the workforce, reasoning skills are highly valued, as they are essential for innovation, problem-solving, and leadership.

Educational systems must prioritize the development of reasoning abilities to prepare students for success in the 21st century. This involves not only teaching content but also fostering critical thinking, creativity, and the ability to apply knowledge in new and unfamiliar situations. By equipping students with strong reasoning skills, educators can help them navigate the complexities of modern life and contribute meaningfully to society.

EDUCATIONAL IMPLICATIONS

Given the importance of reasoning ability in both academic and everyday contexts, educators, curriculum developers, and policymakers must take proactive steps to support students' cognitive development. The following are key educational implications for promoting reasoning ability among students:

1. Incorporating Critical Thinking into the Curriculum

To promote reasoning, critical thinking must be explicitly taught as part of the curriculum across all subjects. Rather than focusing solely on content knowledge, curricula should include opportunities for students to engage in critical analysis, problem-solving, and logical reasoning. This can be achieved through activities such as debates, case studies, and simulations that require students to apply reasoning skills to real-world problems.

2. Differentiated Instruction

Students vary widely in their cognitive abilities and developmental stages, so instruction must be differentiated to meet the needs of all learners. Teachers can provide scaffolded support to help students who struggle with reasoning tasks while challenging advanced learners with more complex problems. Differentiated instruction ensures that all students, regardless of their starting point, can make progress in developing their reasoning abilities.

3. Assessment Practices that Measure Reasoning

Traditional assessments, such as multiple-choice tests, may not adequately measure students' reasoning abilities. Instead, assessment practices should include tasks that require students to demonstrate their reasoning process, such as open-ended questions, written explanations, and project-based assessments. These types of assessments provide a more accurate picture of students' reasoning skills and their ability to apply knowledge in meaningful ways.

4. Professional Development for Teachers

Teachers play a pivotal role in fostering reasoning ability, but they must be equipped with the tools and strategies to do so effectively. Professional development programs should focus on helping teachers design lessons that promote critical thinking and reasoning, use formative assessments to gauge students' cognitive progress, and create an inquiry-based learning environment that encourages exploration and problem-solving.

5. Creating an Inclusive Learning Environment

An inclusive learning environment is essential for supporting the development of reasoning ability. This means ensuring that all students, regardless of their cultural background, language proficiency, or learning disabilities, have access to the resources and support they need to succeed. Teachers can implement culturally responsive teaching practices and provide accommodations for students with special needs to create an environment that fosters cognitive growth for all learners.

CONCLUSION

Reasoning ability is a cornerstone of cognitive development and academic success. While numerous factors, including cognitive development, genetics, and educational practices, influence the development of reasoning skills, challenges such as cognitive overload, misconceptions, and lack of motivation can impede progress. Educators, curriculum developers, and policymakers must work together to create learning environments that promote critical thinking, differentiate instruction, and assess.

Reasoning ability is a cornerstone of modern education, critical thinking, and decision-making in a world that is increasingly complex, interconnected, and fast-paced. It empowers individuals to navigate the challenges of the digital age, make informed decisions, solve problems creatively, and engage in constructive dialogue. By developing and strengthening reasoning skills, individuals can better adapt to the demands of the 21st century and contribute meaningfully to society.

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INNOVATIVE PRACTICES IN TEACHING–LEARNING PEDAGOGICAL APPROACHES AMONG B.ED. TRAINEES

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Abstract

Teacher education is central to the development of competent, reflective, and socially responsible teachers. In the context of rapid educational reforms, technological advancement, and learner diversity, innovative teaching–learning pedagogical approaches have become indispensable in B.Ed. programmes. This paper presents an in-depth discussion of innovative practices adopted in teacher education to enhance professional competence among B.Ed. trainees. Pedagogical strategies such as activity-based learning, experiential learning, ICT-integrated instruction, collaborative learning, flipped classroom, problem-based learning, reflective teaching, and micro-teaching are critically examined. The role of teacher educators, outcomes of innovation, and implementation challenges are also discussed. The paper concludes that systematic integration of innovative pedagogical practices significantly improves the quality of teacher preparation and aligns B.Ed. programmes with contemporary educational demands.

Keywords: Innovative Pedagogy, Teacher Education, B.Ed. Trainees, Experiential Learning, ICT Integration, Reflective Teaching

1. Introduction

Teacher education occupies a pivotal position in the educational system, as the quality of school education largely depends on the quality of teachers produced by teacher education institutions. The Bachelor of Education (B.Ed.) programme is designed to prepare teachers who are professionally competent, ethically grounded, and socially responsive. However, traditional teacher-centered approaches, which emphasize rote learning and passive reception of knowledge, are inadequate to meet the needs of contemporary learners.

In recent years, educational reforms such as the National Education Policy (NEP) 2020 have emphasized learner-centered, competency-based, and experiential approaches to teaching and learning. In this context, innovative pedagogical practices in B.Ed. programmes are essential to develop critical thinking, creativity, collaboration, communication, and digital literacy among trainee teachers. Innovative teaching–learning approaches enable B.Ed. trainees to experience modern pedagogies, thereby preparing them to implement similar practices in school classrooms.

2. Concept of Innovative Pedagogy

Innovative pedagogy refers to the adoption of creative, flexible, and learner-centered instructional strategies that enhance meaningful learning. It involves the integration of new methods, tools, technologies, and assessment practices to improve learner engagement and outcomes. In teacher education, innovative pedagogy emphasizes active learning, reflective practice, collaboration, and real-world application of knowledge.

Innovative pedagogical approaches shift the focus from teaching to learning, encouraging B.Ed. trainees to take responsibility for their own professional development. These approaches promote higher-order thinking skills, problem-solving abilities, and professional autonomy.

3. Need for Innovative Practices in B.Ed. Programmes

The need for innovative pedagogical practices in B.Ed. programmes arises due to multiple factors. Learners today possess diverse backgrounds, abilities, and learning styles, necessitating differentiated instruction. The rapid growth of information and communication technology has transformed the nature of teaching and learning. Additionally, the demand for inclusive education requires teachers to be sensitive to diverse learner needs.

Innovative practices help bridge the gap between theory and practice, enhance teaching competence, and prepare trainee teachers for real classroom challenges. They also support outcome-based education and continuous professional development.

4. Innovative Teaching–Learning Pedagogical Approaches

4.1 Activity-Based Learning

Activity-based learning engages B.Ed. trainees in purposeful activities such as group discussions, debates, role plays, seminars, demonstrations, and project work. This approach enhances conceptual understanding, communication skills, and collaborative learning.

4.2 Experiential Learning

Experiential learning emphasizes learning through direct experience and reflection. Teaching practice, school internships, community outreach programmes, and field visits provide opportunities for trainee teachers to apply theoretical knowledge in real contexts.

4.3 ICT-Integrated Teaching

ICT-integrated pedagogy involves the use of digital tools such as smart boards, multimedia presentations, online learning platforms, and educational applications. ICT enhances engagement, accessibility, and digital competence among B.Ed. trainees.

4.4 Collaborative Learning

Collaborative learning strategies such as peer teaching, group assignments, and cooperative projects foster teamwork, leadership, and interpersonal skills.

4.5 Flipped Classroom Approach

The flipped classroom model allows trainees to access instructional content outside the classroom, while classroom time is used for discussion, clarification, and problem-solving.

4.6 Problem-Based Learning

Problem-based learning presents real-life classroom issues to trainees, encouraging critical analysis and creative problem-solving.

4.7 Reflective Teaching Practices

Reflective practices such as teaching journals, self-evaluation, and peer feedback enable continuous professional growth.

4.8 Micro-Teaching and Simulation

Micro-teaching sessions help trainees practice specific teaching skills in a controlled environment, building confidence and instructional competence.

5. Role of Teacher Educators

Teacher educators play a vital role in implementing innovative pedagogical practices. They act as facilitators, mentors, and role models, designing learner-centered activities and encouraging

experimentation and reflection. Continuous feedback and professional support from teacher educators enhance the effectiveness of innovative practices.

6. Outcomes of Innovative Pedagogical Practices

The adoption of innovative teaching–learning approaches leads to improved teaching competence, enhanced critical and creative thinking, better classroom management skills, and readiness for inclusive and digital classrooms. These outcomes contribute to the holistic professional development of B.Ed. trainees.

Challenges and Suggestions

Despite their benefits, innovative practices face challenges such as inadequate infrastructure, resistance to change, time constraints, and the need for continuous professional development. Institutional support, policy initiatives, and regular training programmes are essential to overcome these challenges.

Conclusion

Innovative teaching–learning pedagogical approaches are indispensable for improving the quality of teacher education. By integrating experiential, collaborative, and technology-enabled strategies, B.Ed. programmes can prepare competent, reflective, and socially responsible teachers. Sustained innovation and institutional commitment are crucial for aligning teacher education with contemporary educational needs.

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THE ROLE OF EMERGING TECHNOLOGIES AND DIGITAL LEARNING PLATFORMS IN EDUCATION

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Abstract

The successful role of contemporary emerging technologies in education and the digital teaching and learning process is examined in this study. The traditional teaching and learning process has undergone significant alterations as a result of globalisation. Globalisation has created a new generation of tech-savvy people. New learning platforms have made the world very different. A new era that is thought to be beneficial for the new educational system has been brought about by the internet, virtual reality (VR), augmented reality (AR), blog chains, 3D printing, gamification, artificial intelligence (AI), information communication technology, virtual classrooms, and other online learning platforms. For academics, students, and research scientists in the new educational system, emerging educational technologies and digital learning have ushered in a new era. The current paper examines a number of platforms that are accessible through legitimate websites and applications. The finest method for establishing the emerging technology learning process in education and digital teaching platforms with the touch of emerging technology is thought to be any branch of knowledge. The current paper goal is to investigate how the use of digital teaching and learning methods interact. It includes everything.

Key Words: Education, Emerging Technology, Digital Learning.

Introduction

Facilitating learning and the development of knowledge, skills, attitudes, beliefs, and habits is the process of education. Today's world is more complex and changing quickly, which puts new demands on our educational system. Every sector has been impacted by innovation, and the education sector is no exception. The classroom is now more participatory and dynamic thanks to digitalisation.

Teaching has become less stressful for both teachers and pupils because to technology. Inventiveness Teachers employ resources like table computers and mobile devices to offer students a more engaged experience. By improving accessibility, customisation, and flexibility, digital technology has revolutionised education. It makes high-quality education more accessible and inexpensive by facilitating online learning and offering immediate access to educational materials. The way teachers and students learn is changing as a result of the incorporation of new technologies into the classroom. Learning is now more dynamic, interesting, and flexible to meet the needs of each student thanks to these advancements. Technology has the ability to close the access and quality gap and prepare students for the needs of a world that is changing quickly, even though it is not a cure-all for educational problems.

To fully utilise emerging technologies, educators, legislators, and tech developers must collaborate as the educational landscape continues to change. By doing this, we can guarantee that education will continue to be engaging, relevant, and empowering for students of all ages, ultimately paving the way for a more promising future in education. Smart classrooms, flipped

classrooms, blended learning, virtual learning, blogs, Moodle, Skype, game-based learning, SAMR, social networking sites, and other digital technologies are being used to deal with these active learners.

Emerging Technologies and Digital Learning

A technology that is not now "commonly" used in education but has the potential to be more extensively adopted to assist advancements in teaching and learning is considered an emerging technology. Many of these technologies have been developing for some years. Many will be in a condition of constant "emergence" as they continue to change quickly. Virtual Reality: Digital education is meant to enhance rather than entirely replace conventional teaching methods. Some popular pedagogies, or instructional strategies, that combine technology and learning are listed below.

- **Virtual Reality:** This is an immersive technology that creates a simulated environment, enabling users to interact with and experience it in a way that appears real.
- **Augmented Reality:** School laboratories and classrooms are starting to be widely outfitted with technological infrastructure thanks to augmented reality, which may be viewed as a dynamic and interactive didactic instrument that helps modify the places, times, and ways of learning. For instance, WI-FI networks change how the classroom is run by enabling students to access to the Internet by directly controlling their own devices, enabling them to conduct research and participate in class activities.
- **Mobile learning:** process of acquiring knowledge and abilities via educational activities and content on mobile devices, offering adaptable and accessible learning opportunities at any time and from any location.
- **Artificial Intelligence:** This area of computer science focuses on creating intelligent machines that can carry out activities that normally call for human intellect. The process of acquiring information and skills through mobile-based educational activities and content that offer flexible and accessible learning possibilities at any time and from any location.
- **Internet of Things:** Internet of things supports the integration of sensors and smart devices like digital whiteboards. Educators can provide diversified and interactive instruction with these technologies.
- **Massive Online Open Courses (MOOC):** A massive open online course (MOOC) is an online course designed for widespread internet access and interactive participation. MOOCs include interactive user forums in addition to standard course materials like readings, videos, and problem sets that foster a sense of community among students, instructors, and teaching assistants (TAs).
- **Blended learning:** Traditional in-person classroom methods are combined with online learning resources and online participation opportunities in blended learning. Both the teacher and the student must be physically present, and students must have control over time, place, path, and location. Online learning offers individualised, self-paced learning with e-learning components that lend themselves to interactive media, such as skill-building games, videos, tutorials, quizzes, and social media components, all of which are accessible from the learners' home page in the Learning Management system, while classroom role-playing with instantaneous face-to-face feedback is available.

- **Flipped Classroom:** A flipped classroom is a cutting-edge teaching strategy. A paradigm shift in the way students acquire new knowledge is referred to as "flipping" a classroom. In a flipped classroom, students are encouraged to read or view lecture videos prior to class. Afterward, class time is set aside for debates, problem-solving exercises, and other forms of active learning that will enable them to recognise and assimilate what they have learnt. The "flipped" classroom allows students to complete the lower levels of cognitive work (learning) outside of class and then concentrate on the higher levels of cognitive work (applications, analysis, and evaluative reasoning), using Bloom's updated taxonomy (2001) as a framework.

Benefits

1. Both teachers and students now have much easier access to instructional materials thanks to the development of technological tools like e-learning platforms, artificial intelligence, and digital learning resources. These developments encourage more engagement and help students improve their ability to study independently.
2. A more dynamic, captivating, and productive learning environment is produced by digital transformation. Additionally, it supports educators in implementing creative and customised instructional strategies.
3. Through online learning platforms, digital transformation is transforming education by giving students access to knowledge at any time and from any location. Geographical and temporal restrictions are eliminated, which is especially advantageous for people who live in rural places or lack access to traditional education. As a result, more people are able to pursue education uninterrupted and educational possibilities become more egalitarian.
4. New forms of contact are made possible by digital learning tools, such as engaging in virtual classrooms, learning via video and online forums. These approaches not only make learning more engaging and dynamic, but they also motivate students to participate actively. Students can also receive rapid feedback by using learning software that facilitates automatic testing and evaluation.
5. Digital transformation lowers expenses for buildings, learning resources, and printing. All lectures, textbooks, and homework can be shared online rather than printed. Additionally, educational administration software saves time and human resources by automating a variety of administrative activities, such as maintaining grades, student information, and associated procedures.

Challenges

1. "Many rural and remote areas still have inconsistent internet connectivity and restricted access to contemporary learning devices despite investments in technological infrastructure." As a result, the quality of schooling in urban and rural areas differs significantly.
2. "In the midst of digital transformation, information security and privacy for both students and teachers remain critical concerns." The handling, storing, and utilisation of personal information in digital settings can present serious security issues, especially in educational systems with inadequate safeguards.
3. A shift in teaching methodology and perspective is necessary for the digital transformation of education, but not all educators, learners, or parents are prepared to accept these adjustments. Traditional approaches are preferred above modern technologies by many educators.

4. The transition to digital transformation in education runs the danger of making access disparities worse, particularly for students from disadvantaged backgrounds. These pupils may not be able to purchase the required digital gadgets or dependable internet connectivity due to a lack of funds, which could result in unequal learning opportunities. Future opportunities and academic advancement may be hampered by this digital gap.

Solutions to Support the Digital Transformation Process in Education

1. The efficacy of digital education depends critically on the calibre of online learning resources. As a result, digital learning resources in contemporary education should be rich, varied, and suited to various student demographics. To make learning more interesting and comprehensible, resources like interactive simulations, online exercises, and video lectures should be widely employed.
2. Policies and rules pertaining to the use of technology in education must be created and enhanced in order to support this process. To guarantee equity and security for all participants, authorities should publish comprehensive instructions on the use of student data, the protection of personal information, and rules regarding online instruction.
3. A range of online learning platforms have ushered in a new era that is thought to be beneficial for the new educational system. For this reason, policy makers must incorporate digital learning into the curriculum.
4. Creating platforms for online learning and education management and strengthening the legal framework.
5. Developing and growing digital infrastructure.

Conclusion

Virtual reality (VR), augmented reality (AR), and online learning platforms are examples of developing technologies that have significantly altered India's educational system. Student engagement, learning results, personalised learning, increased access to education, and teamwork have all benefited from these tools. By enabling students in remote locations to access educational resources and establish connections with peers and professionals worldwide, digital learning platforms have increased access to high-quality education. Additionally, these new technologies have made learning more individualised and flexible. Online learning platforms can customise recommendations and content according to each student's needs and learning preferences by using AI-powered algorithms.

Individual strengths and weaknesses are addressed, self-paced learning is encouraged, and a greater comprehension of the material is fostered by this tailored approach. Additionally, the education system's global communication and collaboration have been made easier by the incorporation of modern technologies. In order to promote cross-cultural understanding and cooperative problem-solving, students can interact and work together with classmates and professionals from various geographical regions. The learning process is enhanced by having access to international educational resources and viewpoints. A number of issues must be resolved before these new technologies can completely change India's educational system. These include infrastructure constraints, guaranteeing fair access to technology for people from all socioeconomic backgrounds, giving teachers proper training and professional development, and resolving privacy and data security issues. In conclusion, India's educational system has been completely transformed by the incorporation of cutting edge technology like virtual reality, augmented reality, and online learning platforms. These technologies have improved access to education, boosted student

involvement, created more individualised learning opportunities, and encouraged worldwide connectivity and teamwork. India can harness the transformative power of emerging technologies to build a more inclusive, dynamic, and efficient education system that equips students for success in the digital age by tackling obstacles and making investments in infrastructure, teacher training, and digital content.

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EDUCATIONAL PERSPECTIVES IN THE DIGITAL AGE

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Abstract

The rapid advancement of digital technologies has intensely influenced educational structures through the globe, bringing significant changes to teaching practices, learning spaces, and institutional operations. The digital era has introduced advanced implements such as artificial intelligence, education managing systems, virtual learning settings, and data-driven technologies that enable more personalized, flexible, and inclusive learning experiences. This paper examines major educational perspectives that have arose in the digital age, highlighting the evolution from traditional teacher-centred coaching to learner-centred, technology-supported pedagogical approaches. It emphasizes the rising significance of digital literacy, critical thinking, and lifetime learning competencies in equipping learners for a knowledge-driven and technologically advanced society. Additionally, the study explores both the opportunities and challenges of digital conversion in education, including concerns related to accessibility, equity, ethical technology use, and the ongoing need for proficient growth among educators. Through a study of current trends and practices, the paper underscores the implication of institutional support, effective policy frameworks, and innovative strategies for the positive addition of digital technologies to advance learning quality and learning outcomes. The findings highlight that adopting digital perspectives is vital for developing adaptable and future-ready educational systems in the twenty-first century.

Keywords: (Digital Education, Digital Pedagogy, Technology-Enhanced Learning, 21st-Century Skills, Learner-Centred Education)

Introduction

Education in the digital age is undergoing a reflective conversion driven by rapid advancements in information and communication technologies. Traditional models of teaching and learning are being redefined as digital tools, online platforms, and artificial intelligence increasingly influence how knowledge is created, accessed, and shared. These technical growths have expanded educational opportunities beyond conventional classrooms, enabling flexible, personalized, and learner-centred approaches that address the various requirements of contemporary learners. The digital age has not only reformed teaching methods but has also reformed the roles of educators and institutions. Teachers are transitioning from knowledge transmitters to facilitators and mentors, while educational institutions are challenged to redesign curricula, assessment strategies, and support systems to align with emerging digital competencies. Skills such as digital literacy, critical thinking, association, and flexibility have become essential for students to achieve in a technology-driven and globalized society. At the similar period, the combination of digital tools in education presents significant challenges, including issues of accessibility, equity, ethical use of technology, and the preparedness of educators to effectively adopt digital tools. Understanding these evolving educational perspectives is crucial for developing sustainable and inclusive learning environments. Therefore, this education inspects key viewpoints on learning in the digital age, highlighting the influence of technological innovation on teaching, learning, and institutional practices, and

emphasizing the need for strategic planning and continuous professional development to enhance educational quality and outcomes.

Digital Education

Digital education uses technology like online platforms, apps, and virtual classrooms to enhance teaching and learning, offering flexible, accessible, and personalized experiences through digital tools, content, and strategies, transforming traditional education to meet modern needs and build essential digital skills for all ages. It encompasses everything from e-learning and blended models to gamified content and AI, aiming to improve engagement, outcomes, and reach, especially for underserved groups

1. Digital Transformation of Teaching and Learning

The digital age has basically changed teaching and learning processes through the integration of information and communication technologies. Traditional classroom instruction is increasingly supplemented or replaced by online and blended learning models that offer flexibility and accessibility. Digital platforms, virtual classrooms, and learning management systems enable continuous interaction between educators and learners, facilitating collaborative and self-paced learning. These developments support personalized learning experiences by adapting instructional content to individual learner needs, preferences, and learning styles.

2. Learner-Centred Pedagogical Approaches

One of the best substantial educational perspectives in the digital age is the modification to learner-centred pedagogy. Technology empowers learners to take a dynamic part in their education by engaging in inquiry-based learning, problem-solving, and project-based activities. Digital tools provide learners with entree to diverse resources, enabling them to explore knowledge independently and develop higher-order thinking skills. This method inspires independence, creativeness, and all-time learning, which are essential competencies in a quickly changing digital society.

3. Role of Educators in the Digital Era

The role of educators has evolved from that of content deliverers to facilitators of learning. In the digital age, teachers are accountable for supervisory students in navigating digital resources, fostering critical thinking, and promoting ethical and responsible use of technology. Professional development and constant preparation are essential for educators to acquire digital competencies and academic talents essential for effective technology integration. Teachers must also adapt assessment strategies to evaluate both academic achievement and digital skills.

4. Digital Literacy and 21st Century Skills

Digital learning is a foundational element of teaching in the digital age. Learners must develop the ability to use digital tools effectively, evaluate information critically, and communicate responsibly in online environments. In addition to technical skills, education must emphasize 21st century competencies such as collaboration, creativity, critical thinking, and adaptability. These skills prepare learners to meet the difficulties of the modern workforce and actively participate in a technology-driven global society.

5. Artificial Intelligence and Emerging Technologies in Education

Developing technical skills, particularly artificial intelligence, are reshaping educational practices by allowing smart teaching schemes, automatic feedback, and adaptive learning platforms. AI-powered tools support personalized learning and enhance student engagement by

providing real-time assistance and customized content. However, the integration of AI also raises concerns related to data privacy, ethical use, and academic integrity. Addressing these experiments necessary perfect policies, institutional support, and ethical outlines to guarantee answerable implementation.

6. Equity, Access, and Inclusion

While digital technologies proposal major opportunities, they also highlight disparities in access to devices, internet connectivity, and digital skills. The digital divide remains a major challenge, particularly in underserved and rural communities. Ensuring equitable access to digital education requires investment in infrastructure, inclusive policies, and targeted support for disadvantaged learners. Inclusive digital practices can promote equal learning opportunities and contribute to social justice in education.

7. Institutional Support and Policy Frameworks

Effective combination of digital technologies in education depends on strong institutional support and effective policy frameworks. Educational institutions must provide technological infrastructure, professional development programs, and technical assistance to educators and learners. Rules should report issues such as curriculum redesign, assessment standards, data security, and ethical use of digital tools. Strategic planning and leadership show a vital role in sustaining digital innovation in education.

8. Challenges and Future Directions

Despite its benefits, digital education faces experiments some as resistance to change, lack of training, technological constraints, and concerns over quality assurance. Addressing these issues requires continuous research, innovation, and collaboration among stakeholders. Future educational perspectives should focus on developing resilient, flexible, and technology-enabled learning environments that balance innovation with pedagogical effectiveness.

Educational perspectives

Educational perspectives in the digital age focus on integrating technology to transform learning, offering access, flexibility, and personalization through tools like AI, online platforms, and virtual classrooms, while also grappling with challenges like digital divides, distraction, and the need to rethink pedagogy for lifelong skills in a rapidly changing world, emphasizing critical thinking, collaboration, and adaptable learning.

1. **Accessibility & Equity:** Digital tools democratize access to vast properties, breach down environmental barriers and offering opportunities for remote and lifelong learning, though challenges remain in ensuring universal access.
2. **Personalized & Flexible Learning:** Technology enables customized learning paths, self-paced study, and blended (hybrid) models, moving beyond traditional, rigid structures.
3. **Transformation of Teaching:** Educators shift from information providers to facilitators, using data analytics for early intervention and focusing on higher-order skills like critical thinking and problem-solving.
4. **New Skills for a New Era:** Education must equip students with digital literacy, adaptability, and collaboration skills for evolving job markets, addressing concerns about AI's impact and ensuring students can discern fact from fiction.

5. **Rethinking Boundaries:** Learning is no lengthier limited to the classroom; digital culture blurs lines between formal/informal learning, home/school, and social/academic life, requiring new frameworks for understanding where and how learning happens.
6. **Challenges & Criticisms:** Concerns include potential for distraction, disruption of memory, digital addiction, and the need for robust teacher training to manage these new environments effectively.

Digital Pedagogy in Education

Digital pedagogy refers to the purposeful and reflective integration of digital technologies and learning environments to enhance teaching and learning processes. Rather than focusing solely on the transmission of content, it emphasizes the creation of meaningful, interactive, and learner-centred experiences that promote collaboration, critical thinking, and the development of essential 21st-century skills for digitally connected learners. This approach involves the deliberate redesign of pedagogical practices by examining how students engage, interact, and construct knowledge within digital spaces, supporting adaptive learning pathways, global engagement, and authentic forms of assessment, while also considering ethical responsibilities. Importantly, digital pedagogy is not merely about the adoption of technological tools in education; instead, it is grounded in a critical pedagogical stance that evaluates the appropriateness, effectiveness, and consequences of technology use. Consequently, it highlights the significance of creation informed results not only about how digital tools are employed, but also about when their use may be unnecessary or counterproductive, with careful attention to their impact on learning outcomes and educational equity.

Digitalization as a Social and Cultural Transformation

The procedure of digitalization is foremost to a essential societal modification moving all ranges of societal life. With this, one has to be aware that digitalization is inevitable but, at the same, a social product. This means that digitalization and media change generally does not occur like a force of nature. It is a cultural manifestation and has to be discussed as such. The social dimension of digitization has ambivalent effects. Thus, digitalization provides the communicative basis for decentralism and pluralism. Simultaneously, the question of self-determination in times of data tracking is a central point of criticism. All these societal effects of digitalization also affect the educational field. There is a need for re-structuring key concepts such as learning, teaching, and education that considers socio-economic and cultural changes in the pedagogical field. In the context of an increasingly differentiated society, aspects like diversity and emancipation via and within education in the digital age are central aspects for a proper understanding of digital-based teaching and learning in theory and practice.

To develop such digital-based teaching and learning in theory and practice, contemporary media education and e-learning research face the challenge of opening up to a trans-disciplinary dialogue with other scientific disciplines. Such a dialogue makes it possible to address and discuss education's complexity in the digital age drawing knowledge and research results from different fields. The Series provides a forum for such a dialogue, for discussions and a critical, integrative analysis of social transformations in the digital age, drawn from different fields such as the humanities, social sciences, and economics. The Series aims to analyse the implications of cultural change on education in the digital age by bringing together trans-disciplinary dialogue and different theoretical approaches.

Shaping the Future of Learning in the Digital Age

The world remains in the grip of a profound learning crisis: 272 million children are out of school, and two-thirds of 10-year-olds in low and middle-income countries are unable to read with comprehension. As education systems face the mounting pressures of conflict, poverty, underfunding, climate shocks, and rapid technological change, the need for a bold and coordinated global response has never been greater.

UNICEF's new Digital Education Strategy 2025–2030 is a call to action to transform learning through the smart, sustainable, and inclusive use of technology. Rather than simply digitizing traditional approaches, we are reimagining education to dramatically improve learning outcomes placing teachers and learners at the centre and ensuring that digital solutions are evidence based, accessible for all, and aligned with national education priorities.

Digital learning can be a lifeline: reaching children in conflict zones, supporting teachers in remote areas, and opening new pathways for girls, children with disabilities, and those out of school. By bridging digital divides and leveraging innovations like AI and adaptive learning tools, we aim to empower teachers, accelerate foundational learning, build critical 21st-century skills, and strengthen entire education systems.

Together with governments, educators, technology partners, and communities, UNICEF is committed to creating a future where every child can learn safely, inclusively, and meaningfully in our rapidly evolving digital world.

Digital education initiatives

PM e-VIDYA

PMe-VIDYA is a comprehensive national initiative that brings together all digital, online, and broadcast-based educational efforts to provide multi-mode access to learning. Designed to benefit nearly 25 crore school-going children across India, the programme delivers diverse educational resources through multiple platforms such as digital and online media, television, radio, community radio, and podcasts.

An innovative initiative of the Ministry of Education, Government of India, PMe-VIDYA aims to sustain and strengthen school education by effectively leveraging information and communication technologies (ICT). It offers rich learning content through 12 DTH television channels, community radio, podcasts, and inclusive materials for Divyangs (Children with Special Needs), while utilizing various streaming platforms nationwide to broadcast audio and video educational content.

Pathshala

The Digital India campaign has encouraged the widespread integration of information and communication technologies (ICTs) into the teaching–learning process. In this context, ePathshala, a joint initiative of the Ministry of Human Resource Development (MHRD), Government of India, and the National Council of Educational Research and Training (NCERT), was launched in November 2015 to display and disseminate a wide range of educational e-resources. These resources include textbooks, audio and video materials, periodicals, and various other print and non-print learning materials.

Students, teachers, educators, and parents can access eBooks on multiple technological platforms, such as mobile phones and tablets, as well as through the web on laptops and desktop computers in flipbook format. ePathshala enables users to carry numerous books digitally on their

devices and offers user-friendly features such as zooming, bookmarking, highlighting, note-making, sharing, and easy navigation to enhance the learning experience.

DIKSHA: DIGITAL INFRASTRUCTURE FOR KNOWLEDGE SHARING

Digital Infrastructure for Knowledge Sharing (DIKSHA) is an initiative of the National Council of Educational Research and Training (Ministry of Education, Govt. of India)

PM eVidya

PMe-VIDYA is a distinctive and innovative initiative of the Ministry of Education, Government of India, aimed at sustaining school education through the effective use of information and communication technologies (ICT). The programme provides a wide range of educational resources across multiple platforms, including digital and online media, 12 DTH television channels, community radio, podcasts, and specially designed content for Divyangs (Children with Special Needs). By utilizing various streaming platforms available nationwide, PMe-VIDYA ensures the delivery of educational content in both audio and video formats, thereby enhancing access and inclusivity in learning.

NISHTHA

The National Education Policy (NEP) 2020 emphasizes the pivotal role of teachers in nation-building, stating that teachers shape the future of children and, consequently, the future of the nation. To ensure the best possible outcomes for learners and society, NEP 2020 highlights the need for motivated and empowered teachers. Accordingly, the policy recommends that every teacher and head teacher engage in a minimum of 50 hours of Continuous Professional Development (CPD) annually, aligned with their professional interests.

These CPD programmes are designed to focus on contemporary pedagogical practices, including foundational literacy and numeracy, formative and adaptive assessment, competency-based learning, and innovative approaches such as experiential learning, arts- and sports-integrated methods, and storytelling-based pedagogy. In line with the vision of NEP 2020, NCERT, in collaboration with States and Union Territories and autonomous bodies under the Ministries of Education, Defence, and Tribal Affairs (such as CBSE, KVS, NVS, CTSA, AEES, Sainik Schools, and CISCE), has launched the NISHTHA 2.0 online Integrated Teacher Training Programme for various stages of school education. This initiative includes NISHTHA at the Elementary level (Classes I–VIII), Secondary level (Classes IX–XII), Foundational Literacy and Numeracy (Classes I–V), and Early Childhood Care and Education (ECCE) for CRC, BRC, DIET and SCERT faculty, Programme Officers, CDPOs, Anganwadi supervisors, and teachers at the foundational and preparatory stages.

NCF Tech Platform

As per the National Education Policy, 2020, following four NCFs will be developed: National Curriculum Framework for Early Childhood Care and Education (NCFECCE) National Curriculum Framework for School Education (NCFSE) National Curriculum Framework for Teacher Education (NCFTE) and National Curriculum Framework for Adult Education (NCFAE) In this regard, a comprehensive strategy has been worked out jointly by the Ministry of Education (MoE) and NCERT. As per this strategy, at the State level

ICT Curriculum

The National Policy on ICT in School Education has set the goal of preparing youth to participate creatively in the establishment, sustenance and growth of a knowledge teachers and

children must be treated not merely as consumers but also as active producers. The digital India Campaign (2015) strives to transform India into a digitally empowered society and knowledge economy by focusing on the three vision areas.

Accessibility in School Curriculum

Efforts toward equitable education and inclusive education aim to address educational needs that arise as a result of belonging to SEDG's as well as those that arise despite having no association with SEDGs. Addressing the special educational needs demands availability of resources in multiple modes and flexibility in content delivery for personalized adaptive learning. Mentioned below are the major initiatives taken by NCERT for making education accessible to all including children belonging to SEDG's, recognized in NEP 2020.

Bharatonthemoon

Chandrayaan -3 and 23 August 2023 is etched in history as a glorious day for Indians. Our Prime Minister, Shri Narendra Modi, declared 23 August to be celebrated as National Space Day marking the significance of this milestone event. NCERT under the aegis of DoSEL, MoE, and Govt. of India aims to inspire the young Indians in Science, Technology, Engineering, Art and Mathematics using activities based around the legacy of Chandrayaan-3. Every month, the new creative activities and initiatives, will aim to promote skill sets that foster innovation and critical thinking in young minds. We hope teachers, parents and students use these resources to create enriching learning experiences within the classroom and beyond

The Importance of Digital Education

To be successful in the workplace of the future, people will need to have the right digital education. Whether in school, at university or on the job – the digital transformation that is under way is making IT skills more important every day. Digital media are also creating new opportunities for digital learning. I am confident that our company will be able to meet the challenges of digitalization and take advantage of the opportunities it presents, but we will need a comprehensive approach.

Industry 4.0 Needs Education 4.0

Digital transformation is underway. People working for start-ups are not the only ones who need digital skills increasingly, industrial workers in plants, staff in administrative positions and managers of banks need to be adept in the digital realm as well. Our educational system and, in particular, the way we learn and teach must therefore be adapted for this era of digitalization. This is true for all educational levels – from primary school to vocational schools and universities to continuing education. A digital education will allow people to continue to participate in social life in a self-determined manner in the future. In addition, digital education will ensure that companies remain competitive. Simply put: Industry 4.0 needs education 4.0. With the digital transformation, we must radically alter both how we learn and what we learn. This is because digital skills have become a fourth key competency alongside reading, writing and arithmetic.

New Paths to Digital Learning

We must change not only what we learn, but also how we learn. Whether this involves digital platforms, virtual or augmented reality, online libraries or webinars digital media make possible a host of new and innovative forms of teaching and learning in schools, vocational institutions and universities as well as in corporate training and development programs. Digital learning means more than just digitizing traditional instruction materials. Using digital media in education will result in completely new areas of communication, cooperation and networking. Since digital

instruction is not bound by time and place, it is more flexible, more individualized and more mobile than traditional forms of learning. In the digital era, course materials are created, shared with others and developed together in the cloud. With digital instruction, students learn at an early age to accept greater personal responsibility while also improving communication and teamwork.

Education on Par with Digitalization

As a company, we must ensure that our occupational vocational and advanced training efforts keep pace with digital transformation. At Merck, we already provide our apprentices with regular digital training. We also offer junior managers a digital development program in cooperation with Stanford University. And all employees can use our learning app to get up to speed with the latest on digitalization. Despite all the changes that are taking place in the wake of digital transformation, the goal of education remains the same: It should enable people to develop as individuals and allow them to participate in social, political and economic life in a responsible manner. That is why we need education that is on par with the latest technology.

Conclusion

Education in the digital age is experiencing a deep conversion formed by rapid technological advancements, globalization, and evolving societal needs. Digital tools and platforms have expanded access to knowledge, personalized learning experiences, and fostered innovative teaching learning practices that move beyond traditional classroom boundaries. At the same time, these developments challenge educators and institutions to rethink pedagogical approaches, curriculum design, assessment methods, and the part of trainers as facilitators of learning relatively than simple transmitters of information. However, digitalization in education should not be viewed as a purely technical or inevitable process; it is a societal and traditional phenomenon that reflects human values, choices, and power relations. Issues such as the digital divide, data privacy, ethical use of technology, and the necessity for critical digital literacy must be addressed to confirm complete and equitable educational chances for all learners. Technology alone cannot guarantee educational quality; its effectiveness depends on thoughtful integration supported by institutional policies, teacher training, and learner-centred pedagogies.

Ultimately, educational perspectives in the digital age call for a balanced and reflective approach one that embraces technological innovation while remaining grounded in humanistic values, critical thinking, and social responsibility. By aligning digital transformation with educational goals and societal well-being, education can empower learners to navigate complexity, adapt to change, and contribute meaningfully to a digitally connected world.

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PARAKH AND COMPETENCY-BASED ASSESSMENT: EXAMINING IMPLEMENTATION OUTCOMES OF NEP 2020

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Abstract

The National Education Policy (NEP) 2020 initiated a significant shift in India's educational landscape by promoting Competency-Based Assessment (CBA) as a replacement for traditional rote-based testing. To facilitate this transformation, PARAKH was established as a national assessment regulator to standardize assessment frameworks, promote learning outcome-based evaluation, and ensure comparability across school boards. This study examines the level of awareness, implementation practices, and challenges faced by teachers regarding PARAKH-driven CBA. Using a descriptive survey method with a sample of 120 teachers from government and private schools, the study employed mean, standard deviation, frequency distribution, and t-test for analysis. Results reveal that private school teachers exhibit significantly higher awareness and implementation readiness compared to government school teachers. While teachers acknowledged the benefits of CBA in improving student learning, several challenges—such as inadequate training, lack of resources, and limited assessment literacy—were identified. The study highlights the need for robust capacity-building initiatives and strong institutional support to ensure effective CBA implementation under NEP 2020.

Keywords: PARAKH, Competency-Based Assessment, NEP 2020, Learning Outcomes, School Assessment Reform, Teacher Readiness, Educational Policy

1. Introduction

The National Education Policy (NEP) 2020 introduced a paradigm shift in Indian school education by recommending a move away from memory-based, high-stakes examinations toward Competency-Based Assessment (CBA) that measures learners' skills, understanding, and real-world application (MHRD, 2020). To operationalize this shift, the policy established Parakh as a central agency under NCERT to set assessment standards, develop frameworks, and ensure comparability across school boards (Chakraborty & Gupta, 2022). Traditional assessments in India have long been criticized for focusing on factual recall rather than deeper learning (Batra, 2021). CBA, by contrast, emphasizes mastery of skills, problem-solving, conceptual clarity, and holistic development (OECD, 2019). PARAKH aims to guide the transition by supporting states, boards, and schools through test development models, assessment tools, and capacity-building programmes. However, implementing CBA at ground level depends largely on the readiness of teachers, availability of resources, school culture, and systemic support. Early reports suggest that teachers often struggle with designing competency-based tasks and rubrics (Nayak, 2023). This study investigates the current level of implementation of PARAKH-driven CBA in schools and examines teachers' perceptions, challenges, and readiness.

2. Need and Significance of the Study

The present study is essential because NEP 2020 has initiated one of the most transformative reforms in India's educational assessment landscape, making it crucial to examine how these

changes unfold at the school level. PARAKH, as the national assessment body, plays a pivotal role in shaping the future of school evaluations; however, its success depends significantly on teachers' awareness, readiness, and capacity to implement competency-based practices. Understanding teachers' perceptions and identifying the challenges they face will provide valuable insights into the current state of implementation and the systemic barriers that need to be addressed. The study is particularly significant in bridging the gap between policy and practice, as early research indicates that schools often struggle to shift from traditional assessment methods to competency-based frameworks due to limited training, unclear guidelines, and resource constraints.

Additionally, evaluating the initial outcomes of PARAKH-integrated CBA helps determine whether the reforms are leading toward improved learning experiences and more accurate measurement of students' abilities. As India moves toward creating standardized learning benchmarks and comparable assessments across boards, empirical evidence on implementation realities becomes vital for policymakers, administrators, and teacher education institutions. This study contributes to strengthening assessment reforms by highlighting areas requiring further capacity building, infrastructural support, and alignment between curriculum and evaluation. Ultimately, the findings will guide future interventions aimed at enhancing assessment literacy, promoting holistic learning, and ensuring equitable and effective adoption of competency-based assessment across schools.

3. Review of Literature

The implementation of Competency-Based Assessment (CBA) in school education has gained global recognition as a progressive approach to measuring students' learning outcomes. International frameworks, such as the OECD Learning Compass (OECD, 2019), emphasize the importance of assessing competencies like critical thinking, collaboration, problem-solving, and creativity to prepare learners for complex real-world challenges. In India, the National Education Policy (NEP) 2020 marked a paradigm shift in assessment practices by advocating for holistic, formative, and performance-based assessments rather than rote memorization (MHRD, 2020). Several scholars have argued that traditional examinations tend to prioritize factual recall, thereby limiting opportunities for deep learning and conceptual understanding (Batra, 2021). Competency-based models, on the other hand, encourage continuous assessment, learner engagement, and mastery of skills, making them more aligned with contemporary pedagogical needs. To operationalize these reforms, the Government of India established PARAKH (Performance Assessment, Review, and Analysis of Knowledge for Holistic Development) as a national assessment regulator. Research highlights that PARAKH's role in standard-setting, development of learning indicators, and harmonization of assessment practices across school boards is critical in ensuring consistency and quality in evaluation (Kaur & Sinha, 2023). However, despite these policy advancements, the transition to CBA presents several challenges. Studies examining early implementation reveal that teachers often face difficulties in designing competency-aligned tasks, constructing rubrics, integrating formative assessments, and analyzing assessment data (Nayak, 2023; Sharma, 2023). Moreover, teachers' professional readiness plays a significant role in determining the success of assessment reforms. Gupta and Raman (2021) found that insufficient training and limited exposure to assessment tools create implementation gaps at the classroom level. Collectively, the literature underscores the need for robust training systems, resource availability, and school-level support to ensure that PARAKH and NEP 2020's assessment goals translate into effective classroom practices.

4. Objectives

1. To assess teachers' awareness of PARAKH and CBA.
2. To examine the extent of CBA implementation in schools.
3. To identify challenges faced by teachers in implementing CBA.
4. To compare government and private school teachers' perceptions.

5. Hypotheses

H₁: There is no significant difference between government and private school teachers' awareness of PARAKH.

H₂: There is no significant difference in implementation levels of CBA between the two groups.

6. Methodology

Research Design: A descriptive survey method was used to assess the implementation outcomes of PARAKH and CBA.

Sample: The sample consisted of 120 school teachers from government schools (n=60) and private schools (n=60)

Sampling Technique: Stratified random sampling technique was used in the study.

Tools Used: A structured questionnaire developed by the researcher, including:

1. Awareness of PARAKH and CBA
2. Implementation practices
3. Challenges and support needed

Statistical Techniques

- Mean
- Standard Deviation
- t-test for independent samples
- Frequency distribution

7. Data Analysis and Interpretation

Table 1. Awareness and Implementation Scores of Teachers (N = 120)

Group	N	Mean Score	SD	t-value	Interpretation
Government Schools	60	62.40	8.52		
Private Schools	60	65.85	7.94	2.31*	Significant

*Significant at 0.05 level.

Interpretation

Private school teachers showed significantly higher awareness of PARAKH and CBA frameworks compared to government school teachers.

Table: 2 Frequency Distribution of Teachers' Perception of Competency-Based Assessment (CBA)

Response Category	Likert Value	Frequency (f)	Percentage (%)	Cumulative Frequency (cf)
Strongly Disagree	1	5	5%	5
Disagree	2	12	12%	17

Neutral	3	20	20%	37
Agree	4	38	38%	75
Strongly Agree	5	25	25%	100
Total	—	100	100%	—

Interpretation

The frequency distribution indicates that a majority of teachers (38% agree, 25% strongly agree) hold positive perceptions toward the implementation of competency-based assessments under PARAKH. Only a small proportion (5% strongly disagree, 12% disagree) expressed negative views. The cumulative frequency shows that 75% of respondents fall at or above the “Agree” level.

8. Findings of the Study

Awareness Differences: Private school teachers demonstrated significantly higher awareness of PARAKH and CBA compared to government school teachers, as reflected by the higher mean score ($M = 65.85$) and significant t-value ($t = 2.31^*$).

Positive Perception of CBA: The frequency distribution indicates that 63% (38% agree + 25% strongly agree) of teachers hold a positive perception toward CBA, suggesting broad acceptance of the new assessment approach.

Limited Negative Response: Only 17% of teachers expressed disagreement or strong disagreement with CBA, showing minimal resistance to the reform.

Moderate Neutrality: About 20% of teachers remained neutral, reflecting uncertainty or insufficient understanding of CBA processes.

Implementation Challenges: Qualitative feedback and literature indicate challenges related to designing competency-based tasks, creating rubrics, understanding learning outcomes, and managing time for continuous assessment.

Training Gap: Teachers reported insufficient training and lack of professional development opportunities for effectively adopting PARAKH-aligned CBA practices.

School-Type Variation: Private schools appear to have better institutional readiness and support systems, contributing to higher CBA implementation levels.

9. Discussion

The findings of the study support existing literature indicating that NEP 2020’s shift to competency-based assessment is both timely and necessary, but requires extensive systemic support to succeed. Private school teachers reported greater awareness and readiness, corroborating past studies that found private institutions often have better access to training and resources (Nayak, 2023; Gupta & Raman, 2021). Higher scores among private teachers may be attributed to greater exposure to workshops, better digital infrastructure, and institutional emphasis on continuous teacher development. In contrast, government school teachers face constraints such as heavy workload, limited training, and insufficient resources, which hinder their ability to implement CBA effectively. These findings align with earlier reports highlighting systemic gaps between policy intent and classroom-level execution (Sharma, 2023). The majority of teachers expressed positive attitudes toward CBA, indicating that the reform is conceptually accepted; however, practical challenges in assessment design and interpretation remain significant barriers. The frequency distribution underscores that while teachers understand the value of CBA, many require structured guidance and hands-on training to translate theory into practice. Furthermore, the significant difference between government and private schools suggests the need for equitable resource

distribution and standardized training models. Overall, the study reveals that PARAKH's role in promoting CBA is promising, but its practical impact depends largely on sustained teacher capacity-building and institutional support.

10. Conclusion

The study concludes that PARAKH, as envisioned under NEP 2020, plays a crucial role in transforming India's assessment landscape by promoting competency-based and holistic evaluation practices. Teachers largely view CBA positively, recognizing its potential to enhance learning outcomes and move beyond memorization-based testing. However, the findings indicate a substantial variation in awareness and implementation between government and private schools, with private schools displaying higher readiness. Key barriers identified include limited training opportunities, lack of standardized tools, and insufficient clarity in implementing learning outcome-based assessments. To ensure successful and equitable adoption of CBA nationwide, it is essential to strengthen professional development initiatives, provide comprehensive assessment resources, and enhance institutional support—especially for government schools. PARAKH must continue to refine its frameworks, expand outreach efforts, and collaborate closely with state boards to bridge gaps between policy and practice. With sustained support and systematic implementation, CBA has the potential to significantly elevate the quality of learning and assessment in Indian schools.

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STUDY OF TEACHER'S PERCEPTION OF EFFECTIVENESS OF DIET'S TRAINING PROGRAMMES IN KARNATAKA

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ABSTRACT

The National Achievement Survey (NAS-2015) found that the majority of the States/UTs are performing below the overall average score in all subject areas secondary schools, and highlights the need for significant improvement not only Learning also Teaching. Low achievement largely because of low perception level of the students and low perception of the students depends on teaching skills of the Teachers and Teaching skills are directly related to the effectiveness of the Teacher Trainings. Teachers training (Pre-Service and In-Service) programs might be redesigned on the basis of NAS findings to improve pedagogical aspects, and also Teacher education. The present investigation was undertaken to study 'The Perception level of Effectiveness of the DIETs Training in Karnataka with respect to Teachers Experience, Sex, Age and Qualifications. The researcher had selected Teachers giving representation to Sex of the teachers. The Effectiveness of the DIETs Programs (EDP) scale was developed and used by Rajanna SP and Dr. HaseenTaj. In order to understand the distribution of the scores Percentile was worked out. Chi-square analysis was applied to find out the Association (Relationship) between the Perceptions of Teachers on Effectiveness of the DIETs Programs'. The study found that there is a positive significant relationship between The Perception of Elementary Teachers on Effectiveness of the DIETs Programs' and also the study found that there is a significant difference in the Perception of male Elementary Teachers and female Elementary Teachers. It is further revealed that the Age factor and Experience of Elementary Teachers was found to have a significant effect on the Effectiveness of the DIETs Programs in Karnataka. Ability or Higher

Key words: Perception, Effectiveness, Teacher trainings, research,

INTRODUCTION

The National growth and development of any economy is directly depending on Natural and Human resources. Education is stepping stone and plays a major role in promoting growth and development of Human Resources. This has already been acknowledged by almost all educationists and national builders. Accordingly, several steps have been initiated by all developing countries Education. The quality of Education is directly depends on Teachers and the efficiency of Teachers related to Teacher Trainings provided by DIETs at the district levels in every state of India. In order to bring out the innate potentials of the students, the role of teacher is significant in their processes of education. The essence of teacher education leads to the growing generation. This process has been initiated by establishing the District Institute of Education and Training (DIET) in 1989. By the inception of DIETs, the centralized training system transformed in to a more transparent manner by extending training to the doors of the teachers.

Changes are taking place rapidly in the field of education through knowledge construction in the field of Science and Technology. The emergence of DIETs caused new change in the teacher training education that resulted in the changes of teaching learning process of schools. DIETs are plays major role by providing the Academic Resource, Monitoring and Supervision, Material

development and also Research and Evaluation guidance and support at the grass root level for teachers. The ultimate attention in all the program of the different faculties of DIETs is the learners and their educational rights. Thus the entire activities enunciated by DIETs are meant for Human Resource Development.

The department of education introduced many programs like Minimum Levels of Learning (MLL), ICT program to identifies the learning levels of children and to ensure an equitable, quality across different contexts of schooling by focusing Education for all. To achieve these basic requirements of quality education, we need responsible, skillfully, vibrant and qualitative teachers who can serve honestly and judiciously in the field of Education. Teachers can enriched and activate by providing continuous training, giving opportunity for continuing their education for the enhancement of their professional development at district level by DIETs at State level by DSERT and at the National level by NCERT.

Considerable and innovative classroom practices carried out by the DIETs in the area of Teacher education as well as school education. DIETs have launched many in-service teacher-training programs which help the teachers to enrich themselves in their conceptualization, professional development and pedagogy. The present investigation was undertaken to study 'The Relationship between the Perception of Teachers on Effectiveness of the DIETs Programs on the variables Sex, Age, Experience of the teachers were considered as background variables to study their effect on Effectiveness of the DIETs Programs. The researcher had selected 608 Teachers giving representation to Sex, Age and Experience of the teachers. The Effectiveness of the DIETs Programs (EDQ) was measured by using EDQ which containing 60 questions with four dimensions developed by Rajanna SP and Dr.HaseenTaj were used as tools. In order to understand the distribution of the scores numerical determinants like Mean, SD was worked out. Chi-square test and percentiles were applied to find out the Relationship between the Perception of Teachers on Effectiveness of the DIETs Programs' and 'Chi-square 'test was applied to find out the significant difference between different variables.

OBJECTIVES OF THE STUDY

The main purpose of the study was to find the Elementary level teacher perception of the Effectiveness of the DIET's programs in Karnataka State. The following objectives were formulated.

- To find out the Association (Relation) between the perceptions of the Elementary teacher's on Effectiveness of the DIETs programs and various districts.
- To find out the Association (Relation) between the perceptions of the Elementary teacher's on Effectiveness of the DIETs programs and Teachers Experience
- To find out the Association (Relation) between the perceptions of the Elementary teacher's on Effectiveness of the DIETs programs and Teachers Qualification.

MAJOR HYPOTHESIS OF THE STUDY

- There is no significant Association (Relation) between the perceptions of the Elementary teacher's on Effectiveness of the DIETs programs and various districts.
- There is no significant Association (Relation) between the perceptions of the Elementary teacher's on Effectiveness of the DIETs programs and Experience
- There is no significant Association (Relation) between the perceptions of the Elementary teacher's on Effectiveness of the DIETs programs and Qualification.

SAMPLE AND TOOL OF THE STUDY

Among the 34 DIETS in Karnataka 30 are in revenue districts and 4 in Educational districts. The present study has been carried out only in five DIETs which were considered as the representative districts of four divisions of Karnataka on the basis of their geographic nature and socio-economical status. The functioning of DIETS in these districts was little different at the time of the present study. The questionnaire on Effectiveness of the DIET's Programs (EDQ) contains 60 standardized questions by the A, B, C, D four parts. The present tool was developed by Rajanna SP and Dr. Haseen Taj (2015).

Table-1: The sample for the study:

No	DISTRICT	Male	%Male	Female	%Female	Total	%Total
1	BIJAPUR	108	62.06	66	37.93	174	28.61
2	TUMKUR	52	29.88	68	39.08	120	19.73
3	MYSORE	73	41.95	73	41.95	146	24.04
4	BANGALORE	10	5.74	42	24.13	52	8.55
5	BIDAR	64	36.78	52	29.88	116	19.07
Total		307		301		608	100%

Graph-1: The sample for the study

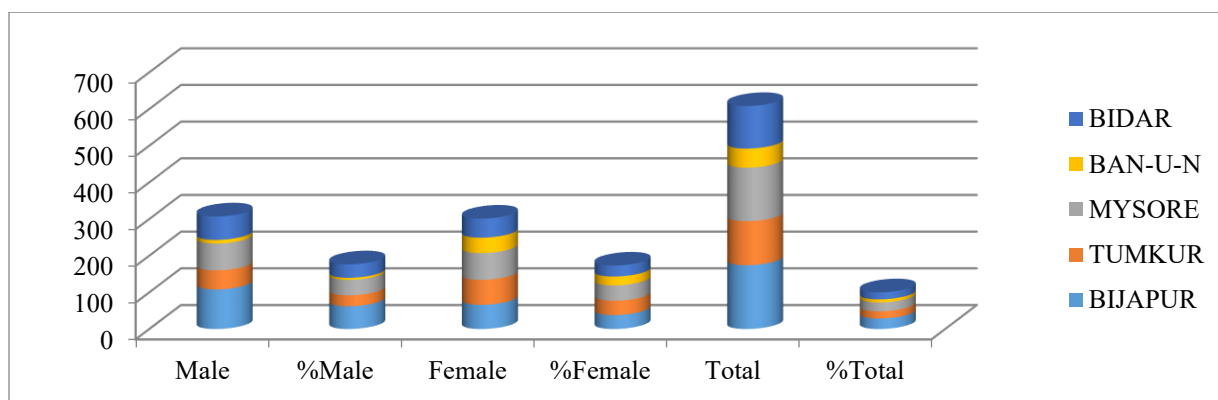
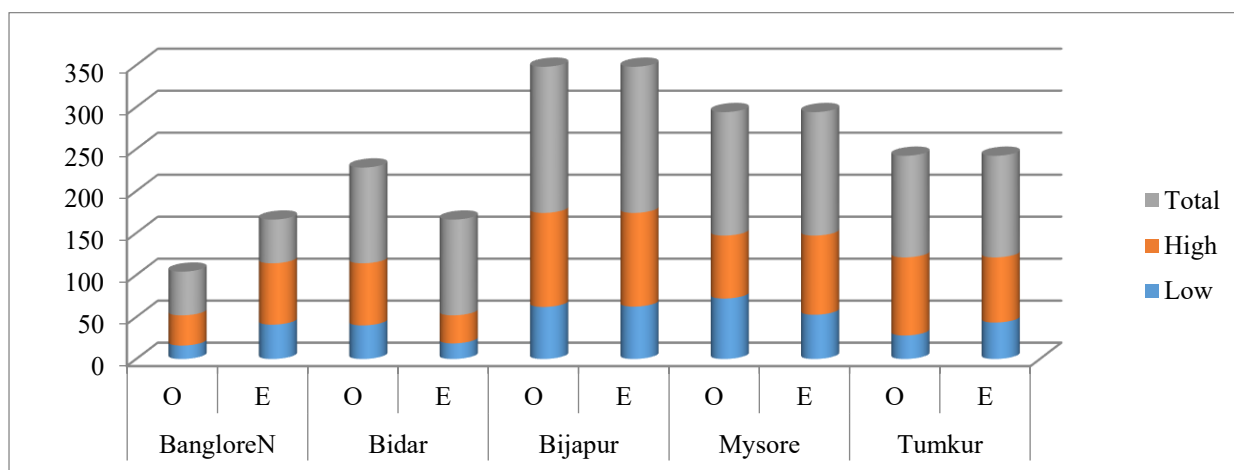


Table-2: Chi-square test for association between Effectiveness of Programs and districts.

Educational Division			Effectiveness level of Program			Chi Square
			Low	High	Total	
1.	Bangalore	O	16	36	52	$\chi^2=20.132$ (P=0.000)
		E	18.6	33.4	52.0	
2.	Bidar	O	40	74	114	
		E	40.9	73.1	114.0	
3.	Bijapur	O	62	112	174	
		E	62.40	111.6	174.0	
4.	Mysore	O	72	75	147	
		E	52.7	94.3	147.0	
5.	Tumkur	O	28	93	121	
		E	43.4	77.6	121.0	
	Total	O	218	390	608	
		E	218.0	390.0	608.0	

Note: O=Observed; E=Expected; df=4 (Table Value 0.05=9.488; 0.01 =13.277)

Graph-2: Chi-square test for association between Effectiveness of Programs and districts



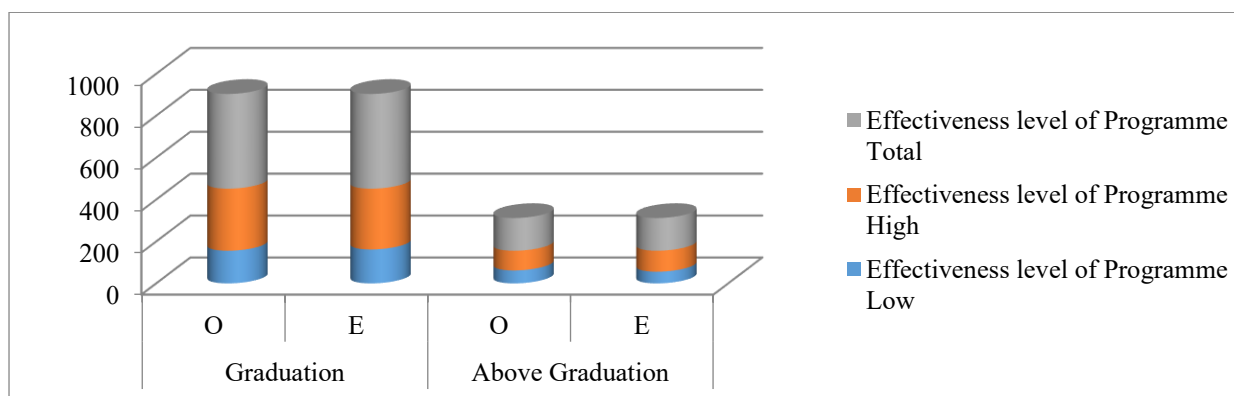
Greater differences between expected and actual data produce a larger Chi-square value. The larger the Chi-square value, the greater the probability that there really is a significant difference. The table value of χ^2 for 4 degree of freedom at 5% level of significance is 9.48 and also at 1% level of significance is 13.27. We note that the result is highly significant. The calculated value of χ^2 is 20.132 ($P=0.000$) is much higher than the table value and hence reject the null hypothesis and the result indicates that there is a significant association or relationship between the perception of Effectiveness level of the DIETS and districts.

Table-3: Chi-square test for association between Effectiveness of Programs and Qualification.

Educational Qualification			Effectiveness level of Program			Chi Square
			Low	High	Total	
1.	Graduation	O	156	296	452	$\chi^2=1.379$ ($P=0.240$)
		E	162.1	289.9	452.0	
2.	Above Graduation	O	62	94	156	
		E	55.9	100.1	156.0	
	Total	O	218	390	608	
		E	218.0	390.0	608.0	

Note: O=Observed; E=Expected; df=1 (Table Value 0.05=3.841; 0.01 =6.635)

Graph-3: Chi-square test for association between Effectiveness of Programs and Educational Qualification



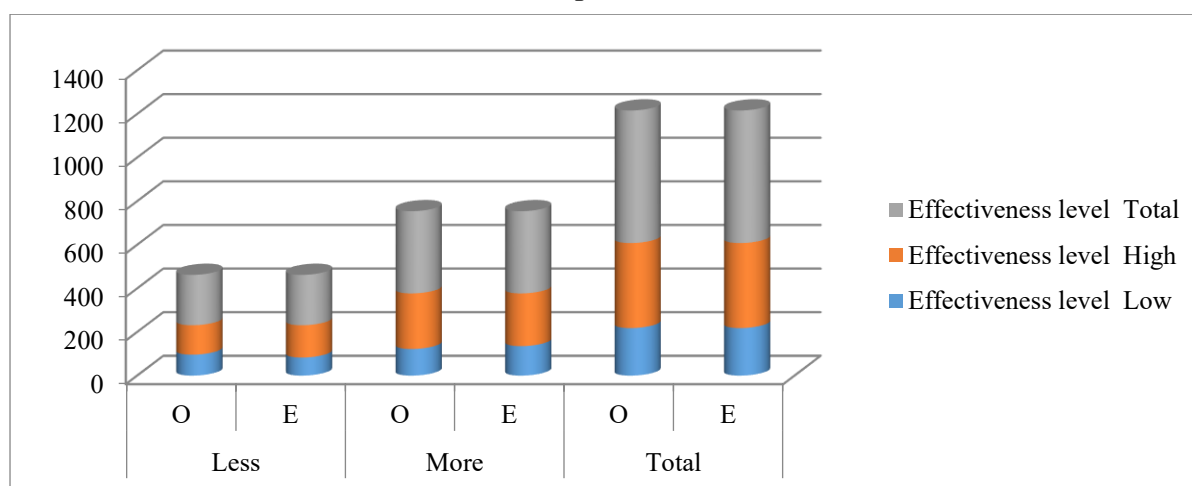
The table value of X^2 for 1 degree of freedom at 5% level of significance is 3.841 and also at 1% level of significance is 6.635. We notice that the result is not significant. The calculated value of X^2 is 1.379 ($P=0.240$) is much lower than the table value and hence accept the null hypothesis and the result indicates that there is no significant association or relationship between the Effectiveness level of the DIET programs and Educational Qualification.

Table-4: Chi-square test for association between Effectiveness of Programs and Teaching Experience

Teaching Experience			Effectiveness level of Program			Chi Square
			Low	High	Total	
1.	Less	O	96	135	231	$\chi^2=0.569$ ($P=0.022$)
		E	82.8	148.2	231.0	
2.	More	O	122	255	377	
		E	135.2	241.8	377.0	
	Total	O	218	390	608	
		E	218.0	390.0	608.0	

Note: O=Observed; E=Expected; $df=1$ (Table Value 0.05=3.841; 0.01 =6.635).

Graph-4: Chi-square test for association between Effectiveness of Programs and Teaching Experience



The table value of X^2 for 1 degree of freedom at 5% level of significance is 3.841 and also at 1% level of significance is 6.635. We notice that the result is not significant at 5% level and also no significance at 1% level. The calculated value of X^2 is 0.569 ($P=0.022$) is much lower than the table value at 5% and 1% level and hence accept the null hypothesis and the result indicates that there is no significant association or relationship between the Effectiveness level of the DIETs programs and Teaching Experience.

DISCUSSION OF THE RESULTS:

Azim premji Foundation [1] noticed that The DIETs are envisioned as ‘Academic Lead Institutions’ to provide guidance to all academic functionaries in the district. The present study found that the result is highly significant the calculated value of X^2 is 20.132 ($P=0.000$) is much higher than the table value (Table Value 0.05=9.488; 0.01 =13.277) and hence reject the null hypothesis and the result indicates that there is a significant association or relationship between the

Effectiveness level of the DIETS and districts. By using technology in trainings the Effectiveness of the DIETs programs can be enhanced and regular use of quality monitoring tools developed by the department should also be mandated.

The Chi-square test result shows that there was no significant association in the Effectiveness level of the DIET and the Sex of the Elementary level Teachers ($X^2 = 3.115$, $P=0.078$). The perception level of Elementary Teachers on Role Performance does not depend upon the Sex of the Elementary level Teachers; the perception of male or female Teachers does not affect the Role Performance Perception level of Elementary Teachers. Babukuttan [2] founds that the existing training system of the DIETS should be restructured for enlarging the human resource development capacity of the teachers irrespective of their sex and the training module in the areas like subject knowledge, pedagogic skill, preparation of Teaching Learning Materials and skill in devising innovations in classroom should be modified in a more practical and realistic manner.

K.S George [3] founds that the teacher Effectiveness in Primary schools at Kerala many factors helping for the optimum utilization of teacher effectiveness and to select the most suitable factors that would help the teachers work effectively. The present study found that The calculated value of X^2 is 0.569 ($P=0.022$) is much lower than the table value at 5% and 1% level and hence accept the null hypothesis and the result indicates that there is no significant association or relationship between the Effectiveness level of the DIETs programs and Teaching Experience.

EDUCATIONAL IMPLICATIONS:

The study focused on the factors that lead to the high Perception level of Effectiveness of the DIETs programs. The teachers' capacity has been boosted up through the effective training programs. Therefore there should be continuous training programs to elementary level teachers. The level of Effectiveness of teachers in the five districts is mentioned, in all in the sample district, are the expected level of achievement. The result indicates that there is a significant association or relationship between the Effectiveness level of the DIETS with Teaching Experience and Qualification of Elementary Teachers, therefore teachers should be encouraged to enhance their educational qualification. The in-service programs should be planned well in advance for effective perception of Teachers.

The qualified and experienced Teachers can also involve in the Training programs as resource persons. All sanctioned posts should be filled with in the span of time and Improve the Infrastructure according to latest MHRD [4] norms. An appropriate transfer policy to DIETs should be drawn up. Such a transfer policy should make provision for identification of academically well qualified and interested persons, from amongst the officers of the department and post them to the vacancies in DIET.

Monitor the academic programs whether they have going on according to the annual calendar of events and check the annual examination results & admissions from last years with proper feedback. Principals must equip to become effective leaders of modern institutes of excellence. Regular use of quality monitoring tools developed should be mandated and all training programs developed and delivered by the DIETs be evaluated by the participants.

Orientation Programs for Teacher Educators to develop the leadership quality and group dynamics at pre-service teacher education programs. The training to elementary school teachers should be provided in small groups so that the problems faced by teachers in curriculum transaction may be discussed in detail during in-service teacher training programs. Unless these constructive environments are created there is no hope that the guiding principles of NCF 2005 will come into effect in our schools and Students.

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COGNITIVE STYLE AMONG HIGHER SECONDARY STUDENTS

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Abstract

This study examines the cognitive styles of higher secondary students in Tamil Nadu, analyzing their preferences for systematic (structured, analytical) versus intuitive (flexible, experience-based) thinking approaches. Using a normative survey method with a sample of 300 students (137 male, 163 female) from diverse school settings, the research employed the Cognitive Style Inventory to assess thinking patterns. The findings reveal that a majority of students (67.7% systematic, 68.9% intuitive) demonstrate moderate cognitive styles, blending both structured and adaptive approaches in their learning processes. Notably, the study found no significant differences in cognitive styles based on gender, geographical location (rural vs. urban), or type of school (government vs. private), challenging common assumptions about demographic influences on thinking patterns. However, 18% of students exhibited low cognitive style scores in both dimensions, indicating potential challenges in information processing that warrant targeted educational interventions. These results emphasize the importance of developing adaptable teaching methodologies that accommodate diverse cognitive preferences, particularly through blended instructional strategies combining structured and exploratory learning activities. The study contributes to the growing body of research on personalized education by providing empirical evidence that cognitive styles among adolescents are more individualized than demographic factors might suggest, highlighting the need for educators to focus on student-centered approaches rather than generalized teaching methods based on gender or institutional characteristics.

Keywords: Cognitive Style, Systematic Thinking, Intuitive Thinking, Secondary Education, Learning Preferences, Teaching Strategies.

INTRODUCTION

Cognition is a general term used to describe various aspects of higher mental processes like thinking, reasoning, decision making, memory and problem solving (Robert A. and Baron 2000). The information coming from the senses is transformed, reduced or elaborated, recovered and used in the cognition process. This process includes how people perceive, learn, remember and think about information. A style is a preferred way of using the abilities one has. It refers to how some one likes to do something. The term may be used to describe a set of individual qualities, activities or behavior sustained over a period of study. Cognitive style refers to information processing habits such as perceiving, thinking, remembering and problem solving (Goldstein and Black Man.1978). Cognitive style is a hypothetical construct that has been developed to explain the process of perceiving, remembering, judging, appraising and problem solving. More or less, it includes one's intellectual activities. It is innate and affects a wide range of individual functioning. In education, cognitive style refers to how the students acquire knowledge (cognition) how they process information (conceptualization) and how it is applied in problem solving.

SIGNIFICANCE OF THE STUDY

The study of cognitive styles among higher secondary students holds critical importance in contemporary education, as it explores how individual differences in information processing

influence learning outcomes. Cognitive style—defined as a student’s preferred way of perceiving, organizing, and retaining information—directly impacts academic performance, engagement, and adaptability to diverse teaching methodologies. With the increasing emphasis on personalized learning and inclusive education, understanding these variations is essential for educators to design tailored instructional strategies that cater to diverse learners.

This research is significant for several reasons. First, it addresses the gap in empirical data on how cognitive styles manifest among higher secondary students, a transitional phase where academic demands intensify. Second, it provides insights into optimizing teaching practices—such as differentiated instruction or technology integration—to align with students’ cognitive preferences, thereby enhancing retention and critical thinking. Third, the study can inform policy frameworks to promote equitable learning environments, particularly for students struggling due to mismatches between their cognitive styles and conventional teaching methods. Lastly, by identifying prevalent cognitive styles (e.g., analytic vs. holistic, verbal vs. visual), the findings can guide career counseling, helping students align their strengths with future academic or vocational paths. In a rapidly evolving educational landscape, this study bridges theory and practice, empowering stakeholders to foster student-centric pedagogies and improve overall educational efficacy.

TITLE OF THE STUDY

COGNITIVE STYLE AMONG HIGHER SECONDARY STUDENTS.

OPERATIONAL DEFINITIONS

DEFINITION OF TERMS

The key term used in the title are given below.

COGNITIVE STYLE

The investigator coined the term cognitive style is a concept used in cognitive psychology to describe the way individuals think, perceive and remember information.

HIGHER SECONDARY STUDENTS

Students who have passed their tenth standard examination and studying eleventh and twelfth standard.

OBJECTIVES

- 1.1 To find out the level of Cognitive Style of higher secondary school students
- 1.2 To find out the significant difference between male and female students in their Cognitive Style.
- 1.3 To find out the significant difference between rural and urban school students in their Cognitive Style.
- 1.4 To find out the significant difference among boys, girls and co-education Higher Secondary Students in their cognitive style.

NULL HYPOTHESES

- 1.2 There is no significant difference between male and female students in their Cognitive Style.
- 1.3 There is no significant difference between rural and urban school students in their Cognitive Style.
- 1.4 There is no significant difference among boys, girls and co-education Higher Secondary Students in their cognitive style.

METHOD ADOPTED

The present study attempts to find out the Cognitive Style of higher secondary students. Since the problem is concerned with survey type, the investigator has selected the normative survey method for conducting the study.

TOOL USED FOR THE PRESENT STUDY

The investigator adopted the questionnaires for conducting a study on Cognitive Style of higher secondary students. The investigator has adopted the Cognitive Style scale.

a) Cognitive Style scale prepared and validated by Amalraj and Greesh Kumar (2015).

COGNITIVE STYLE INVENTORY (CSI)

Cognitive Style Inventory (CSI): Developed and validated by Praveen Kumar Jha (2001). Cognitive Style Inventory (CSI) is a self-report which measures the ways of thinking, judging, remembering, storing information, decision making and believing in interpersonal relationship. This inventory was developed and validated by Praveen Kumar Jha, (2001). To ensure the suitability the investigator has modified and validated this inventory for this study.

Dimensions of Cognitive Style

Dimensions of cognitive style were developed as a result of early studies conducted by Witkin, et al; (1954 and 1962). These studies resulted in a single dimension of cognitive style with two extremes. The two extremes were described in general terms by Keen (1973); Mikenney and Keen (1974) as Systematic style and Intuitive style.

a) Systematic Style

An individual, who typically operates with a systematic style uses a well-defined step-by-step approach when solving a problem; looks for an overall method or pragmatic approach; and then makes an overall plan for solving the problem.

b) Intuitive Style

The individual, whose style is intuitive, uses an unpredictable ordering of analytical steps when solving a problem, relies on experience patterns characterized by un verbalized areas or hunches and explores and abandons alternatives quickly.

Table 1: Dimensions of Cognitive Style

Sl.No.	Dimensions	Items
1	Systematic Style	1 – 20
2	Intuitive Style	21 – 40

Establishing Face Validity

Face validity is defined as the extent to which a set of items is relevant and representative of the concerned domain content (Anastasi, 1968). To establish face validity the tool was submitted to the guide and selected experts. It was asked to check whether the meaning, language and expression of each item were clear, simple and appropriate to the right direction and to locate those items which were ambiguous, not clear and irrelevant. In accordance with their suggestions and opinions, the investigator deleted some items and modified a few. The finalized tool contains 40 items. Thus the face validity was established. A copy of draft cognitive style inventory is given as Appendix.

Establishing Reliability

The investigator used test-retest method for establishing reliability of the cognitive style Inventory. The investigator randomly selected 50 higher secondary students from different school in Tamilnadu. The tool consisted of 40 items and was administered to them. The responses were collected and were scored by the investigator. After fifteen days the same tool was administered to the same respondents. Their responses were scored. The correlation coefficient was obtained for the two sets of scores. The correlation coefficient was computed to be 0.86. This reliability coefficient was found to be significant at 0.05% level of significance. So, it can be inferred on the basis of the reliability coefficient that the scale is reliable. Thus, the reliability of the tool was established. A copy of final cognitive style inventory is given as Appendix.

Scoring Procedure

Cognitive Style Inventory (CSI) is a self-report research tool which gives an estimate of cognitive style of an individual in a five point Likert format. Five response categories are: Strongly disagree; Disagree; Undecided; Agree; Strongly agree. As the CSI is a bio-dimensional measure of systematic style and intuitive style considering of 20 items each; the minimum and maximum score for each dimension range between 20 -100.

Table 2: Scoring Procedure

Sl.No.	Responses	Scores
1	Strongly Disagree	1
2	Disagree	2
3	Undecided	3
4	Agree	4
5	Strongly Agree	5

Interpretation

Respondents are classified according to the following interpretation. A respondent who rates high on the systematic scale and low on the intuitive scale is identified as having systematic style. Respondent who rates low on systematic scale and high on intuitive scale is designated as a person having intuitive style.

POPULATION AND SAMPLE

The population for this study consisted of the higher secondary school students in Tamilnadu. The following table shows the sample taken by the investigator. The sample for the present study consisted of 300 higher secondary students studying in different schools of Thoothukudi District Tamilnadu. The investigator selected 10 schools for the present study. The investigator has adopted random sampling technique.

STATISTICAL TECHNIQUES USED

“Statistics is the scientific study of handling quantitative information. It embodies a methodology of collection, classification, description and interpretation of data obtained through the conduct of surveys and experiments”.

Percentage analysis, Arithmetic mean, Standard deviation and ‘t’ test

ANALYSIS

1. To find out the level of cognitive style of Higher Secondary Students

Table 3

Level of cognitive style of higher secondary students

Cognitive style of Higher Secondary Students	Dimensions	Low		Moderate		High	
		N	%	N	%	N	%
	Systematic Style	27	18.0	103	67.7	23	14.3
	Intuitive Style	27	18.0	100	68.9	20	13.1

It is inferred from the above table 3 that 18.0% of Higher Secondary Students have low, 67.7% of them have moderate and 14.3% of them have high level of cognitive style.

NULL HYPOTHESIS 1

2. There is no significant difference between male and female students in their cognitive style

Table 4

Difference between male and female students in their cognitive style

Cognitive Style of Higher Secondary Students	Category	Count	Mean	S.D	Calculated 't' value	Remarks at 5% level
Systematic Style	Male	137	82.30	21.367	0.023	NS
	Female	163	83.09	20.729		
Institutive Style	Male	137	81.24	20.557	0.923	NS
	Female	163	8.67	21.697		

It is inferred from the above table 4 that the calculated 't' value is less than the table value at 5% level of significance. Hence null hypothesis is accepted that there is no significant difference between male and female students in cognitive style.

NULL HYPOTHESIS 2

3. There is no significant difference between rural and urban school in their cognitive style

Table 5

Difference between rural and urban school students in their cognitive style

Cognitive Style of Higher Secondary Students	Category	Count	Mean	S.D	Calculated 't' value	Remarks at 5% level
Systematic Style	Rural	130	82.76	20.292	0.023	NS
	Urban	170	82.71	21.570		
Institutive Style	Rural	130	80.25	21.292	0.038	NS
	Urban	170	81.27	22.561		

It is inferred from the above table 5 that the calculated 't' value is less than the table value at 5% level of significance. Hence null hypothesis is accepted that there is no significant difference between rural and urban school in their cognitive style of Higher Secondary Students.

NULL HYPOTHESIS 3

4. Significant difference among cognitive style of Higher Secondary Students with regards to their nature of school

Table 6
Difference Among Cognitive Style of Higher Secondary Students with Regards To Their Nature of School

Cognitive style of Higher Secondary Students		Sum of squares	df	Mean square	F Value	
Systematic Style	Between Groups	128.541	2	64.271	0.145	NS
	Within Groups	131618.589	297	443.160		
Institutive Style	Between Groups	130.247	2	65.335	1.645	NS
	Within Groups	122618.657	297	437.572		

(The table value of 'F' is 3.00, S - Significant)

It is inferred from the above table that the calculated 'F' value is less than the table value, (3.00) for df 2, 297 at 5% level of significance in the cognitive style of Higher Secondary Students.

RESULTS AND DISCUSSION

The study analyzed the cognitive styles of higher secondary students, focusing on systematic and intuitive dimensions. The findings reveal significant trends in students' learning preferences and highlight key differences—or lack thereof—across gender, location, and school type.

1. Level of Cognitive Style Among Students

- Majority exhibit moderate cognitive style (67.7% systematic, 68.9% intuitive), indicating that most students blend structured and spontaneous thinking rather than leaning heavily toward one extreme.
- Low cognitive style (18% in both dimensions) suggests a subset of students may struggle with either methodical problem-solving (systematic) or flexible, big-picture thinking (intuitive).
- High cognitive style (14.3% systematic, 13.1% intuitive) implies a smaller group excels in one dominant approach, which could influence their learning efficiency.

The predominance of moderate cognitive styles aligns with prior research suggesting adolescents often adapt their thinking based on context. However, the presence of low-scoring students calls for targeted interventions, such as metacognitive training—to strengthen weaker cognitive tendencies.

2. Gender Differences in Cognitive Style

- No significant difference between male and female students in either systematic (*t* = 0.023, *p* > 0.05) or intuitive (*t* = 0.923, *p* > 0.05) styles.
- Mean scores were nearly identical (e.g., systematic: males = 82.30, females = 83.09), challenging stereotypes that gender inherently influences learning preferences.

This finding contradicts some studies that associate gender with cognitive biases, suggesting cultural or pedagogical factors may homogenize thinking styles in this cohort. Educators should avoid gender-based assumptions and instead focus on individual cognitive profiles.

3. Rural vs. Urban School Differences

- No significant differences in systematic ($t^* = 0.023$) or intuitive ($t^* = 0.038$) styles between rural and urban students.
- Mean scores were remarkably similar (e.g., systematic: rural = 82.76, urban = 82.71), indicating geographic location does not dictate cognitive preferences.

The results imply that access to similar curricula or standardized teaching methods may mitigate traditional rural-urban divides in cognitive development. Further research could explore whether socioeconomic factors or school resources play a hidden role.

4. Nature of School (Government vs. Private)

- No significant variation in cognitive styles across school types ($F = 0.145$ for systematic, $F = 1.645$ for intuitive; both $p^* > 0.05$).
- The null hypothesis was accepted, suggesting institutional management (government/private) does not inherently shape cognitive approaches.

This challenges the assumption that private schools foster more systematic or innovative thinkers. Instead, teacher training and classroom practices may be more critical than school type.

INTERPRETATIONS

1. Pedagogical Implications:

- Since most students exhibit moderate cognitive styles, teachers should blend structured and exploratory activities (e.g., guided projects + open-ended discussions).
- Low-scoring students may benefit from explicit instruction in problem-solving strategies (e.g., step-by-step frameworks for systematic thinkers; brainstorming techniques for intuitives).

2. Equity in Education:

- The absence of gender, geographic, and school-type differences underscores the potential for uniform, inclusive teaching strategies across diverse settings.

3. Future Research:

- Investigate why certain students develop low/high cognitive styles—are these innate, or shaped by teaching quality/parental influence?
- Longitudinal studies could track how cognitive styles evolve with age or curricular changes.

RECOMMENDATIONS

The investigator makes the following suggestions in order to the students.

1. Teachers should give freedom in the classroom to ask the opinion of the students and their suggestions.
2. A new examination system would be appreciable to evaluate the creativity of the students.
3. The teacher must ask the feedback from the students in the class.
4. A special curriculum may be framed in such a way that they are updated and help the students to develop the cognitive skills of the students.

While cognitive styles vary individually, systemic factors (gender, location, school type) show negligible impact. Educators should prioritize personalized, adaptive instruction to nurture all cognitive dimensions effectively.

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THE LANDSCAPE OF ARTIFICIAL INTELLIGENCE TOOLS AND PLATFORMS IN SOCIAL SCIENCE RESEARCH

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ABSTRACT

Artificial Intelligence (AI) transfigures the social sciences by furnishing new methodologies and tools for data analysis. Globally, social science research has experienced a substantial improvement in the 21st century due to the innovation of digital tool technologies. These technological advancements have transfigured research by making researchers get information at their fingertips, gives information within a short time as well, and enable them to manage time and make research more effectively. Many researchers are still trapped in the archaic research methodology, which is marked by stress, time constraints, and methodological errors, in spite of these advancements. This paper investigates the diverse forms of cutting-edge digital technologies in social science research and their impact on strengthening the rigor and quality of research outcomes. The required data were collected through a documentary review of published materials from print and web resources. The findings revealed that there are different innovative digital tools that can be used in social science research, and these tools have a significant impact on the quality of research. This paper reveals the connection among artificial intelligence (AI) and social research.

Key Words: *Artificial Intelligence, Social Science, Research, Digital tools, Innovations and Technologies.*

INTRODUCTION

Artificial Intelligence (AI) has revolutionized social science research by transferring its focus from manual, traditional approaches to tech-enabled dynamic inquiry. The adoption of tools like SpaCy, Tableau, Power BI, Scikit-learn, TensorFlow, Qualtrics, NVivo, and ATLAS.ti have become crucial for current research practice and is no longer an optional extra. It is now essential for modern research practice. These tools, which had been thought to be unfeasible or time-consuming, assist researchers navigate massive quantities of data efficiently identify underlying correlations, and carry out extensive studies. It enhances social science research by offering pioneering techniques for collaboration data analysis, and visualization. Using these tools will be crucial for researchers looking to stay at the vanguard of their fields. This chapter explores the applications of AI tools that are redefining academic research in 2025, enabling researchers to obtain precise information faster than ever before.

Artificial Intelligence (AI) tools used in Social Science Research

ChatGPT – (Adaptability & Intelligence of Conversation). ChatGPT has really taken off as a conversational AI because of its adaptability and conversational intelligence. It has proven to generate very coherent and contextualized texts making it ideal for customer service, virtual assistance, and any type of text generation.

Bard – (Imaginative Text & Narrating) It is perfect for writers, scriptwriters, and creators looking to inspire originality and creativity into their writing. It differs from general AI like

ChatGPT, as it is particularly good at narrating a story and generating a story dialogue. Although Bard is arguably better for artistic and literary forms of texts, it may not be very useful for technical or factual content because of this creative slant.

Jasper – (Content Creation) Jasper is an effective resource for marketers, advertisers, and businesses looking to enhance content creation capabilities. Given Jasper has strong capabilities producing engaging and specifically targeted text, it is probably the most used AI for increasing online visibility and engagement, helped by SEO optimized, product descriptions, and marketing text.

Elicit.org ‘Ought’ is the company that produced Elicit, and is a tool that will help find "seed articles" related to keyword and subject heading investigations. Whenever we raise a question, it will provide alternative questions that create more "seed" articles.

Statistical analysis software

When we are working with statistical data, we use statistical software packages like SPSS, STATA, R, SAS, and JASP. These software were used for process the data, data analysis and tabulation.

SPSS (IBM Corp., 2023) stands for Statistical Package for the Social Sciences, is a software suite used for statistical analysis and data management. It has the easiest user interface for basic data management and recommended choices for a beginner to intermediate statistical software package since any one can handle and maintains a graphical user interface (GUI).

SAS

SAS is widely known for its congenial graphical interface, making it an ideal option for those at the beginner to intermediate level in statistical analysis. It allows users to perform data management and analytical tasks efficiently without necessitating programming expertise, wide-ranging software suite designed for advanced analytics, business intelligence, data handling, and predictive modeling

STATA (StataCorp.2023) stands for Software for Statistics and Data Science. It is a statistical software which is widely used for data manipulation, statistical analysis, and creating visualizations and reports. STATA is the combination of two words “statistics” and “data”. Everyone is aware with STATA, which is a good option for those who want to perform advanced statistical procedures without a lot of data management that involves the use of programming.

R Language

R (R Core Team, 2023) is a versatile programming language specifically designed to support statistical computing and data visualization. It bids extensive capabilities for both basic and advanced statistical tasks, broadly chosen in research and academic realm.

JASP (JASP Team, 2023), “Jeffreys' Amazing Statistics Program,” is named in honor of the renowned Bayesian statistician Sir Harold Jeffreys. This open-source software assists as a accessible alternative to SPSS, amalgamation intuitive design with a range of modern statistical features. Compatible with Windows, macOS, and Linux, JASP also gives a convenient cloud-based version for online use. When we are looking for a free option that is also tends to be easier for entry level users, both R and JASP are good choices. But, if we are looking for commercial software with professional capacity that has solid capabilities for data processing and management SPSS, STATA and SAS offers an array of powerful statistical options.

DATA VISUALIZATION TOOLS

Tableau

In general, Tableau is quite facile to use and offers excellent data connectivity and visualization. Collaboration on graphs and charts was simple with this application, which has a good user interface. A tiered licensing model that changes according to how users engage with the platform is the basis of Tableau's price structure. Instead of charging a fixed price per business, it charges varying prices for multiple user roles, such as creator, Explorer, and viewer, each of which has a distinct cost, features, and degree of access.

Power BI

As a Microsoft product, Power BI integrates with other Microsoft "products," which makes it an excellent option for businesses who employ Microsoft products. Power BI functions effectively and provides excellent interfaces to numerous data sources. It also offers other functions like report sharing and data modeling.

Google Data Studio : (Now Looker Studio)

It is a free cloud-based application that strikes an appropriate equilibrium between adaptation of setup and moving away from basic dropping and dragging methods is Google Data Studio. Reports and dashboards may be created and shared using Data Studio, which is also ideal for data exploration. Using other Google products and technologies already can help us make the optimal use of Data Studio.

Gephi

Gephi is a program for network applications enabling for visualization and analysis. In essence, it is design for the investigation and evaluation of complicated networks. Gephi enables users to create and preserve interactive web-based visualizations, with the flexibility to export outputs in formats such as PHP, SVG, and other image types.

Computer Assisted Qualitative Data Analysis Software (CAQDAS)

ATLAS.ti

This tool supports both PC and macro level insights in data analysis. It offers seamless integration with sources like Twitter, EndNote, and Evernote, and includes full Unicode support. Known for its intuitive interface and compatibility with various file types, the platform stands out for its flexible layouts and user-friendly design, making it a preferred choice for researchers handling complex qualitative data.

Nvivo

Nvivo is a robust qualitative data analysis tool that many investigators and analysts utilize. It enables users to import and analyze an array of data formats, such as videos, images, emails, spreadsheets, and online material, and enables empirical and mixed methodologies research techniques. Researchers may perform in-depth analysis with Nvivo by utilizing its word clouds, charts, comparison diagrams, and relationship coding capabilities.

Quirkos

Users may effectively filter, manage, and comprehend qualitative text data with its assistance. Live visualization let users to watch connections and discoveries come to life, and its visual interface makes writing quick and simple to use, researchers from a wide range of socioeconomic backgrounds can use it.

HyperRESEARCH

It is multiplatform, easily maneuverable qualitative analysis tool. Because of its ease of use and adaptability, researchers of all skill levels can use it. Hyper RESEARCH simplifies qualitative analysis with enhanced media sources, case and code filters, and automatic project compression.

MAXQDA

MAXQDA is a professional software program used by researches all over the world to analyze data utilizing mixed, qualitative, and quantitative methodologies. It enables users to examine a wide range of data formats, such as videos, reports, surveys, and interviews. The integrated multimedia tools and transcription functions in **MAXQDA** make it easier to manage, categorize, and interpret unstructured qualitative data effectively.

Reference Management Software

- While RefWorks, EndNote, Mendeley, and Zotero differ in features and user experience, they all provide essential functions common to reference management tools.
- One key feature is the ability to seamlessly import batches of references directly from academic databases, streamlining the citation and bibliography process for researchers.
- Incorporate these references into folders.
- Share the citations to the teammates and generate a bibliography of citations in various forms.
- Use a Google Docs or Microsoft Word plug-in (which is available in RefWorks and Zotero) to enable citations while writing the document.

INNOVATIVE DIGITAL TOOLS AND THEIR SIGNIFICANT IMPACTS IN SOCIAL SCIENCE RESEARCH (2025)

Tool category	Examples	Usage	Impact on Research
AI research Assistants	ChstGPT-4.5, Claude 3, Perplexity, Elicit	Text generation, literature review, survey question generation	Speeds writing enhances analysis, reduces human bias
Qualitative Analysis	Nvivo 2025, Atlas.ti Cloud, MAXQDA	Coding, theme analysis, multimedia data support	Increases accuracy and transparency in qualitative studies
Text Mining & NLP	MonkeyLearn, Voyant 2.0, Trink AI, Leximancer	Keyword extraction, grammar- quality check	Improves insight clarity and acade writing quality
Survey & Polling Platforms	Qualtrics XM, SurveySparrow AI, Typeform plus, Jotform AI	Adaptive questionnaires, emotion analysis, survey design	Boosts data quality and response rate through dynamic interaction
Advance Visualization Tools	Tableau GPT, Power BI Copilot, RAWGraphs 3.0, Flourish Studio	Dashboards, data story telling, animated visuals	Enhances interpretability
Digital Ethnography Tools	FieldKit, Zoom AI, Kumospace, EthnoCloud	Remote data collection, network mapping, fake news tracking	Enables access and immersion

Social Media & Network Analysis	Netlytic 2025, Talkwalker, CrowdTangle	Network & sentiment tracking	Tracks discourse and opinion
Collaboration Tools	Notion AI, Obsidian, Trello AI	Research Planning, notes	Boosts team efficiency
Reference Managers	Zotero AI, Mendeley Cite, EndNote Web, Paperpile GPT	Citation management, paper sharing	Reduces manual citation errors and saves time
Mixed-Methods Platforms	Dedoose, SurveyCTO, Rstudio + Quarto	Integration of qualitative/quantitative data, multi-language support	Enables methodological richness and cross validation

Sources: Adapted from Open AI (2024), QSR International (2025), Anthropic (2024)

Using AI Platforms in social science

A platform is a comprehensive, frequently cloud-based environment that incorporates a variety of tools, interfaces, and services intended to support the entire research cycle in the context of Artificial Intelligence (AI) research. AI platforms are revolutionary from a social science standpoint because they enable researchers to examine both structured (like survey responses) and unstructured (like interviews, social media posts, and videos) data in the same framework. This convergence facilitates mixed-methods research and improves methodological integration. In addition, platforms facilitate quick hypothesis testing, dynamic modeling, and pattern recognition, allowing for prompt and evidence-based decision-making in disciplines like political science, sociology, and education. But also improve social science researcher's breadth, scope and integrity in the digital era.

SOME POPULAR AI PLATFORMS AND THEIR FUNCTIONS IN SOCIAL SCIENCE RESEARCH

Name of the Platform	Functionality
Google Cloud AI	NLP, VISION, Speech-to-text, BigQuery ML (Cloud-based, Scalable AI + big data analysis)
IBM Watson Studio	Text mining, machine learning, automated model building (offers data visualization, ML, NLP in one interface)
SurveyMonkey Genius	Predictive text analysis, intelligent survey suggestions (AI-enhanced survey platform with automated insights)
Elicit (AI Research Assistant)	Literature review, data extraction (AI reasoning engine integrated with academic sources)

Sources: Adapted from Open AI (2024),

Also these platforms provide integration among various tools, bringing close automation, visualization, and data analysis often in one context. It minimizes the requirement for expertise in programming. Facilitates fast hypothesis testing and pattern recognition whereas strengthening replication and ethics via pipelines and logs.

In conclusion

A significant shift towards more effective, adaptable, and data-rich methodologies has been illustrated by the incorporation of artificial intelligence (AI) tools and platforms towards social

science research. These technologies are transforming how researchers collect, analyze, and make sense of data. Examples include AI-powered writing assistants, automated text analysis tools, and comprehensive platforms which promote mixed-methods research. Careful management is mandatory to prevent algorithmic bias, misinterpretation of AI-generated outputs, and data privacy issues.

Recommendations

- It is crucial for each and every Social Science researchers encounter the complete training in AI literacy, ethics and limitations of AI.
- All educational institutions ought to be conscious of the ethics and protocols encompassing the application of AI.
- AI platforms, especially in the developing nations of the world, should be adaptable to indigenous languages, social circumstances, and data environments.
- Research comprising AI should be endorsed by funding agencies and scholarly associations through subsidies, infrastructure, and ongoing capacity building initiatives.

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TRANSFORMING MATHEMATICS CLASSROOM THROUGH EXPERIENTIAL LEARNING

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Abstract

This article examines the historical roots and cognitive consequences of passive learning—characterized by rote memorization, minimal engagement, and superficial understanding—and argues for a paradigm shift toward cultivating adaptive thinkers in 21st-century education. Tracing the origins of passive learning to the Industrial-Era Education Model and behaviorist pedagogies, the paper highlights how traditional assessment systems reinforced compliance over critical reasoning. Drawing on Kolb's Experiential Learning Theory, the article proposes a four-stage transformational pathway Concrete Experience, Reflective Observation, Abstract Conceptualization, and Active Experimentation supported by formative, authentic, and learner-centered assessment practices at each stage. Grounded in contemporary challenges highlighted by India's PARAKH 2024 National Assessment Report, the paper advocates for reimagining the assessment not as a tool of judgment, but as a dynamic catalyst for nurturing creativity, cognitive flexibility, metacognition, and real-world problem-solving essential competencies for democratic citizenship and a complex future.

Introduction

According to Pressy, Robinson and Horrocks, "Learning is an episode in which a motivated individual attempts to adopt his behaviour so as to succeed in a situation which he perceives as requiring action to attain a goal." Yet, for generations, formal education has often stifled this very motivation. The modern archetype of the passive learner one who listens silently, copies notes, and memorizes facts without reflection or application emerged not by accident, but by design. During the 19th and 20th centuries, as nations industrialized, schools adopted factory-like models: standardized curricula, teacher-centered lectures, and assessments that rewarded obedience and recall over inquiry and creativity. Influenced by behaviorist psychology, these systems conditioned students to equate learning with compliance, discouraging deviation as disobedience.

While reformers like Johann Heinrich Pestalozzi, Thomas Jefferson, Raja Rammohan Roy, and Dr. B.R. Ambedkar envisioned universal education as a means to cultivate informed, ethical citizens, the reality of mass schooling often prioritized efficiency over intellectual autonomy. Today, in an era marked by rapid technological change, climate instability, and social complexity, passive learning is no longer merely inadequate—it is obsolete. The need for adaptive thinkers, individuals who can flexibly adjust their strategies in response to ambiguity, new information, and evolving contexts has become urgent. This article explores how reimagining assessment through the lens of experiential learning can transform passive recipients of knowledge into active, resilient, and ethically engaged thinkers capable of thriving in an uncertain world.

Passive Legacy:

Passive learners are typically refers to those who receives information by listening to lectures, copying notes, or memorizing facts without questioning, reflecting, or applying knowledge. This

mode of learning is typically superficial, transient, and disconnected from real understanding or personal meaning. The modern concept of passive learners crystallized during the Industrial Revolution (19th to 20th century). Before Industrial Revolution the formal education was largely reserved for elite people. Most children learned trades through apprenticeships or worked on farms. Reformers like Johann Heinrich Pestalozzi, Thomas Jefferson, Raja Rammohan Roy, and Dr.B.R. Ambedkar argued that universal education could create informed citizens for democratic societies. Thus, public, compulsory, and standardized schooling become a cornerstone of modern nation-building.

As nations sought to educate masses quickly and uniformly, schools adopted factory-like models:

- Students sat in rows, facing a central authority (the teacher).
- Uniform curricula were delivered through lectures.
- Standardized testing measured output (correct answers), not depth of understanding.
- Compliance, discipline, and rote memorization were valued over creativity or critical thought.

This system prioritized efficiency and social control over intellectual autonomy. Passive reception of knowledge became the norm because it was scalable: one teacher could “deliver” content to dozens of students simultaneously. While the rise of behaviorism (Watson, Skinner), learning was reduced to observable behaviors shaped by rewards and punishments. Students learned that passive compliance such as listening, repeating, and not disrupting. Critical questioning or deviation was often discouraged as “disobedience”. Thus, behaviorism institutionalized passivity by rewarding surface- level performance over deep engagement.

Many classrooms still follow the “*sage on the stage*” model. That teacher’s lecture for 80-90% of class time, students will take notes without any discussion, and questions are limited to factual recall. This approach is often due to large class sizes, lack of teacher training in active learning methods, pressure to cover syllabi for high-stakes exams. Now the world has facing the rapid technological change, global interconnectedness, climate crises, and social complexity, passive learners can’t hold this and this turns adaptive thinking is no longer optional but it is essential for survival, innovation, and ethical action. Adaptive thinking goes beyond intelligence or knowledge. It involves cognitive flexibility, metacognition, emotional regulation, and openness to change. Because an adaptive thinkers is one who can change flexibility and effectively adjust their thinking, strategies, and behaviors in response to new information, changing circumstances, ambiguity, or complex challenges.

Journey of Assessment

When assessments don’t require analysis, synthesis, or creativity, students rationally choose the path of least resistance like memorize and regurgitate. As educational researcher Linda Darling-Hammond (1951) notes, “What gets tested gets taught.” During the Industrial-Era Education Model (19th -20th century), assessment was designed to align with the core values of standardization, efficiency, control, and social sorting. That is mirroring the logic of factories and bureaucratic systems. During early-mid 19th century ***Oral Recitation*** where the students stood one by one to recite memorized lessons (e.g., Multiplication tables, historical dates, grammar rules). The main purpose of this assessment is to demonstrate obedience and rote memory. This allows the teacher to verify what the students have learned and their assignment materials quickly. As schooling expanded in mid 19th -20th century, ***written exams*** became dominant. The exams are summative in

nature end-of-chapter or end-of-unit tests, and high-stakes final examination which used to determine promotion to the next grade or graduation.

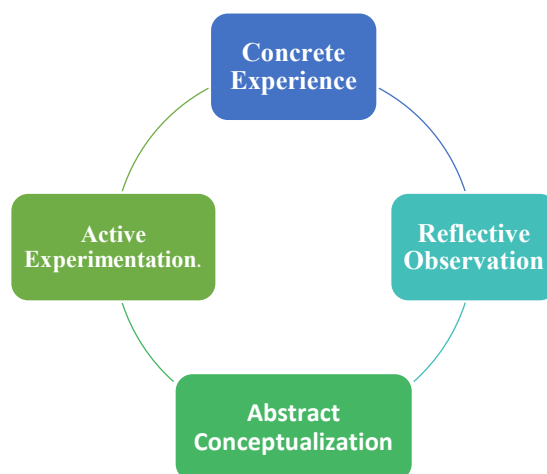
Early-Mid 20th century onwards with the rise of psychology and mass education, standardized test became widespread; the **Multiple-choice test** was popularized by Edward Thorndike and later by organizations like the College Board (SAT,1926), **Intelligence Test** by Binet-Simon Scale (905) was adapted as Stanford-Binet IQ Test (1916) by Lewis Terman, **Achievement Test** measured the mastery of grade-level content. In the early 20th century letter grades (A-F) or **numerical marks** became standard. Its main purpose is to simplify comparison across students, it motivate through competition, and sort students for college or jobs. In the present 21st century the assessment has undergone a profound transformation moving away from the industrial-era focus on ranking, standardization, and recall towards a more holistic, equitable, and learner-centered approach.

From Memorizers to Mindful Makers

In early psychological models particularly behaviorism (Pavlov, Skinner), viewed learning as a response to external stimuli and reinforcement. In traditional classrooms shaped by behaviorist principles, students are often conditioned to be passive: they sit quietly, listen to instructions, and reproduce correct answers to earn rewards (grades, praise) or avoid punishment (criticism, failure). Skinner's concept of operant conditioning explains how passive compliance can be reinforced—students learn that minimal engagement (e.g., copying notes) is sufficient for acceptable performance. In contrast, cognitive constructivist theories, notably those of Jean Piaget and Lev Vygotsky, fundamentally reject passivity as viable learning. Piaget argued that knowledge is not transmitted but constructed through interaction with the environment. Learners actively assimilate new information into existing mental schemas or accommodate their schemas to fit new experiences—a process requiring engagement, disequilibrium, and reflection. A passive learner, by avoiding cognitive conflict, remains stuck in equilibrium, hindering intellectual growth.

David Kolb's Experiential Learning Theory (ELT) provides a robust framework for understanding and overcoming passivity. Passive learners typically stall at the first or second stage—they may observe a lecture (concrete experience) but fail to reflect, conceptualize, or apply. Kolb argues that effective learning demands movement through all stages, requiring learners to do, reflect, think, and test. By designing education around this cycle through labs, case studies, projects, and reflective journals the educators can disrupt passivity and cultivate engaged, reflective practitioners.

Kolb posits that learning is a four-stage cycle:



Stage 1: Concrete Experience

Concrete Experience (CE) is the first and essential stage of David Kolb's experiential learning cycle. It refers to direct, hands-on, immersive involvement in a real or simulated situation where learners do, feel, and encounter phenomena firsthand, rather than merely watching, listening, or memorizing. For passive learners', students who habitually absorb information without questioning, connecting, or applying the Concrete Experience serves as a catalyst for engagement, breaking the cycle of intellectual passivity by placing them in situations where action, curiosity, and personal relevance are unavoidable. Passive learners in math and science often view math as a set of rigid rules to memorize, see science as a list of facts to recall, avoid risk because they fear being "wrong," and disengage because content feels abstract and irrelevant. Concrete Experience disrupts these patterns by creating emotional and cognitive investment through real challenges, making learning tangible and sensory (seeing, touching, testing), framing mistakes as natural parts of discovery, not failure, connecting concepts to meaningful contexts (e.g., community issues, personal curiosity). When students do science or use math to solve a real problem, they stop being spectators and start becoming participants in knowledge construction this is the first step toward adaptive thinking.

Stage 2: Reflective Observation

Reflective Observation (RO) is the second stage of David Kolb's experiential learning cycle, following Concrete Experience. It is the deliberate, thoughtful process of pausing to observe, question, and make meaning of what just happened. While Concrete Experience gets learners doing, Reflective Observation gets them thinking deeply that is analyzing actions, emotions, outcomes, and perspectives without rushing to conclusions. For passive learners those who typically move from one task to the next without internal processing then this stage is transformative. It cultivates metacognition (awareness of one's own thinking), empathy, and intellectual humility, all essential for becoming adaptive thinkers who can learn from complexity rather than avoid it. Passive learners often skim the surface of experiences ("I did the lab; it's done"), avoid discomfort or confusion, attribute failure to external factors ("The question was tricky"), and rarely ask, "What did I really learn? How could I improve?" Reflective Observation interrupts this pattern by creating space for critical self-examination ("Where did I get stuck? Why?"), perspective-taking ("How did my teammate see this differently?"), pattern recognition ("This reminds me of..."), and emotional awareness ("I felt frustrated when my hypothesis failed—was that useful?"). In math and science disciplines often perceived as purely logical. The reflection reveals that thinking is messy, iterative, and deeply human. It's where data becomes understanding, and mistakes become insight.

Stage 3: Abstract Conceptualization

Abstract Conceptualization (AC) is the third stage of David Kolb's experiential learning cycle. It follows Concrete Experience (doing) and Reflective Observation (reviewing), and represents the critical leap from what happened to what it means. In this stage, learners analyze their reflections, identify patterns, and construct mental models, theories, or principles that explain their experiences. They move beyond the specific event to generalize ideas that can be applied broadly and turning raw experience into transferable knowledge. For passive learners, who often see school content as disconnected facts to memorize, Abstract Conceptualization is transformative. It shows them that concepts are tools and not just answers. This understanding emerges from inquiry, not transmission. For adaptive thinkers, this stage is where cognitive flexibility, systems thinking, and principled reasoning take root. In traditional classrooms, abstract concepts (e.g., Newton's laws, quadratic

functions, photosynthesis) are often taught first as definitions to be memorized before the students have any meaningful context. This approach alienates passive learners, who struggle to see relevance and resort to rote learning.

Kolb's model flips this:

Experience → Reflection → Then Abstraction.

Now, abstraction is motivated by curiosity, not imposed by authority. Students need the concept to make sense of what they've seen and felt. This timing makes learning sticky, meaningful, and generative.

Stage 4: Active Experimentation

Active Experimentation (AE) is the fourth and final stage of David Kolb's experiential learning cycle. It follows Concrete Experience (doing), Reflective Observation (reviewing), and Abstract Conceptualization (theorizing). In this stage, learners apply their newly formed concepts, models, or insights to test, refine, and solve new problems in real or simulated contexts. They move from understanding to doing differently like designing actions, anticipating outcomes, and iterating based on results. For passive learners, who often stop at comprehension ("I get it") without acting on it, Active Experimentation is where learning becomes agency. For adaptive thinkers, it is the proving ground where mental models are stress-tested in novel, complex, or ambiguous situations, and flexibility, creativity, and resilience are forged. In traditional education, learning often ends with a test: once students "know" a concept, the process stops. But true mastery—and adaptability—requires application in fresh contexts. As the saying goes "Tell me, and I forget. Show me, and I remember. Involve me, and I understand. Let me do, and I become." Active Experimentation closes the loop by, testing the validity of abstract models in real-world conditions, revealing gaps in understanding when theory meets practice, fostering innovation through trial, error, and redesign, and building confidence through iterative success. Without this stage, learning remains inert stored in memory but unused in life.

The Transformative Role of Assessment in Cultivating Adaptive Thinkers

The transformation of passive learners into adaptive thinkers through Kolb's four-stage experiential learning cycle requires a reimagined role for assessment and not as a final judgment, but as a dynamic, supportive, and diagnostic partner in learning. According to PARAKH Rashtriya Sarvekshan Report 2024, "71% of Grade 6 students in India struggle to represent and compare commonly used fractions in everyday situations. Grade 3 students have great difficulty in "recognising, creating, and classifying basic geometric shapes and their properties." By Grade 9, students' learning gains seemed to plateau or even decline, with the average math score dropping to 37%, the lowest across all grades, said the report. Science and social science also showed weak performance, both averaging 40%. Just 29% of them were able to apply it to solve problems." Traditional summative assessments (e.g., end-of-chapter tests) reinforce passivity by rewarding memorization and correct answers. In contrast, formative, authentic, and student-centered assessments aligned with each stage activate engagement, deepen understanding, and build adaptability.

The *Concrete Experience*, engage learners in a meaningful, hands-on experience that disrupts passivity. Here the role of assessment is Diagnostic + Motivational to observe initial thinking, spark curiosity, and establish a baseline and not to grade. Here the teachers can use **Observational Checklists + Low-Stakes Entry Tasks** as an assessment tool because it Reduces fear of failure (no grade attached). For example Design a Mini-Olympics Scoring System learners should collect real

data from trials, experiment with scoring method (point, ratio, average). This moves the learners from “Math is just numbers” to “Math helps us make fair decisions.” The *Reflective Observation* Help learners make sense of their experience through self-awareness and perspective-taking. Here the role of assessment is Metacognitive + Formative to make thinking visible and guide deeper inquiry. . Here the teachers can use **Reflective Journals + Structured Peer Dialogue** as an assessment tool because it develops metacognition—learners monitor their own understanding. For example following Mini-Olympics Students reflect on their scoring system after testing it like, “Whose idea changed your thinking? How?”, “When did your group disagree? What math did you use to resolve it?” this makes the learners to realize math isn’t about “being right”—it’s about reasoning, listening, and revising. In the *Abstract Conceptualization*, Construct mental models, theories, or principles that explain the experience. Here the role of assessment is **Conceptual + Diagnostic** to evaluate depth of understanding and ability to generalize. Here the teachers can use Concept Maps + Explain-in-Your-Own-Words Tasks as an assessment tool because its reveals how well students integrate ideas, not just recall them. For example after reflection, the teacher introduces measures of central tendency (mean, median, and mode) and weighted averages not as definitions, but as tools to explain their Olympic designs. In the *Active Experimentation*, it’s applied and refines understanding in a new, authentic challenge. Here the role of assessment is **Performance-Based + Adaptive** to evaluate transfer, creativity, and responsiveness to feedback. Here the teachers can use Authentic Performance Tasks + Iterative Portfolios as an assessment tool because it is useful to measures real-world competence, not just academic recall, traditional assessment asks: “Did you get the right answer?” This approach asks: “How did you think? How did you adapt? What will you do next?” for example “Redesign Your School’s Grading Policy” learners use their understanding of averages, weighting, and fairness to propose a new report card system By aligning assessment with Kolb’s cycle, educators can replace judgment with support, turn mistakes into learning data, honor the messy, iterative nature of real thinking, and empower students as agents of their own growth.

Conclusion

The journey from passive learning to adaptive thinking is not a mere pedagogical preference—it is an educational imperative. The legacy of the Industrial-Era model, with its emphasis on standardization, rote memorization, and summative judgment, has left deep imprints on classrooms worldwide, as evidenced by India’s PARAKH 2024 findings: students may memorize facts, but struggle to apply them meaningfully. Yet, hope lies in transformation. By anchoring instruction in Kolb’s experiential learning cycle and aligning assessment to each stage—diagnostic observation in Concrete Experience, metacognitive reflection in Reflective Observation, conceptual integration in Abstract Conceptualization, and performance-based application in Active Experimentation—educators can disrupt the cycle of passivity.

Assessment, in this reimagined role, ceases to be a gatekeeper of failure or success and becomes a compass for growth. It honors the messiness of real learning, values revision over perfection, and empowers students as co-constructors of knowledge. When students are invited to do, reflect, theorize, and experiment, they develop more than content mastery—they cultivate the cognitive agility, ethical reasoning, and creative resilience that define adaptive expertise. In doing so, education fulfills its highest promise: not just to transmit information, but to awaken the capacity to think, adapt, and contribute meaningfully to a world in flux.

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UNDERSTANDING PEDAGOGY IN SPECIAL SCHOOLS: INSIGHTS INTO TEACHING–LEARNING PRACTICES AND NEP 2020 ALIGNMENT

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Abstract

The National Education Policy (NEP, 2020) emphasizes inclusive, flexible, and learner-centred pedagogical practices, particularly for children with diverse learning needs. Special schools often require adaptive instructional approaches, including multisensory, individualized, and psychologically informed methods. This qualitative study examines the teaching–learning practices employed by special educators and evaluates their alignment with the recommendations outlined in the NEP 2020. Approximately 20 participants—comprising special educators and related school-based professionals—will be interviewed using semi-structured interviews to explore current pedagogical practices and the challenges encountered during implementation. The data will be analysed using Braun and Clarke’s thematic analysis to identify patterns related to classroom strategies, learner support mechanisms, and congruence with policy guidelines. The study aims to contribute meaningful insights toward strengthening innovative, inclusive, and developmentally appropriate teaching approaches within the context of special education settings.

Keywords: *special education, inclusive pedagogy, NEP 2020, teaching–learning practices, thematic analysis*

Introduction

Education is fundamental to cognitive development, emotional regulation, and social participation, allowing individuals to engage meaningfully with society (UNESCO, 2015; Woolfolk, 2016). Due to the significant variability in learners' cognitive, emotional, and developmental characteristics, standardized educational approaches often fail to adequately meet individual learning requirements, thereby necessitating the implementation of specialized and responsive educational provisions. Special education encompasses structured educational frameworks designed to assist such learners through differentiated and individualized instructional strategies (Hallahan, Kauffman, & Pullen, 2018).

Special schools serve as educational environments where pedagogy extends beyond mere academic instruction to encompass emotional support, behavioral guidance, and personalized learning pathways. The teaching and learning practices within these settings are inherently intricate, as educators must cater to multiple and often conflicting learner needs within a single classroom. Within this context, inclusive pedagogy foregrounds teachers’ professional judgment in responding to learner diversity through flexible, participation-oriented classroom practices. Research indicates that effective pedagogy in special education demands ongoing adaptation, professional judgment, and sustained engagement with learners (Florian & Black-Hawkins, 2011; Woolfolk, 2016).

In India, prior to the National Education Policy (NEP) 2020, inclusive education was characterized by fragmented provisions and insufficient emphasis on classroom-level pedagogy. Conversely, the NEP 2020 signifies a notable transition by explicitly highlighting inclusive, learner-

centered, and flexible teaching practices grounded in classroom application (Singal, 2016). NEP 2020 marks a pivotal advancement by underscoring inclusive, learner-centered, and flexible education, formally acknowledging the rights of children with special needs and positioning educators as key facilitators in translating policy into practice (Government of India, 2020). Despite this progressive vision, the policy provides limited guidance on the implementation of inclusive principles within diverse classrooms. Therefore, it is crucial to comprehend how teachers interpret, negotiate, and apply NEP 2020 within the context of special schools.

Learning in diverse classrooms is most effectively understood as both an active and socially mediated process, especially in contexts where learners require differentiated and sustained instructional support. Drawing on constructivist theory, learning is conceptualized as an active process whereby learners construct knowledge through interaction with their environment. It therefore supports a learner-centered, flexible, and individualized pedagogical approach in special education settings (Piaget, 1972; Woolfolk, 2016). In parallel, the emphasis of sociocultural theory on the role of teachers as mediators of learning is underlined, with Vygotsky's Zone of Proximal Development indicating the value of guided interaction and scaffolding in terms of supporting the learner beyond current capabilities (Vygotsky, 1978). Inclusive pedagogy centers on teachers' professional judgment and responsibility to design learning environments that enable participation for all learners without marginalization (Florian & Black-Hawkins, 2011). Applied frameworks such as Universal Design for Learning operationalize these principles by supporting multiple means of engagement, representation, and expression in order to accommodate learner variability (CAST, 2018). These perspectives combined provide a coherent theoretical lens for exploring pedagogical practices in special schools within the inclusive and learner-centered vision of NEP 2020.

Review of Literature

Research on teaching and learning has been shaped by constructivist and sociocultural theories, which conceptualize learning as an active and socially mediated process. Constructivist theory emphasizes that learners construct knowledge through interaction with their environment, thereby supporting learner-centred and experiential pedagogical approaches (Piaget, 1972; Woolfolk, 2016). In special education contexts, constructivist principles have justified individualized instruction and adaptive teaching strategies that respond to diverse cognitive and developmental profiles. However, research cautions that constructivist approaches, when implemented without adequate structure and guidance, may impose excessive cognitive demands on learners who require sustained instructional support (Woolfolk, 2016).

Sociocultural theory complements constructivism by foregrounding the role of social interaction and teacher mediation in learning. Vygotsky's concept of the Zone of Proximal Development highlights the importance of scaffolding and guided participation in enabling learners to progress beyond their current capabilities (Vygotsky, 1978). Empirical research in special education consistently demonstrates that teacher-mediated instruction, continuous adaptation, and emotional support are central to effective learning in heterogeneous classrooms, positioning teachers as active mediators rather than passive transmitters of content (Woolfolk, 2016).

Building on these learning theories, scholarship on inclusive pedagogy has shifted focus from learner deficits to teachers' professional judgment and classroom practices. Florian and Black-Hawkins (2011) argue that inclusive pedagogy involves designing teaching–learning practices that enable participation for all learners without marginalization. Subsequent studies emphasize that inclusive practice depends on how teachers interpret learner diversity and make pedagogical decisions within complex classroom realities (Florian, 2019; Florian & Black-Hawkins, 2011;

Singal, 2016; Slee, 2018). Despite these conceptual contributions, existing research often remains focused on inclusive ideals, with limited examination of how such principles are enacted in special school contexts.

Applied frameworks such as Universal Design for Learning (UDL) further operationalize inclusive pedagogy by advocating multiple means of engagement, representation, and expression to address learner variability (CAST, 2018). While research supports the value of UDL-informed practices, the literature predominantly focuses on mainstream or higher education settings, offering limited insight into how these principles are adapted within special schools, where instructional demands are more intensive and individualized.

In the Indian context, literature on special and inclusive education has largely examined policy frameworks and systemic challenges. Studies consistently highlight gaps between inclusive policy intentions and classroom-level practices, particularly for children with disabilities (Singal, 2016). Following the introduction of the National Education Policy 2020, scholarly attention has turned toward inclusive and learner-centred education; however, existing analyses remain largely policy-oriented, providing limited empirical insight into how teachers interpret and implement inclusive principles within everyday teaching–learning practices in special schools (Government of India, 2020).

Significance of the study

While existing literature emphasizes learner-centred pedagogy, teacher mediation, and inclusive educational frameworks, there remains a significant lack of qualitative research that integrates learning theory, inclusive pedagogy, and policy enactment through teachers' lived experiences in special school contexts. In the Indian setting, scholarship on inclusive education and the National Education Policy (NEP) 2020 has largely remained policy-oriented, offering limited empirical insight into how inclusive principles are interpreted, negotiated, and enacted within heterogeneous classrooms. In particular, insufficient attention has been paid to how special school teachers manage diverse learning needs, navigate pedagogical, emotional, and institutional challenges, and translate policy ideals into everyday classroom practice. Addressing this gap, the present study provides a qualitative, classroom-level examination of teachers' perspectives on teaching–learning practices in special schools. By foregrounding teacher voices, the study generates empirically grounded insights that bridge learning theory, inclusive pedagogy, and policy implementation, thereby contributing to a deeper understanding of how inclusive education policies are realized in practice and informing teacher preparation, institutional support, and inclusive education reform.

Research questions

1. How do teachers in special schools **interpret and negotiate** the inclusive and learner-centred principles of NEP 2020 within classrooms comprising diverse learners?
2. How do special school teachers **navigate and manage** teaching–learning practices in classrooms where students require varied and individualized instructional approaches?
3. What pedagogical, emotional, and institutional challenges do teachers encounter while addressing multiple and contrasting learning needs?

Objectives of the study

1. To explore teachers' interpretation and negotiation of NEP 2020 within special school classrooms.

2. To examine the teachers-learning practices that are navigated through pedagogical diversity in heterogeneous classroom contexts.
3. To understand the challenges teacher's face in implementing inclusive practices in special education settings.

Method

Research design and data Analysis

A qualitative research design was adopted to examine pedagogical practices in special schools and their alignment with the National Education Policy 2020, using thematic analysis based on Braun and Clarke's (2006) six-phase framework. Approximately 20 participants, comprising special educators and school-based professionals with a minimum of two years of teaching experience, were recruited through purposive sampling from three special schools to ensure contextual variation. Data were collected through semi-structured interviews lasting 45–60 minutes, conducted in person or online with informed consent and audio recording, focusing on teaching strategies, classroom adaptations, individualized learning, learner engagement, and NEP 2020 implementation. Field notes and contextual observations were maintained and used to triangulate interview data, strengthening the credibility of the findings. Data were analysed inductively through iterative manual coding, theme development, and review to enhance analytical rigor, with peer debriefing used to support reflexivity and trustworthiness.

Ethical consideration

Ethical procedures ensured informed consent, confidentiality, voluntary participation, and secure use of anonymized data.

Results

The findings are presented as four themes that capture recurring patterns in teachers' accounts of pedagogical practice in special schools. These themes reflect how educators interpret inclusion, manage classroom heterogeneity, encounter challenges, and sustain their work in practice.

Figure 1. Representation of Themes and Sub-Themes

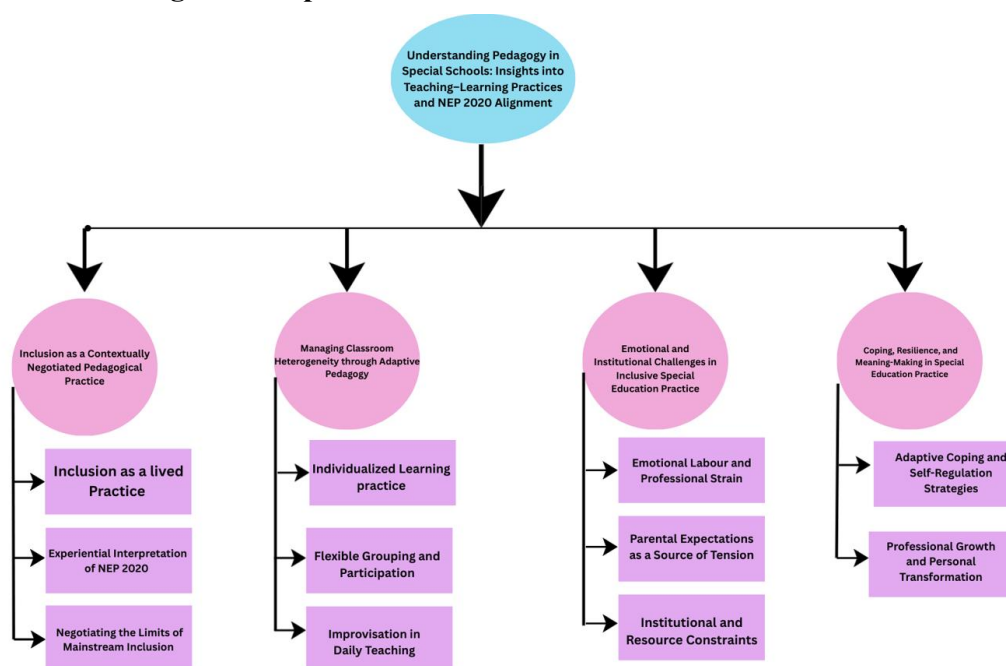


Figure 1 illustrates the four major themes and their associated sub-themes identified in the study, depicting how inclusive pedagogical practices in special schools are shaped by classroom adaptation, institutional contexts, and teachers' professional experiences in alignment with NEP 2020. Inclusion as a Contextually Negotiated Pedagogical Practice

1. Inclusion as a contextually negotiated pedagogical practice

This theme captures how special school educators conceptualize inclusion not as a fixed or uniform policy mandate but as a pedagogical practice that is continuously negotiated within classroom realities. Across participants (P1–P20), inclusion was described as context-dependent, learner-sensitive, and grounded in professional judgment rather than strict adherence to prescriptive models of inclusive education.

1.1 Inclusion as a Lived Pedagogical Practice

Participants consistently rejected the notion of inclusion as a symbolic or rhetorical concept. Instead, inclusion was framed as something that must be actively enacted through everyday teaching practices. Educators emphasized that inclusive education becomes meaningful only when it is translated into concrete classroom actions that respond to learners' developmental, emotional, and behavioural needs.

“Our vision is to ensure that inclusion is just not a buzz term. We want to ensure that it actually becomes a lived reality.” (*Participant 3 personal communication, 5th January 2026*)

Teachers highlighted that inclusion requires methodological flexibility and the use of varied instructional approaches rather than standardized practices. One participant explained that inclusive education is embedded in how teachers adapt methods to suit learners' capacities rather than treating inclusion as a separate instructional model.

“Inclusive education is not something different... we adopt various methodologies... they can learn anything a so-called neurotypical child can.” (*Participant 7 personal communication, 5th January 2026*)

These accounts suggest that inclusion is understood as a practice-oriented commitment shaped by classroom interaction rather than as an abstract educational ideal.

1.2. Experiential Interpretation of NEP 2020

Educators reported uneven familiarity with the formal provisions of the National Education Policy (NEP) 2020. While NEP was widely referenced in discourse, many participants indicated that their understanding of inclusive principles emerged primarily through classroom practice rather than through direct engagement with policy texts.

“Everybody uses the word NEP. Nobody knows NEP.” (*Participant 5 personal communication, 5th January 2026*)

Despite limited formal policy literacy, participants described NEP 2020 as largely affirming the pedagogical practices already in place within special school settings. Rather than initiating significant changes, the policy was perceived as legitimizing existing inclusive approaches.

“NEP gave us validation that what we are doing is not wrong or less academic.” (*Participant 12 personal communication, 6th January 2026*)

At the same time, teachers noted tensions between the aspirational nature of policy and the practical constraints of classroom implementation.

“Sometimes the policy feels very idealistic. Classroom reality is quite different.” (*Participant 18 personal communication, 8th January 2026*)

1.3. Negotiating the Limits of Mainstream Inclusion

Participants emphasized that inclusion does not necessarily equate to mainstream placement for all learners. Instead, inclusion was framed in terms of appropriateness, developmental readiness, and meaningful participation. Special schools were described as necessary educational spaces for learners requiring intensive and individualized support.

“All children cannot become inclusive or go to mainstream... there are children who need special schools... which is as per the NEP policy.” (*Participant 11 personal communication, 6th January 2026*)

Educators also critiqued mainstream curricular structures, suggesting that they often fail to accommodate learner diversity effectively, even among neurotypical students.

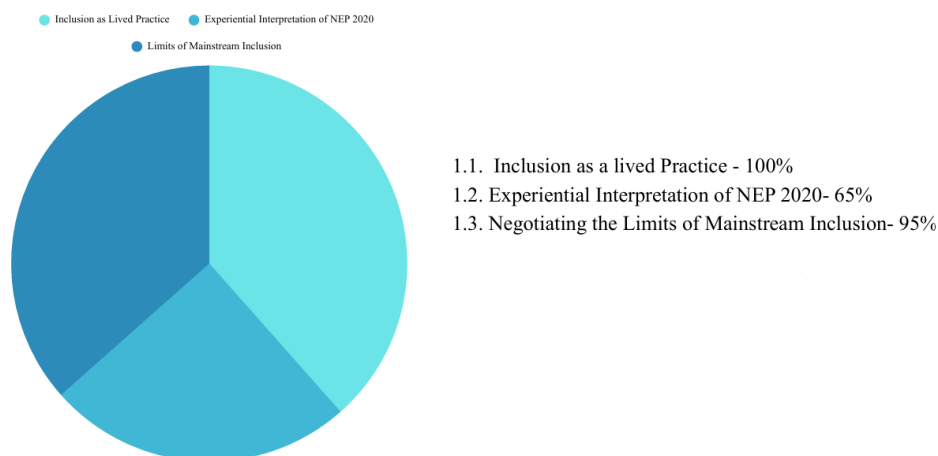
“Mainstream schools are not aligned with NEP... even neurotypical parents are not happy with this curriculum.” (*Participant 13 personal communication, 6th January 2026*)

Several participants highlighted the importance of organizing learning environments based on learners’ developmental levels rather than chronological age.

“Our classes should be based on the level of the child rather than the age.” (*Participant 9 personal communication, 6th January 2026*)

Together, these narratives illustrate how teachers actively negotiate the boundaries of inclusion, prioritizing learner well-being and engagement over uniform inclusion models.

Figure 2: Distribution of sub-themes within Theme 1: Inclusion as a contextually negotiated pedagogical practice *Note. N = 20*



Interpretation of Figure 2

Figure 2 illustrates that **Inclusion as Lived Practice** emerged as the most frequently referenced sub-theme, indicating that educators prioritize enactment over symbolic or policy-driven interpretations of inclusion. The prominence of **Experiential Interpretation of NEP 2020** highlights that policy principles are primarily understood and applied through classroom experience rather than formal policy literacy. The representation of **Limits of Mainstream Inclusion** reflects teachers’ critical engagement with inclusion, emphasizing appropriateness and learner readiness over uniform inclusion models. Overall, Theme 1 demonstrates that inclusion in special schools is a negotiated, practice-driven process shaped by contextual realities, professional judgment, and learner needs rather than rigid policy implementation.

2. Managing Classroom Heterogeneity through Adaptive Pedagogy

This theme captures how special school educators manage extensive heterogeneity within a single classroom, where learners differ widely in developmental level, diagnosis, behavioural regulation, and learning pace. Across participants (P1–P20), heterogeneity was described as a defining feature of special school classrooms, requiring continuous pedagogical adaptation rather than standardized instructional delivery.

2.1. Individualized Learning practice

Participants consistently emphasized that instruction in special schools is organized around individual learner profiles rather than age-based or grade-level expectations. Teaching–learning practices were described as grounded in individualized goal-setting, with educators prioritizing developmental readiness, attention span, and emotional regulation.

“Our classes should be based on the level of the child rather than the age.” (*Participant 9 personal communication, 6th January 2026*)

Educators highlighted that even learners with similar diagnoses require different instructional approaches, reinforcing the need for individualized planning.

“Even if children have the same condition like autism, the level and type are different, so activities cannot be the same for everyone.” (*Participant 1 personal communication, 5th January 2026*)

Several participants described designing separate lesson plans or objectives for each learner within the same classroom.

“We plan separate lessons for each child based on what they need and how they can understand.” (*Participant 5 personal communication, 5th January 2026*)

These accounts indicate that individualized learning forms the core pedagogical principle through which heterogeneity is managed.

2.2. Flexible Grouping and Participation

Educators reported using flexible grouping strategies to balance individualized attention with collective learning experiences. Participants described alternating between one-to-one instruction, small group activities, and group-based interventions depending on learner needs and classroom dynamics.

“If there are four to five children, we take only two at a time; otherwise, we do group therapy activities.” (*Participant 3 personal communication, 5th January 2026*)

Group activities were not structured around uniform outcomes; instead, children were assigned differentiated roles based on their abilities.

“In group activities, each child has a different role based on their ability.” (*Participant 6 personal communication, 5th January 2026*)

Participants emphasized that participation itself was defined flexibly, with engagement taking multiple forms.

“Even if one child is just sitting and observing, that is also participation for them.” (*Participant 10 personal communication, 6th January 2026*)

This approach allowed educators to maintain classroom cohesion while addressing individual learning needs.

2.3. Improvisation in Daily Teaching

Improvisation emerged as a recurring feature of daily teaching practice. Educators described frequently modifying lesson plans in response to learners' emotional states, behavioural challenges, and fluctuating engagement levels.

"Sometimes we stop the lesson and focus on calming the child instead of completing it."
(Participant 18 personal communication, 8th January 2026)

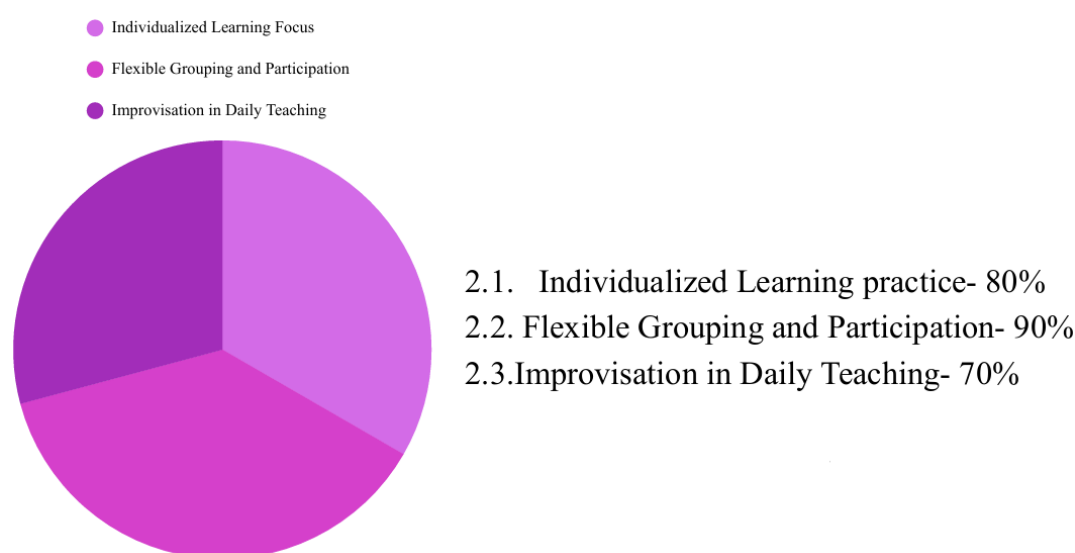
Several participants described improvisation as an intentional pedagogical response, whereby teachers continuously adjust instructional methods, pacing, and classroom strategies in real time to accommodate learners' emotional states, engagement levels, and developmental needs. Educators also described changing instructional approaches when planned strategies failed to produce engagement or progress.

"If one method does not work, we keep the same goal but change the approach in different ways." (Participant 7 personal communication, 5th January 2026)

These narratives highlight how adaptive pedagogy relies on teachers' moment-to-moment decision-making to navigate the complexities of heterogeneity.

Figure 3: Distribution of Sub-Themes within Theme 2: Managing Classroom Heterogeneity through Adaptive Pedagogy

Note. N = 20



Interpretation of Figure 3

Figure 3 indicates that Individualized Learning Focus was the most frequently referenced sub-theme, highlighting the centrality of learner-specific planning in managing heterogeneity. Flexible Grouping and Participation reflects teachers' adaptive organization of classroom interactions, while Improvisation in Daily Teaching underscores the necessity of real-time pedagogical adjustment in response to fluctuating classroom conditions. Overall, Theme 2 demonstrates that classroom heterogeneity in special schools is addressed through continuous adaptation, individualized planning, and flexible instructional practices rather than standardized pedagogical models

3. Emotional and Institutional Challenges in Inclusive Special Education Practice

This theme captures the emotional, relational, and structural challenges encountered by special school educators while implementing inclusive and learner-centred pedagogical practices.

Participants (P1–P20) consistently described teaching in special education as emotionally demanding and institutionally constrained, with challenges arising from parental expectations, workload intensity, and limited systemic support.

3.1. Emotional Labour and Professional Strain

Participants described teaching in special schools as involving sustained emotional engagement that extended beyond instructional responsibilities. Educators reported managing learners' emotional regulation, behavioural needs, and interpersonal dynamics on a daily basis, often requiring significant emotional investment.

Teachers noted that responding to learners' distress, dysregulation, or fluctuating engagement levels placed continuous emotional demands on them.

"Some days are emotionally exhausting because you are constantly regulating not just the child but yourself as well." (*Participant 4 personal communication, 5th January 2026*)

Several participants highlighted that emotional labour was an implicit and undervalued component of their professional role.

"People see teaching, but they don't see the emotional work behind it." (*Participant 15 personal communication, 7th January 2026*)

This emotional strain was often compounded by the pressure to remain patient, calm, and responsive despite unpredictable classroom situations.

3.2 Parental Expectations as a Source of Tension

Participants frequently identified parental expectations as a significant challenge in their professional practice. Educators described navigating tensions between parents' aspirations for academic progress and the developmental realities of their children.

"Parents want fast results, but they don't always understand the process." (*Participant 17 personal communication, 8th January 2026*)

Teachers reported that parents often compared their children's progress to neurotypical benchmarks, which created pressure on educators to demonstrate visible outcomes.

"There is a lot of comparison, especially when parents see other children progressing differently." (*Participant 11 personal communication, 6th January 2026*)

Managing parental expectations required careful communication, emotional sensitivity, and professional negotiation, adding to teachers' workload and stress.

3.3. Institutional and Resource Constraints

Participants also highlighted structural and institutional limitations that affected their ability to implement inclusive pedagogical practices effectively. Common challenges included limited staffing, time constraints, and insufficient access to specialized resources or training.

"We want to do more, but time and manpower become a limitation." (*Participant 13 personal communication, 7th January 2026*)

Several educators noted that while inclusive education is emphasized at the policy level, institutional support did not always align with these expectations.

"The expectations are high, but the support system is not always there." (*Participant 19 personal communication, 8th January 2026*)

Participants described adapting their practices within these constraints, often prioritizing immediate learner needs over ideal pedagogical conditions.

Figure 4: Distribution of Sub-Themes within Theme 3: Emotional and Institutional Challenges in Inclusive Special Education Practice

Note. N = 20



Interpretation of Figure 4

Figure 4 shows Emotional Labour and Professional Strain as the most prominent sub-theme, indicating the centrality of emotional demands in special education practice. Parental Expectations and Tensions reflect relational challenges beyond the classroom, while Institutional and Resource Constraints highlight systemic limitations shaping teachers' work conditions. Overall, Theme 3 illustrates that inclusive pedagogy in special schools is shaped by emotional demands, relational negotiations, and institutional constraints alongside instructional responsibilities.

4. Coping, Resilience, and Meaning-Making in Special Education Practice

This theme captures how special school educators make sense of the emotional and professional demands of their work and the strategies they use to sustain themselves within challenging teaching contexts. Across participants (P1–P20), coping was described not merely as stress management but as an ongoing process of adaptation, reflection, and meaning-making that enabled teachers to continue working effectively in inclusive special education settings.

4.1. Adaptive Coping and Self-Regulation Strategies

Participants reported employing a range of adaptive coping strategies to manage the emotional intensity and unpredictability of their work. Teachers described consciously regulating their own emotions in order to remain responsive to learners' needs while maintaining classroom stability.

"We have to be emotionally regulated ourselves before we can help the children." (*Participant 16 personal communication, 7th January 2026*)

Several educators emphasized the importance of setting emotional boundaries and developing self-awareness to prevent burnout.

"If we carry everything home, it becomes too heavy, so we learn to draw a line." (*Participant 12 personal communication, 7th January 2026*)

Others highlighted informal peer support, reflection, and brief moments of withdrawal as ways of managing daily stressors.

"Talking to colleagues helps a lot because only they understand what we go through." (*Participant 9 personal communication, 6th January 2026*)

These strategies enabled educators to sustain their professional functioning despite continuous emotional demands.

4.2. Professional Growth and Personal Transformation

Beyond coping, participants described their work in special education as contributing to personal and professional growth. Many educators reflected on how their teaching experiences reshaped their understanding of learning, success, and inclusion.

“Working here has changed the way I see education and children.” (*Participant 17 personal communication, 8th January 2026*)

Teachers reported developing greater patience, empathy, and flexibility over time, viewing these qualities as outcomes of prolonged engagement with diverse learners.

“You grow along with the children; it’s not just them learning.” (*Participant 2 personal communication, 5th January 2026*)

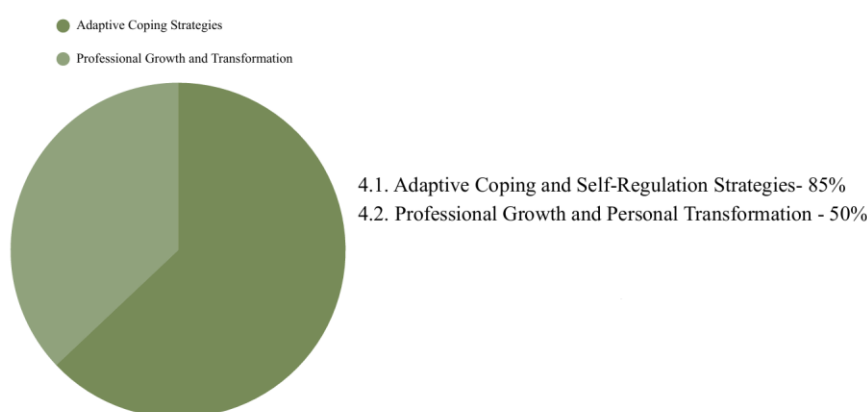
Several participants described a strong sense of purpose and fulfilment derived from small but meaningful learner progress, which reinforced their commitment to special education.

“Even small changes feel very rewarding here.” (*Participant 20 personal communication, 8th January 2026*)

This theme illustrates how teachers sustain inclusive practice through adaptive coping strategies and reflective meaning-making, positioning resilience as central to long-term engagement in special education.

Figure 5: Distribution of Sub-Themes within Theme 4: Coping, Resilience, and Meaning-Making in Special Education Practice

Note. N = 20



Interpretation of Figure 5

The pie chart indicates that Adaptive Coping and Self-Regulation was more frequently referenced, reflecting the immediate need to manage emotional demands. Professional Growth and Meaning-Making represents longer-term reflections that sustain teachers’ commitment to special education practice. Overall, Theme 4 demonstrates that educators sustain inclusive practice through adaptive coping strategies and reflective meaning-making, positioning resilience as central to long-term engagement in special education.

Implications of the study

The findings of this study have significant implications for special education practice, teacher preparation, and policy implementation. First, this study illustrates that inclusive pedagogy in

special schools is enacted through teachers' professional judgment, adaptive decision-making, and continuous responsiveness to learner diversity. This indicates an imperative need for teacher education and in-service training programs to go beyond prescriptive models of instruction and strengthen educators' capacities for reflective practice, pedagogical flexibility, and learner-centered adaptation.

While the NEP 2020 outlines progressive intentions for inclusive and learner-centered education, the findings suggest that its actual execution is determined through contextual interpretation mainly at the classroom level. As a result, teachers are seen as active agents of policy enactment, and policymakers and education managers should extend sustained institutional support in terms of adequate staffing, time, and material resources to facilitate substantive inclusion in special school settings.

Finally, emotional labour and coping strategies point out that teacher well-being is an important factor for sustaining inclusive practices. Various institutional mechanisms must be created to provide peer support systems, professional supervision, and even access to mental health resources for educators working in emotionally demanding special education environments. In all, the study emphasizes that inclusive education is not solely a pedagogical concern but a systemic responsibility requiring alignment between policy, practice, and teacher support.

Limitations of the Study

Despite the contributions brought about by this study, a number of limitations do exist. First, the generalisability of findings to broader educational contexts is limited by the qualitative design and purposive sampling comprising 20 participants who were drawn from a limited number of special schools.

The study used self-reported data from the semi-structured interviews, so participants' answers might have been affected by social desirability biases, recall issues, and subjective interpretations. The study could have been further improved by adding classroom observations or triangulating with instructional artefacts.

Third, the research exclusively considered teachers' point of view and did not include the perspectives of students, parents, or administrators. Future research, which would adopt a multi-stakeholder approach, might provide a better understanding of inclusive pedagogy in special education.

Finally, the study is also time-bound; it captures the experiences of teachers during an ongoing policy transition. Longitudinal studies could provide a more in-depth understanding of how meanings and practices associated with NEP 2020 change over time.

Conclusion

This study examined how special school teachers enact inclusive and learner-centred pedagogy within heterogeneous classrooms in relation to the National Education Policy 2020. The findings show that inclusion is operationalized through continuous professional judgment, adaptive instruction, and relational engagement rather than standardized models. Teachers actively mediate between policy expectations, classroom constraints, and learner needs, positioning inclusion as a context-responsive pedagogical practice.

Management of classroom heterogeneity was achieved through individualized planning, flexible grouping, and ongoing instructional adjustment, shaped by emotional labour, parental expectations, and institutional limitations. Despite these pressures, teachers sustained inclusive practice through adaptive coping and reflective professional growth.

The study underscores the need to treat teachers as central agents of policy enactment and to strengthen management-oriented training for learner-centred practice—specifically, training in classroom decision-making, differentiated planning, collaborative problem-solving, and teacher well-being. Aligning teacher preparation, institutional support, and ongoing professional development with these competencies is essential for translating NEP 2020’s inclusive aspirations into effective classroom practice.

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THE BURUNDI SECTORAL PLAN FOR EDUCATION 2022-2030: A SWOT ANALYSIS

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ABSTRACT

The responsible for education in Burundi are working as hard as possible to implement educational policies likely to improve education. Nevertheless, it is obvious that the challenges facing education in Burundi are legion. The objective of this paper is to highlight the strength, weakness, opportunity and threats of Burundi sectoral education plan 2022-2030. Also, this SWOT analysis will help to underscore the main challenges that hamper the implementation of the Burundi sectoral education plan 2022-2030. The results showed that the weakness and the threats tend to outweigh strengths and opportunities. It was shown also that the main challenge for the implementation of this sectoral plan for education in Burundi is linked to the lack of sufficient own funding. Fundings from partners in the education sector fail to find solutions to the real problem. If this self-funding challenge is met, it is undoubtedly possible to change the situation.

Key words: Analysis, Burundi, Education, Plan, SWOT

INTRODUCTION

The education sector, like so many other sectors of national life, requires planning that outlines a broad vision for the education of its citizens. This planning not only positions education as a bulwark against ignorance but also anticipates potential challenges in a rapidly changing world. Just as the problems facing society are constantly evolving, education must keep pace to adapt to these new challenges.

In particular, the Burundian education system has demonstrated exemplary performance in educational planning. This is evident in the numerous important documents that have been produced in a cascading fashion, aiming to provide guidance for the Burundian education system. Furthermore, conferences on education have been organized at regular intervals to find solutions for an education system striving to consolidate itself after or before serious economic, political, and social crises that continually weaken it.

Burundian education system has long faced both internal and external challenges that have consistently held it back. These challenges are documented in various reports produced by both national and international institutions, yet significant progress in the education sector remains elusive.

This paper aims to study in more or less detail the most recent document entitled, " Sectoral Plan for Education 2022-2030." The objective is to identify the strengths, weaknesses, opportunities, and threats that characterize the implementation process of this master plan for education in Burundi. Once this analysis is successfully completed, it becomes easier to understand the scope of the problem affecting education in Burundi.

RESEARCH QUESTION

What is the biggest threat to Burundi's education policy?

THE CHALLENGES FACING EDUCATION IN BURUNDI

Before diving into main challenges, Burundi is a small country highly populated located in the East Africa. Burundi's past is characterized by periods of conflicts that have slowed its economic development. Notable examples include the long civil war that ended in 2003 and the recent crisis of 2015, which reversed progress made towards development. According to the recent data, the Burundi GDP was 153.9 USD in 2024, the lowest in the East African community. The majority of Burundian population live in extreme poverty.

Among the big challenges as stated in a short statement delivered in April 2025 by the Permanent Secretary in the Burundi ministry of Education in a meeting, “It is evident that the system faces issues of access and equity, poor learning outcomes, high repetition and drop-out rates, and a mismatch between training and the demands of the labour market” (UNICEF BURUNDI, 2025).

Other challenges facing the education sector include the lack of adequate school infrastructures, both in terms of quality and quantity, to accommodate the growing student population. Furthermore, the internal efficiency of the school system is also a cause for concern. Changes are implemented very frequently without taking into account evaluations of existing practices. Also, very recently, another phenomenon is taking place: the departure of teachers seeking other opportunities, is causing concern and threatening performance in the Burundian education system.

Despite all these problems, Burundi is trying to address the challenges, as evidenced by the following actions: the construction of classrooms, in-service training for teachers, and an increase in spending allocated to education.

PRESENTATION OF THE 2022-2030 EDUCATION SECTOR PLAN OF BURUNDI

The first version of this kind of document was established in 2009 but was not endorsed by technical and financial partners. The second was launched in 2012 for the period 2012-2020. This one was called “Plan sectoriel de développement de l'éducation et de la formation 2012-2020” (PSDEF), (Sectoral plan for the development of education and training).

The current is named “Plan Sectoriel de l'Education 2022-2030” (Sectoral Plan for Education 2022-2030). This is a data-driven plan that aligns with both national and international agendas for promoting education. It is structured into six chapters, namely: Situation of Education sector, Main strategic guidelines and consistency with the national development plan, the priority programs of the PSE, implementation, monitoring, and evaluation of the PSE, cost and financing of the PSE, risks and mitigation measures. Between these two documents, another one named “Plan transitoire de l'Education 2018-2020” (Transitional Education Plan 2018-2020). This one was not a sectoral plan. It covered only 3 years. Among its objectives, was helping to mobilize resources (Le Groupe-conseil baastel ltée, 2018).

METHODOLOGY

The methodology used is the thematic analysis. A comprehensive SWOT Analysis was conducted on Burundi Sectoral Plan for Education 2022-2030. All the aspects of this document are screened, analyzed and categorized into the four angles of the SWOT tool.

RESULTS

Strength	weakness
✓ Based on the evidence: Written by national experts and IPE-UNESCO Dakar financial support, the approved macroeconomic framework; demonstrates credible policy guidelines. ✓ Clear and comprehensive objectives (5): improving access/equity, improving teaching quality, modern higher education, reform technical and vocational education, improving governance; ✓ Supporting strong early childhood education; ✓ A government commitment to fund education to the tune of a quarter of the national budget, excluding debt; ✓ Governance and management of education: a clear desire to decentralize education structures; ✓ STEM strengthening, curriculum reform; ✓ Labor market alignment effort.	✓ The completion and retention rate are low: in 2019, 32% and 25% respectively in fundamental and post-fundamental; ✓ Low internal efficiency 34% and 76% respectively in fundamental and post-fundamental; ✓ Disparities in access: 12%, 28% and 39% respectively in preschool, fundamental and post-fundamental; ✓ Unfair teacher deployment and high pupil-teacher ratio; ✓ Infrastructure issue: lack of electricity, water, fencing, classrooms, poor learning conditions; ✓ Lack of proficiency in the medium of instruction; ✓ Textbooks insufficient especially in early grades; ✓ Poor capital investment in education: the high majority of expenses are used in recurrent expenses; ✓ Poor planning: centralization, labor demand and education offer weakly unlinked.
Opportunities	Threat
✓ The high youth number; ✓ Legal inputs: establishment of professional and vocational education law; qualification frameworks; ✓ A drive towards quality education: textbooks distribution, strengthening the medium of instruction transition, in-service support; ✓ ICT reinforcement ✓ Re-equilibrating the investment in education sector; ✓ Innovation in higher education by diversifying the STEM education.	✓ Budget constraints: the investment is small; education partners contributions are not certain; ✓ The implementation ability is problematic: administration procedures, human resource management is challenging, activities can be delayed; ✓ The stability of institutions is problematic which affect fundings and partnerships; ✓ Health and sanitary issues: this can affect student attendance; ✓ Demographic boom: lack of strict birth control can worsen the pupil-teacher ratio. ✓ The lack labor-market alignment the inactivity of public private partnership can limit job access

ANALYSIS AND DISCUSSION

The strengths highlight the contribution of experts and the financial support of IYPE-UNESCO, early childhood education, the desire of education reform, funding commitment... Actually, the Burundi education plan is trying to pave the way to the bright future. This result is supported by this statement : “The Burundian government has given unequivocal priority to the sector and demonstrated a level of commitment far above the average for sub-Saharan African countries, despite having the lowest GDP per capita levels in the sub-region.”(IYPE-UNESCO DAKAR., 2021, p. 148). It is evident that the good will of improving education system is real but the implementation remains very problematic.

The opportunities are about the big youth number, the commitment for education quality, establishment of crucial documents, ...Indeed, according to projections, by 2030, 56% of the population will be under 25, which could increase the school-age population (IYPE-UNESCO DAKAR., 2021). For this, instead of being an opportunity, it could become a big challenge if the economic move does not surpass the increase of the population. For example, the large number of young people cannot be beneficial if young people lack opportunities for their future. This is evidenced by the high dropout rate and low retention rate. Motivation for studying remains low. The reinforcement of ICT, requires some preliminaries like availability of internet, electricity and ICT materials. Also, the quality of education and setting up some documents will be successful provided that the fundings are available.

The analysis of the weaknesses reveals a system suffering from enormous and multifaceted difficulties, ranging from planning and equipment to internal efficiency. This was also underscored by the report of (IYPE-UNESCO DAKAR., 2021) that indicated that high class repetition and school dropout are hampering Burundi Education system and its internal efficiency. Obviously, all those challenges revolve around insufficient fundings.

The analysis of threats revolves around the main challenge namely budget availability. In fact, if the system was having enough funds, it should not suffer from the cut of fundings of partners due to political disruptions or crisis. Also, unemployability results from the extreme poverty of the country. This finding is not far from the assessment of the sector of Education that showed that, “on the ground, despite the existence of well-defined processes, sectoral policies are not being implemented. Several reasons explain this finding: lack of dialogue and strategic thinking between the various levels of the system, lack of alignment between regional and national planning, lack of relevance in the choice of actions planned by the decentralized level (they do not reflect the strategies to be developed to address specific challenges identified at the commune or provincial level), and insufficient resources allocated”(UNESCO IIEP regional Office for Africa & French Development Agency, 2024, p. 59). Even though the funding is not much highlighted it is the biggest issue that make every plan unsuccessful.

This said, to rely on foreign funding cannot help to system to be efficient. This echoes the circumstances that led to the following sad reality: The previous plan of 2012-2020 failed to complete due to the political crisis of 2015, “Indeed, funding for the sector had decreased, the entire macroeconomic framework of the PSDEF (Education Sector Development Plan) was disrupted, the common education fund was no longer functioning, and several development partners had withdrawn” (République du Burundi, 2023, p. 9)

Moreover, the funding of Burundi teaching policy, produced with the financial help of Unesco, was set to be funded by both the government and his partners: “The financing of education policy

in Burundi will come from the national budget and the government's ability to mobilize funds from its bilateral and multilateral partners, as well as from NGOs and local private donors.” (République du Burundi, 2019, p. 32)

CONCLUSION

Through the analysis of the document referred to here as Burundi sectoral plan for education 2022-2030, it is clear that the Burundian education system faces enormous challenges, similar to those found in some other parts of the world. However, it is noticeable that the plan does not take into account a very important dimension: the financing of education. As long as the system remains dependent on external funding, it will not be able to improve. The suggestion is to seek domestic funds to finance its education system. This will allow it to pursue its desired direction, and success will be guaranteed.

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A STUDY ON TEACHING COMPETENCY OF SECONDARY STUDENT-TEACHERS AN ANALYSIS

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ABSTRACT

This study explores the *Secondary student-teachers with varying teaching experience during their teaching practice would have had diverse experiences in obtaining their teaching competency. Teaching competency varies depending on the subject, as different disciplines demand varied knowledge, skills, pedagogical techniques and content expertise for effective teaching. The study aimed to examine differences in teaching competency based on their discipline. Survey method of study used, data were collected using stratified random sampling technique from 100 secondary student teachers five colleges of education in the Salem and Dharmapuri districts of Teaching Competency scale Tamilnadu. Standardized tool (Teaching Competency Training (TCT) Strategy Developed by Bajwa) was developed and validated for the study, with high reliability confirmed through Cronbach's Alpha (0.91) and split-half reliability (0.85). Statistical analyses including Mean, Standard Deviation, and t-test were employed to test hypotheses. The findings revealed that more than 80% of both arts and science subject secondary student-teachers have average level of teaching competency. And also, the t-test analysis explored that the science subject teachers have better teaching competency than the arts subject secondary student-teachers*

Key Words: *Teaching, Competency, Secondary student-teachers,*

INTRODUCTION

Teaching: Being a teacher is a mission, not just a job. Children are moulded and formed by teachers, who treat them like clay. Teaching is a full-fledged social activity. Teaching is a career and a way to help kids reach their full potential and acquire valuable life lessons, such as sharing, respect, ethical ideals, and cultural norms. According to N.L.Gage's Democratic View, teaching is interpersonal influence meant to alter someone else's probable behaviour. **Competency:** According to Rankin (2004), competencies are essentially specifications of expected performance that, when considered collectively, ought to give users, a comprehensive understanding of the most important behaviours, values, and tasks necessary for the success of their businesses. **Teaching Competency:** Towards a more complete definition Rama (1979) defines teacher competency as the "A teacher's ability is demonstrated through a collection of over teacher classroom behaviours that are a consequence of the interplay between the presage and the product variables of teaching in a social situation". Thus, the term "teaching" can be defined as a collection of observable instructor behaviours that result in intended student results. The term "competence" has also been debated. It refers to the criterion for determining teacher effectiveness. To create teaching competency standards, we must first evaluate two challenges: (a) How to characterize the successful teaching behaviour of teachers, or what core teaching competences teachers should possess, and, (b) What significant modifications have occurred in the connotation of teacher teaching competency structure during the course of technological change? Most teaching competency improvements promote and encourage human performance behaviour, and they are utilized to signify a level of

professional certification. McLagan (1997) defined competency standards as six aspects: tasks, results, outputs, knowledge, skills, and commitments / effects and bundles of qualities. The International Board of Standards for Training, Performance, and Instruction defines competency standards as a set of relevant knowledge, skills, and attributes that enable individuals to perform specific occupations or job responsibilities in accordance with professional standards. According to Liles (2007), effective teaching is founded on a 'knowledge of how learners learn' rather than individual mastery of methods and equipment.

REVIEW OF RELATED STUDIES

Lavanya. S & G.N. Tiwari (2025) found that variables, including stream (arts vs. science), educational qualification (UG vs. PG), and previous computer knowledge, did not show significant differences in TPACK levels. Deepa and Vasudevan (2022) found that the B.Ed trainees having positive attitude towards teaching profession and relation with teaching competency. K., Bindusha and D., Bindu (2020) there is no significant difference in the teaching competency level of graduate level teacher trainees in terms of locality and qualification of the trainees. Ram Niwas. (2018) found that the teaching competency of trainee-teachers is found a significance differences between the Pedagogical groups. Attitude of trainee-teachers towards creative teaching mean have significant difference exists in their Gender, Caste, and Qualifications bases. The influence of teacher training programme on attitude towards creative teaching of Science stream is highest with the comparison of Humanities streams trainee-teachers. William Dharma Raja and Beulahbel Bency (2012) found that there was no significant difference in the teaching competency of prospective teachers with regard to Optional Subject, Type of School and Medium of instruction.

SIGNIFICANCE OF THE STUDY

Teachers have a significant impact on their students' academic performance. It is the teacher's obligation to ensure that the students achieve their full potential in terms of overall growth. The teacher should provide the essential experiences and instruction to the students, ensuring that they conduct according to societal norms and lead a successful life. To do such jobs successfully, the teacher must be more efficient and aware. Secondary student-teachers mark the beginning of a teaching career. The teaching community's role in shaping the nation's future is critical. It is a pleasant privilege for teachers to develop the nation's children into helpful citizens of the future. In today's hurried environment, secondary student-teacher education should be competency-based. If secondary student instructors are competent, the entire country will profit. Regardless of how brilliant the educational system, curriculum, and textbooks are, if the teachers are incompetent, education will be ineffective. Secondary-student teachers with varying teaching experience during their teaching practice would have had diverse experiences in obtaining their teaching competency. Teaching competency varies depending on the subject, as different disciplines demand varied knowledge, skills, pedagogical techniques, and content expertise for effective teaching. For example, a teacher must possess distinct competences in order to properly teach abstract mathematics as opposed to practical science or literary nuances. A teacher's ability to tailor their skills to the specific demands of a subject is a critical component of their efficacy. This means that the same teacher must adapt their technique, content delivery, and assessment methods to the specific peculiarities of the subject being taught. This study will provide a platform for assessing the teaching competency of secondary student-teachers in relation to main subjects using selected indicators. Quality indicators are required to monitor the system. Thus, the establishment of quality indicators based on the teaching performance of secondary student teachers in this study is extremely relevant.

OBJECTIVES OF THE STUDY

- To find out the level of teaching competency of secondary student-teachers with regard to arts & science major subject.
- To find out whether there is any significant difference between arts and science subject group secondary student-teachers in their teaching competency

HYPOTHESIS OF THE STUDY

- There is no significant difference between arts and science subject group secondary student-teachers in their teaching competency.

METHOD USED

The "Survey Method" was chosen for the current investigation to under the teaching competency of student-teachers.

POPULATION AND SAMPLE

The target population is the larger group to which the research study findings will be generalized. Subpopulations exist inside the larger target population. Generalizing from a sample of individuals to the larger target population is a two-step procedure that begins with defining the broader target population of persons of interest and then selects a sample of individuals at random from that target population. The researcher has decided to work on teaching competency of secondary student-teachers with regard to subject, hence population in this study refers to all the secondary student-teachers who are studying arts and science subject in the colleges of education.

A sample is a group of people that a researcher utilizes in a study. "Participants" are the individuals who make up samples. In quantitative research, samples are chosen in such a way that they may be applied to the wider population from which they were first gathered. In the present study the researcher has chosen five colleges of education from Salem and Dharmapuri District. Furthermore, the sample comprises of 100 arts and science subject secondary student-teachers from the above said colleges of education. Following is the break-up of the samples from the five institutions.

TOOL USED

Basic-teaching Competency Training (BCT) Strategy Developed by Bajwa is competency-based teacher training strategy. The most fundamental idea of BCT strategy is that student teachers should focus attention upon specific behaviour of teaching. Thus at one time a student teacher is concerned with one sub- competence, which may be defined as a set of components and each component is defined as a set of related type of teaching behaviours. The five basic teaching competencies taken in the strategy are Cognitive-based teaching competency (CC), Performance-based teaching competency (PC), Affective-based teaching competency (AC), Consequence-based teaching competency (CNC) and Managerial teaching competency (MC). TCS consists of 30 statements. It is a five-point scale. Every positive statement gets scores 5, 4, 3, 2 and 1 to the responses strongly agree, agree, undecided, disagree and strongly disagree respectively. This is reversed in the case of negative statements. **Reliability:** The items in the tools were divided into two equivalent halves and the two sets of scores were correlated. For this split – half method correlation was calculated. Then the reliability of the tools was established by using the Spearman-Brown Prophecy formula (Best & Kahn, 2005). The reliability coefficients using the above formula for TCS were found to be 0.69.

Objective: To find out the level of teaching competency of secondary student-teachers with regard to art and science subject.

Table – 1.1**Level of teaching competency of secondary student teachers with regard to major subject**

Variable	Major Subject	Low		Average		High	
		N	%	N	%	N	%
Teaching competency	Arts	3	13	19	82.6	1	4.3
	Science	3	3.9	68	88.3	6	7.8

From the above table it is clear that 13% of arts subject secondary student teachers have low level, 82.6% of them have average level and 4.3% of them have high level of teaching competency. And also, 3.9% of arts subject secondary student teachers have low level, 88.3% of them have average level and 7.8% of them have high level of teaching competency.

Null Hypothesis: There is no significant difference between arts and science subject group secondary student teachers in their teaching competency.

Table-1.2**t – test analysis on the scores of teaching competency of secondary student teachers with regard to major subject**

Variable	Major Subject	N	Mean	S D	t - Value	P - Value
Teaching competency	Arts	23	108.5	12.56572	3.112	0.004 S
	Science	77	117.97	13.48681		

S - Significant at 5% level

It is inferred from the above table that p value is greater than 0.05 for teaching competency of secondary student-teachers. It shows that there is significant difference between arts and science subject group secondary student teachers in their teaching competency. The mean difference revealed that the science subject secondary student-teachers have better teaching competency than the arts subject secondary student-teachers.

FINDINGS OF THE STUDY

- 82.6% of arts subject secondary student-teachers have average level of teaching competency. But, 88.3% of science subject secondary student-teachers have average level of teaching competency.
- The science subject teachers have better teaching competency than the arts subject secondary student-teachers

CONCLUSION

The present study reveals that more than 80% of both arts and science subject secondary student-teachers have average level of teaching competency. The reasons for this conclusion could be traced to the fact that both teaching competencies and major subject are interrelated. Teachers in various disciplines demand varying levels and breadths of expertise. Pedagogical Content Knowledge describes how a teacher understands how to teach a given subject. A physics teacher may use different tactics than one who teaches English literature, because the former must explain abstract concepts, whilst the latter must stimulate critical interpretation of texts. The nature of the subject determines the most successful teaching approaches. Science teachers may conduct hands-on experiments, whereas social studies teachers may impart material through group discussions,

case studies, or primary source analysis. And also, the inferential analysis revealed that, the science subject teachers have better teaching competency than the arts subject secondary student-teachers. Accordingly, this study suggested that the best way to improve the teaching competency of arts and science subject secondary student-teachers is to concentrate on specialized pedagogical training that combines subject-specific knowledge with technologies, classroom management, adaptive teaching, assessment, and effective instructional strategies. Through this integrated approach, the secondary student-teachers gain the skills necessary to design interesting lessons, oversee classroom operations, assess student learning, and encourage critical thinking in their particular fields of science and arts.

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ENHANCING THE WRITING IN ENGLISH BY USING PROPER PUNCTUATION MARKS FOR THE MIDDLE SCHOOL STUDENTS

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Abstract

English, the preferred language for international communication, allows native and non-native speakers to interact and collaborate. India is the country, with diverse languages and people, according to the different states people speaks different languages and English is the foreign language acquired in schools. English language has been learned from the LKG class until the graduation level either as the language or the medium of instruction itself is in English, were all the subjects will be learned through English. Punctuation is one of the important mechanics of writing. Simply speaking, punctuation refers to the use of standard marks and signs in writing to separate words into sentences, clauses, and phrases in order to clarify the meaning. This study on punctuation marks employs an experimental design. Approximately fifty students from the sixth-grade pupils were selected for the study from a government institution in the state of Kerala. Of the fifty pupils, twenty five were designated as the control group, while the remaining twenty five constituted the experimental group, which received treatment on punctuation marks by working out the worksheets related to punctuation marks on full stop, question marks, exclamatory marks, comma, semicolon and colon for ten days. Results found that the experimental group students have very good practice in writing the paragraph with proper punctuation marks. Recommendations were given according to the findings.

Keywords: Full Stop, Question Marks, Exclamatory Marks, Comma, Semicolon and Colon.

INTRODUCTION

People from all over the world are able to communicate with one another and understand one another better thanks to the fact that English is a universal language. Interaction and collaboration between native and non-native speakers of English is made possible by the fact that English is the language of choice for international communication. According to the various states, people speak a variety of languages, and English is the foreign language that is taught in schools. India is a country that is home to a diversity of people and languages. The English language has been taught from the kindergarten level all the way up until the graduation level, either because the language or the medium of instruction itself is in English, and all of the subjects will be taught through the medium of English. A variety of abilities, including reading, speaking, and writing, are among those that the students strive to concentrate on, study, and master. Essay writing is not as difficult as many people assume it to be. It is necessary to acquire a substantial amount of vocabulary and to become proficient in the principles of grammar. As Hundarenko (2019) points out, it is essential for students to acquire the ability to write academically because it has a direct bearing on their academic achievement and plays a vital part in their professional lives respectively.

There are two various ways of communicating that can be utilized in order to carry out the mission in a variety of different circumstances. It is possible that speech, which is an oral form of language, is the major means of communication that is utilized in order to carry out the activity with the assistance of speech. Writing is the graphic form in which the letters of the alphabet are written. Sounds and writing comes together. It is possible for information, thoughts, feelings, and emotions to be transmitted from one person to another and from one location to another through the medium of writing, which is a fundamental element of communication. Graphics, which also include written symbols such as letters of the alphabet, are utilized in this process. The ability to write is the most difficult of all the talents that are associated with language. Students who are learning a second language face a great deal of difficulty when it comes to writing tasks.

When it comes to writing, punctuation is one of the most fundamental mechanics. In its most basic form, punctuation is the application of conventional symbols and signs in written communication for the purpose of separating words into sentences, clauses, and phrases in order to make the meaning more discernible. Carter and Carthy (2006) make the following statement: "Punctuation exists in order to indicate the boundaries of grammatical units and to indicate grammatical information that is marked in spoken language by means of intonation, pitch, etc." Similarly, Hard et al. (1941) state that "Punctuation marks are useful tools without which no writer could hope to convey his meaning to his reader with immediacy and accuracy." This suggests that punctuation marks are an essential component of writing.

Punctuation Marks

In both British and American English, there are fourteen different punctuation marks that are regularly employed. A full stop, a question mark, an exclamation point, a comma, a semicolon, a colon, a dash, a hyphen, dashes, brackets, braces, an apostrophe, quotation marks, and ellipses are the punctuation marks that are included in this category. Within the scope of this current investigation, a number of punctuation marks have been examined in great detail. The following gives an explanation of them:

Full Stop (.): The full stop is one of the punctuation marks that is considered to be among the most important in English grammar. In writing, it serves the purpose of clearly indicating the conclusion of a sentence and providing clarity. That is another name for it: a period. For the purpose of indicating that a concept or statement has been completed, the full stop is an essential component. With the use of the full stop, the writing becomes much simpler to read. *Example: I worked from the morning until the evening.*

Quotation Mark (?): Another often used punctuation mark with a widely understood meaning is the question mark. It is employed following a direct spoken query. Words like How, Who, Where, When, Why, and What are the first words in a question sentence. But in academic writing, inquiries can also begin with other terms. For *example, where are my glasses?*

Exclamation Mark (!): An exclamation mark is employed at the conclusion of a phrase to convey surprise or emphasis, and in direct speech, it indicates that the speaker is either speaking loudly or yelling. It is employed when the author perceives something humorous and is typically enclosed in brackets like follows: (!). E.g. *The guard shouted, "Watch out!"*

Comma (,): A comma delineates elements in a list but fails to differentiate between two independent clauses. It serves to indicate the division of concepts or components inside a sentence's structure. It is also utilized in correspondence following the salutation and the closing. E.g. *Smith had never ridden on the back of a camel, so he tried out of curiosity.*

Semi-colon (;): A semicolon is used in between a comma and a period. It serves as a pause that is not quite as decisive as a period but a bit more forceful than a comma. When two clauses may be stated in a single sentence and are related to one another, it is employed. that it is used to join independent clauses; compared to a period, it indicates a closer relationship between the clauses. E.g. *Kemi was hurt; he knew she only said it to upset him.*

Colon (:): It serves two primary purposes. The first comes following a word that introduces a series, a quotation, an explanation, or an example. It is also frequently used following a business letter's salutation. Ex. *There were three variants: green, blue, and red.*

REVIEW OF RELATED LITERATURE

The purpose of the study by Roma et al., (2026), explores on descriptive quantitative study was to address the punctuation proficiency among high school students. The study participants were 34 seventh-grade students from Baltazar Nicor Valenzuela National High School. The study introduced an intervention called Explicit Instruction to improve students writing skills in punctuation usage. The research employed a quantitative, pre-experimental one-group pretest-post-test design to assess the intervention's effectiveness. According to Thyer (2012), this design entails measuring a single group prior to and subsequent to an intervention to ascertain changes. The pre-test and post-test results showed a significant difference: the pre-test had a mean score of 21.5 (SD = 3.45), while the post-test showed a mean score of 41.2 (SD = 4.88). The statistical analysis revealed $t(39) = 19.2$, $p < .001$ significant improvement in punctuation usage following the explicit instruction intervention. These findings suggest the intervention effectively improved students' punctuation usage. To provide a comprehensive understanding of the students' insights during and after the intervention, the researchers conducted interviews with 10 selected individuals. From the responses gathered, five themes emerged regarding how the use of explicit instruction and the proposed intervention improve students writing skills in punctuation usage: (1) enhanced clarity and organization of student written outputs, (2) use of step-by-step approach in explicit instruction, (3) Increased Student participation, (4) Enhanced Lesson Comprehension, and (5) Improves memory retention. In addition, five themes emerged regarding the insights of students: (1) holistic and inclusive development of writing skills across subjects and grade levels, (2) stakeholder support in literacy interventions, (3) development of writing awareness and habits through the intervention, (4) Improving School Support with Teaching Materials and Tools, and (5) Clearer Writing Confidence.

Andrew Burrell and Roger Beard (2024) examined the subject of playful punctuation in the narrative writing of primary pupils. The writing of three attainment groups of children aged 9–11 was analyzed within the domains of applied linguistics and language play to examine their utilization of ludic punctuation in crafting an imaginative tale. The scripts originated from an extensive repeat-design study on writing development that examined several linguistic aspects. The scripts exhibited several linguistic play elements, including ludic punctuation, which were subsequently analyzed methodically. Seventy-one stories were analyzed to detect and categorize the humorous punctuation employed by the youngsters in this writing task. A variety of playful punctuation was seen, particularly in the application of quotation marks, exclamation marks, and question marks. Conversely, the asterisk, interrobang, underlining, brackets, and dash were utilized seldom. Distinct disparities existed among the achievement groups regarding the substance and scope of these applications. The results demonstrate that children aged 10 to 11 perceive narrative writing as providing various opportunities for creative and fun applications of punctuation, despite not being urged to engage in such practices. The results indicate that these applications, including

language play in its whole, necessitate additional examination. The research conducted by Raheem and Ghafar (2024) seeks to analyze the punctuation and spelling problems encountered by EFL learners in their academic writing during English proficiency assessments. A quantitative approach was employed to achieve the research objective. One hundred seventeen written samples were gathered and analyzed. The participants consisted of 82 females and 35 guys. The mean age ranges from 23 to 37 years. The findings revealed several types of faults and problems. The study addresses specific problems and challenges: punctuation and spelling inaccuracies. The results indicate a significant prevalence of punctuation and spelling problems among Iraqi EFL trainees. The predominant punctuation problems were the use of capital letters (54.72%), commas (25.71%), and periods (19.58%). Regarding spelling errors, omission accounted for the biggest percentage of errors (40.9%), followed by substitution (30.5%), transposition (15.0%), and insertion (13.6%).

The study examined by Isah Abdulmumini and Ahmad Shehu Musa (2024) investigates the utilization of punctuation marks by 400-level English students at Ahmadu Bello University Zaria (ABU) and Federal University Gusau (FUG) during the 2023/2024 academic session. The pupils were administered an in-class examination to evaluate their proficiency in punctuation. The research questionnaire of 15 brief responses and one essay question. The participants were positioned in a classroom, and each student submitted independent responses to authenticate the data. Fifty scripts from students were randomly chosen from each college. The test scripts function as the data for the study. The researchers employed a quantitative approach to analyze the inquiries. The research utilizes a framework established by Gass & Selinker (2008), comprising six essential steps: data collection, error identification, error classification, error quantification, analysis of error sources, and error remediation. The study revealed that ABU English students possess a superior understanding of punctuation marks, achieving 100% accuracy with ellipses and dashes, while the semicolon ranked lowest with a mere 38% accuracy. Students at Federal University Gusau demonstrate a superior understanding of the full stop, achieving a 96% accuracy rate, however their comprehension of the colon is notably lower at 16%. The research determined that errors arising from improper punctuation usage primarily stem from negligence, leading to the misrepresentation of English students. The essay advises university lecturers teaching writing to ensure that English applicants, as prospective educators, rigorously follow punctuation standards for enhanced communication efficacy.

The research by Lelakova and Toman (2023) addresses the issue faced by Slovak secondary school students regarding the usage of commas in complicated sentences that include adverbial and nominal subordinate clauses in English essay writing. It also focuses on the English teachers' proficiency in identifying accurate and wrong comma usage in their students' writings. The research sample comprises school leaving test essays authored by students with a B1 level of English proficiency. The digitized texts of 115 essays are posted in The Main Corpus and categorized into 8 distinct sub corpora corresponding to various essay topics. Comprehensive corpus linguistic and statistical analyses indicate that the efficacy of comma usage among the observed EFL students is directly contingent upon the complexity of the essay topic, and that the error rate in adverbial clauses significantly exceeds that in nominal clauses. The recent discovery indicating that English language instructors frequently neglect or inaccurately correct comma usage in numerous sentences prompts the authors to consider the various underlying causes of students' inaccuracies in comma application in their written work, along with several proposed solutions to address this issue.

The research undertaken by Mahnoor Fayyaz, Aqsa Irshad, Azha Farid, and Syeed Sheraz Ali Sherazi (2022) aims to enhance the English punctuation skills of secondary school students through

targeted exercises and assessments on various punctuation marks, including colons, semicolons, full stops, exclamation marks, hyphens, dashes, question marks, brackets, apostrophes, and quotation marks. The primary emphasis will be on enhancing the use of semicolons and colons, since students often have challenges with these punctuation marks. Students will receive written dialogues and will view films with subtitles. To enable them to excel in essays, letters, applications, and similar tasks. If pupils excel in punctuation, they will subsequently perform exceptionally in their post-graduation endeavors, enabling them to compose outstanding articles, books, plays, and research papers that profoundly impact the reader's mind.

THE PURPOSE OF THE STUDY

Middle school pupils, particularly those in the sixth grade, possess considerable knowledge of English grammar but have limited understanding of punctuation, sometimes struggling to punctuate sentences correctly or utilize punctuation marks appropriately. Punctuation marks include full stops, question marks, exclamation marks, colons, semicolons, and commas. Punctuation marks impart significance to phrases and can alter their interpretations. Sentences devoid of punctuation lack coherence. Punctuation marks are essential in students' lives; for instance, they require punctuation in composing essays, letters, applications, and similar documents. Full stops, question marks, and exclamation marks are the simplest punctuation marks; nevertheless, commas, colons, and semicolons pose challenges for middle school children and necessitate further practice for comprehension. Numerous punctuation rules exist. A colon is a punctuation mark that follows a clause. A full stop will be present upon the completion of the sentence. Semicolons will follow the conjunction verb, a question mark will be placed after the interrogative sentence, and a solitary exclamation mark will be used for abrupt expressions such as hooray or alas.

The sole method to enhance their punctuation skills is through the regular practice of reading or writing worksheets, as well as engaging with articles, newspapers, films, or novels rich in punctuation, as instructed by their English professors. It can enhance their proficiency in English punctuation. Punctuation is indeed challenging, necessitating much effort for improvement. The principal goal is to facilitate the coherent reading of written text by illustrating its grammatical structure, such as sentence-ending punctuation, clause-separating commas, and paragraph-indenting.

Punctuation marks provide the reader with indications regarding the prosody appropriate for reading a text aloud, including characteristics like as question marks and exclamation points. These are particularly crucial for accurately conveying the intonation and emphasis of spoken language. Punctuation can emphasize semantic units or contrasts within the text that are not immediately tied to its grammatical structure, such as the selection of colons versus semicolons to illustrate the rhetorical framework of a complicated sentence, as well as the application of line breaks and stanzas in poetry. Punctuation can introduce a semantic layer that is distinctive to the pictorial medium, rendering it challenging or unfeasible to articulate verbally. For instance, the employment of 'scare quotes' to indicate that a term had a specific connotation, or the utilization of capital letters to emphasize a significant point. The current study assists middle school pupils in reading and writing English paragraphs or phrases by employing suitable punctuation marks, hence facilitating comprehension across all disciplines and improving their academic achievement.

METHODOLOGY OF THE STUDY

This research utilizes an experimental design. Approximately fifty sixth-grade kids were selected for the study from a government institution in Kerala. Out of the fifty pupils, twenty-five

were assigned to the control group, while the remaining twenty-five formed the experimental group, which underwent treatment on punctuation marks by completing worksheets pertaining to full stops, question marks, exclamatory marks, commas, semicolons, and colons over a period of ten days. The program focused on the correct application of punctuation marks in sentences and culminated in substantial practice of paragraph writing over the course of 10 days. The pre-test and post-test were conducted, and SPSS was employed to evaluate the results. After ten days of therapy, students from both the experimental and control groups underwent a post-test in punctuation.

RESEARCH QUESTION

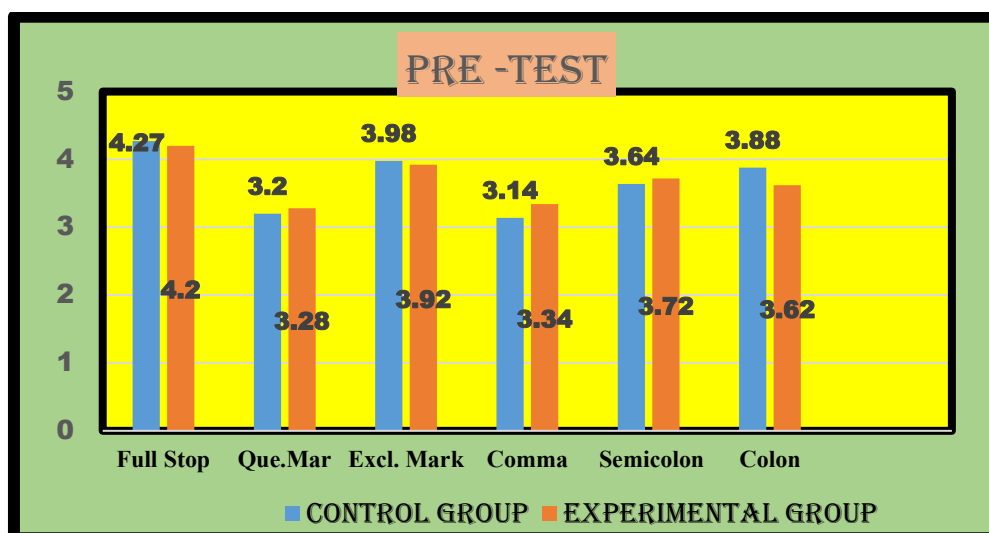
1. Is there is any significant mean difference between the Control and Experimental group in the pre-test score in the full stop, question mark, exclamatory mark, comma, semicolon and colon of the sixth standard students?
2. Is there is any significant mean difference between the Control and Experimental group in the post-test score in the full stop, question mark, exclamatory mark, comma, semicolon and colon of the sixth standard students?
3. Is there is any significant mean difference between the pre-test and post-test score of the experimental group in the full stop, question mark, exclamatory mark, comma, semicolon and colon of the sixth standard students?
4. Is there is any relationship among the punctuation marks like full stop, question mark, exclamatory mark, comma, semicolon, colon and overall punctuation marks total of the sixth standard students?

FINDINGS OF THE PRESENT STUDY

Answer – Question 1

Significant mean difference between the Control and Experimental group in the pre-test score in the full stop, question mark, exclamatory mark, comma, semicolon and colon of the sixth standard students

(N (50) = Control group students – 25; Experimental Group students – 25)

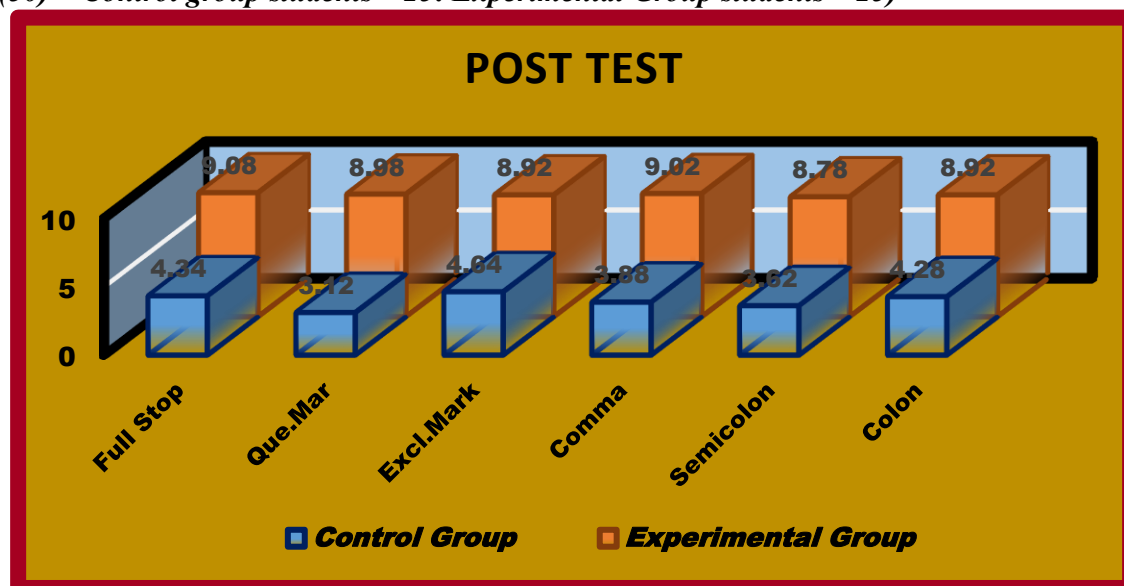


It is observed from the above graph that there is no significant difference between the control and experimental group in the pre-test score in full stop, question mark, exclamatory mark, comma, semicolon and colon. That is both the control and experimental group students are found found to be same in the pre-test score.

Answer – Question 2

Significant mean difference between the Control and Experimental group in the post-test score in the full stop, question mark, exclamatory mark, comma, semicolon and colon of the sixth standard students

(N (50) = Control group students – 25; Experimental Group students – 25)

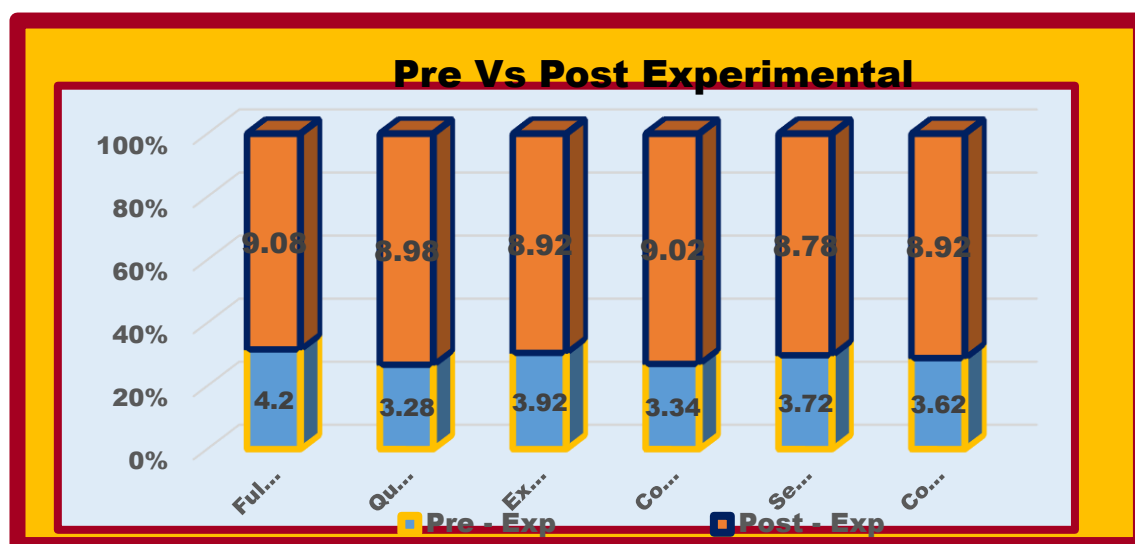


It is observed from the above graph that there is significant difference between the experimental group in the post-test score in full stop, question mark, exclamatory mark, comma, semicolon and colon have better mean score than the control group students. It is further reported that experimental post-test score is positively significant than the control group students at 1% level.

Answer – Question 3

Significant mean difference between the pre-test and post-test score of the experimental group in the full stop, question mark, exclamatory mark, comma, semicolon and colon of the sixth standard students

(N = Experimental Group students – 25)



It is observed from the above graph that there is significant difference between the experimental group in the post-test score in full stop (9.08), question mark (8.98), exclamatory mark (8.92), comma (9.02), semicolon (8.78) and colon (8.92) have better mean score than the post test score of the experimental group students in full stop (4.2), question mark (3.28), exclamatory mark (3.92), comma (3.34), semicolon (3.72) and colon (3.62). It is further reported that experimental post-test score is positively significant than the pre-test score of the sixth standard students at 1% level.

Answer – Question 4

Correlation among the punctuation marks like full stop, question mark, exclamatory mark, comma, semicolon, colon and overall punctuation marks total of the sixth standard students

Variable	Full Stop	Question Mark	Exclamation mark	Comma	Semi colon	Colon	Punctuation Total
Full Stop	1	0.899**	0.901**	0.912**	0.881**	0.886**	0.957**
Question Mark	X	1	0.861**	0.886**	0.870**	0.879**	0.951**
Exclamation Mark	X	X	1	0.858**	0.862**	0.849**	0.924**
Comma	X	X	X	1	0.871**	0.871**	0.953**
Semi colon	X	X	X	X	1	0.884**	0.928**
Colon	X	X	X	X	X	1	0.942**
Punctuation Total	X	X	X	X	X	X	1

It is evident that punctuation marks which is selected for this study namely full stop, question mark, exclamation mark, comma, semicolon and colon are significantly related among themselves and to the overall total of the punctuation marks. Moreover, it is also noted that it is positively significant with among themselves at 1% level.

CONCLUSION

Reading and writing abilities are crucial to the literacy level of a population. Punctuation is essential as it clarifies the meaning of sentences within a paragraph. The second exam demonstrated that students excelled due to instruction delivered through diverse and creative methods, utilizing several worksheets to enhance their understanding of punctuation marks, hence clarifying the tone of their communication. This study has demonstrated that the intervention provided to middle school students was highly effective in improving their English paragraph writing through the use of proper punctuation.

RECOMMENDATION OF THE STUDY

- 1) Middle school students especially sixth standard students need more encouragement and help to develop writing skill as well as punctuation marks.
- 2) Punctuation marks should be taught along with other skills. e.g. while teaching reading passages, the English teacher should make the students aware about the use of punctuation marks.
- 3) The teacher should provide sufficient amount of time to practice writing activities related to the punctuation marks in the English language classroom.
- 4) The syllabus designers as well as textbook writers should include appropriate exercises on the use of punctuation marks.

- 5) Punctuation marks should be taught from elementary level. So, that it helps to develop writing skill in the middle school students in a proper way.

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FROM CHALKBOARDS TO CHATBOTS: AN ETHNOGRAPHIC STUDY OF THE STUDENT COMMUNITY IN THE VICINITY OF PANJIM

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Abstract

Background: Teaching pedagogies transition to online and more importantly as hybrid mode of education has significantly altered the global teaching–learning practices.

Purpose: This preliminary ethnographic study examines how students in and around Panjim (Goa) experience the pedagogical shift from a conventional chalkboard-centric pedagogy to a more digitally oriented learning environment.

Methodology: The researcher’s status as a student facilitated participant observation, informal interviews, which was followed by thematic analysis.

Findings: The study acknowledges the adoption of hybrid learning. Students appreciate the flexibility, accessibility, and personalised delivery offered by digital pedagogies. However, challenges such as digital inequality, lack of connectivity and over-dependence on AI persists.

Implications: The findings highlight that the digital transformation is not a linear technological shift. Rather a negotiated cultural process

Conclusion: The study underscores the need for integration of digital tools while sustaining human connection alongside ethical, inclusive learning practices.

Keywords: Ethnography; Digital Pedagogy; Student Experience; Goa

1. Introduction

Indian education system has always followed a conventional pedagogy, where the teacher serves as a source of knowledge transmission, discipline, and socialisation. The chalkboard, has been the central pedagogical tool employed symbolising teacher’s authority and collective learning. However, with introduction of National Education Policy 2020, accompanied by technological advancement this model has been disrupted. Today, we witness, digital platforms, online resources, and artificial intelligence-based tools adopted in educational institutions, even in remote parts of India, thanks to connectivity penetration. This transition was prominent during the COVID-19 pandemic. Post the pandemic online and blended modes of learning was normalised and was smoothly embedded in mainstream education.

Goa has high literacy rate and exposure to digital infrastructure. Panjim, being the capital of state has a conducive educational environment which is suitable to examine this transition. Students in Panjim and its suburbs are exposed to multiple pedagogical worlds simultaneously. They not only have physical classrooms, but access to virtual learning and AI-driven tools such as chatbots.

This study explores how these students make sense of this transition in their everyday academic pursuits. The study adopts an ethnographic lens to document students lived experiences, perceptions, and their negotiations with change.

Objectives of the study:

1. To understand how the student community in and around Panjim perceive the shift from traditional to digital and AI-mediated learning
2. To examine how AI and digital tools shape students' learning practices
3. To identify concerns associated with AI assisted teaching-learning environs

2. Review of Literature

Ethnographic studies have stressed that education is a culturally embedded practice shaped by social norms, institutional practices, and symbolic meanings (Geertz, 1973). In India traditional classroom pedagogy has been teacher-centric where instructions, discipline, and collective attentiveness is practiced (Bourdieu & Passeron, 1990). The chalkboard, in this context, represents embodied teaching and dialogic engagement.

Research shows that with digital education students experience greater autonomy, flexibility, and easy access to information (Selwyn, 2016). Hybrid learning models, involving first hand interaction, supplemented by online interface is gaining popularity. The recent trends show how AI tools including chatbots assist students to gain personalised learning, while giving instant feedback and required academic support. However, scholars also critique this digitalisation which can possibly lead to inequalities, reduce human interaction, and promote superficial learning if not carefully integrated (Noble, 2018).

2.1 Research Gap

The existing literature concentrates more on teacher centred pedagogies, policies, infrastructure etc with very little attention to students' everyday experiences. Moreover very limited students have focussed on AI mediated learning in regional Indian educational contexts. This study addresses this research gap by offering an ethnographic account from the student perspective.

3. Methodology

3.1 Research Design

This is a qualitative ethnographic study, which is exploratory and preliminary in nature. It documents students' lived experiences within their natural educational classrooms. It attempts to understand teaching learning processes and their everyday learning practices. In the given context, Ethnography is particularly suited.

3.2 Scope of the Study

For the purpose of this study, students in and around Panjim city were contacted.

3.3 Data Collection Methods

- **Sampling and Sample size:** Convenience sampling was employed to contact 27 students who were informally interviewed
- **Documentation:** Participant observation of classroom interactions and informal academic settings such as canteen, corridors, parking slots etc. were undertaken.
- **Informal and semi-structured interviews** focusing on learning experiences and technology use
- **Digital ethnography**, observing engagement with online platforms and AI tools
- **Researcher Positionality:** The researcher's status as a student facilitated the study however reflexive awareness ensured insider bias was avoided.

3.4 Data Analysis

Thematic Analysis was adopted. Interview transcripts, observations, field notes were coded to identify recurring patterns. This was followed by identifying core themes that reflected students' experiences and perceptions.

4. Findings and Thematic Analysis

Table 1: Thematic Analysis of Student Experiences

Theme	Indicative Codes
Sustaining traditional pedagogy	Chalkboard teaching, teacher monitoring, discipline
Hybridisation of learning	Blended modes, flexibility, online resources
AI assistance	Chatbots, instant support, anonymous identity
Digital inequality	Access issues, connectivity, availability of devices
Student identity	Agency, self-directed learning, independent

4.1 Sustaining traditional pedagogy

Students are exposed to digitalisation yet they expressed strong to traditional classroom teaching- learning pedagogy. They believed physical presence in classroom with chalkboard-based instruction generated a sense of focus, clarity, and emotional engagement. The teachers in class facilitated sharing of academics, feedback, also creating a sense of belonging and accountability which is absent online.

4.2 Hybridisation of learning

Rather than opting for a fully digital pedagogy, students preferred a hybrid learning environment. Classroom teaching remained central, while digital tools played supplementary role rather than central. Online access promoted revision, clarification, and additional information for learning. This hybridisation permitted students to balance both the structure and flexibility.

4.3 AI assistance

Students use chatbots for doubt clarification, assignments, preparation for exams. Students consider AI as non-judgmental, flexible and is accessible, round the clock unlike teachers who face time constraints, pre-commitments. However, students are aware of the repercussions of over-dependence on AI, which includes declining analytical skills, presentation and interpersonal skills.

4.4 Digital inequality

The study brought to light disparities in terms of access to devices, internet connectivity, and personal spaces. These inequalities shaped and defined students' dependence on digital learning tools and learning outcomes.

4.5 Student identity

Constant exposure to digital learning pushed students to be independent learners, Making them to be conscious of their time, resources, and processing information. While this fostered independence, it also impacted their cognitive and emotional makeup.

5. Discussion

The findings indicate that the transition from chalkboards to chatbots in Panjim is not a linear technological replacement but a negotiated academic process. Students mediate between traditional classroom pedagogical norms and digital practices. Chalkboards and chatbots can coexist

symbolically, representing evolution that embraces both continuity and change within the same educational ecosystem.

6. Conclusion

This ethnographic study demonstrates that academic transformation in Panjim is shaped by academic context, institutional practices, and student agency. While digital tools provides flexibility and access, they cannot replace the personal and relational dimensions of education. Effective integration of technology must prioritise inclusivity, critical digital literacy, and sustained human engagement.

Limitations of the Study

The study relies on thematic interpretations and does not include specific quotes of students. The study is also limited to educational institutions in Panjim and its immediate vicinity. As a qualitative ethnographic inquiry, the findings are based on participants' perspective as such cannot be broadly generalised. The perspectives of faculty and administrators are absent.

Scope for Further Research

Longitudinal research could be undertaken to assess the long-term impact of AI tools on the student community and their learning practices. Inclusion of teachers and administrators could add a holistic context.

Acknowledgement of AI Assistance

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A MULTIDISCIPLINARY SYNTHESIS OF EXPERIENTIAL LEARNING: FROM THEORY TO PRACTICE ACROSS EDUCATIONAL CONTEXTS

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Abstract

This article examines the link between Experiential Learning (EL) and other fields of study. Over 70 studies published since 2000 were analysed using the Preferred Reporting Items for systematic reviews and meta-analysis process (PRISMA) in order to limit the material to the top 50 studies for this article review. The studies found a multitude of different situations, including K-12 education, higher education, and workforce development. The significance of the review aligns with the provisions of NEP 2020, which highlights the integration of EL in both the teaching-learning process and curriculum design. The research has three specific goals: a. To identify the theoretical frameworks that guide EL; b. To summarize how EL has contributed to developing skills; c. To identify the ongoing barriers and facilitators of implementing EL into practice. This article employs a thematic analysis methodology to compile and synthesize findings from qualitative, quantitative, and mixed-methods studies. The results provide a holistic view of EL. While there are several models of EL, the methodological themes indicate that Kolb's learning cycle (Kolb, 1984) is often cited along with constructivism and sociocultural theory as a model of EL. In addition, the results indicate that EL has a positive influence on the development of pedagogical competence, critical thinking, and problem-solving skills, as well as increasing emotional competence. The successful implementation of EL is supported by the successful use of technology, specifically augmented reality (AR), artificial intelligence (AI), gamification, and quality mentoring/support from university faculty.

Keywords: Multi-disciplinary, Experiential Learning, Educational Contexts, Theory to Practice, Kolb's Cyclical Model

INTRODUCTION

Experiential Learning (EL) is an evolving model of educational practice that continues to grow as a successful pedagogical way to eliminate the disconnect between what a learner learns through theory versus how they will use that knowledge in the real world. The foundational philosophy of EL can be traced back to John Dewey with his idea of "learning by doing," Jean Piaget's work on the cognitive development of individuals through experience, and David Kolb's creation of a learning cycle. Kolb describes EL as a dynamic process, providing us with a mechanism to develop our experiences into usable knowledge. EL consists of four elements: 1) Concrete Experience; 2) Reflective Observation; 3) Abstract Conceptualization; and 4) Active Experimentation (Kolb, 1984).

EL was first recognized as a legitimate learning method by academic institutions during the late 20th century and has since become key to many theories of learning across various disciplines, including early childhood education, project-based learning, simulations in higher education, and, most recently, immersive learning models in business. The quick growth of EL programs has been

driven by global demand for learning that emphasizes skill-based learning and increasing demand for authentic learning, as well as governmental policy towards inquiry-based learning, such as India's National Education Policy (NEP) 2020.

While there has been widespread acceptance of Experiential Learning (EL) among Educators, EL's actual use has been rather inconsistent between educators. Institutional and Pedagogical features surrounding the EL practice will naturally contribute to the effectiveness and therefore the diversity of EL practices. Although most of the currently existing research on EL has focused on the role of EL in specific Subject Areas of Teacher Training or Business Studies, there isn't a consolidated or coherent body of knowledge about the theoretical and empirical convergence that exists together across multiple disciplines or an analysis of the major issues associated with EL's adoption across the various disciplines. The objective of this literature review is to give Educators, Curriculum Developers, and Policy Makers an opportunity to systematically examine the available empirical literature on the concept of EL and to answer three critical questions considered by the authors to be important for all associated with the EL practice:

1. What theoretical frameworks have informed the design, implementation, and evaluation of EL within each of the associated Educational Contexts?
2. How do cognitive, affective, and Professional Skills develop through EL according to the empirical research?
3. What are the major barriers and key facilitators that do or do not promote successful and transformative implementation of EL as described in the empirical literature?

The purpose of this writing is to give a comprehensive understanding based on evidence-based practice regarding the way in which Experiential Learning (EL) serves as a theoretical basis and provides an understanding of the positive aspects of implementing EL but also the realistic challenges in the implementation of EL. Through this understanding, the author(s) are attempting to create a more comprehensive, improved practice and policy in the implementation of EL and conduct research in targeted areas that will enable the shift from a rhetoric-based approach to an increase in the successful implementation of EL in a sustainable and high impact manner.

The authors took an explicit analytical approach to the development of this review using David Kolb's Experiential Learning Theory (ELT) as the foundation for their analysis and understanding of EL. Kolb (1984) developed a cyclical four-stage model (Concrete Experience; Reflective Observation; Abstract Conceptualization; Active Experimentation) that provides a concise and foundational model for understanding how people learn from their experiences and the ongoing cycles of learning that result from the integration of new experiences. A fundamental premise of Kolb's model is that people learn by doing; therefore, learning is viewed as a process that continues until the process is complete, not an end.

In addition to Kolb's framework, the authors emphasize that it is important to note that the rigor of a multidisciplinary synthesis (of EL in practice and analysis) cannot rely only on one theoretical model; rather, it must be informed by a variety of integrative and complementary models that have been developed to address some of the limitations of exclusively cognitive, individualistic models of EL. In addition to the work of Kolb, this review has also included:

1. **Constructivism and Sociocultural Views (Vygotsky & Dewey)** - These ideas depict students as active in their environment to construct new ideas and information. Every student is part of a community to learn from others, and learning happens with multiple

people working together to solve real-world problems (Salis et al., 2015; Jančič & Hus, 2018).

2. **Theory of Self Determination (SDT)** - The Theory of Self-Determination (SDT) looks at how people's or student's individual characteristics influence their motivations. The SDT looks at how autonomous motivation, competence, and connections with others affect student motivation and provide insight into why some types of electronic or computer-based learning experiences/designed environments are more appealing to students and positively impact their retention and understanding level (Yuen et al., 2025; Mendoza-Mardones et al., 2025).
3. **Embodied/Situated Learning Theories** - The theories of Embodied and Situated Learning both suggest that human thought is a product of the environment; an individual's physical surroundings and social interactions contribute significantly to shaping their cognitive structures. The context of a learning experience (e.g. Laboratory, Virtual Reality, Community Environment) plays a big role in defining how an individual's experiences will be learned (Tan et al., 2022; He & Zhang, 2025).
4. **Critical Pedagogy and Transformative Learning:** While the previous approaches focused on skill development, these theories pay attention to the application of critical thinking in the transformation of students' assumptions, ideologies, and power relations. Critical pedagogy-informed EL seeks to understand the world but also empower the transformation of the world (Lenoir & Van Metre, 2024; Clancy, 2020).

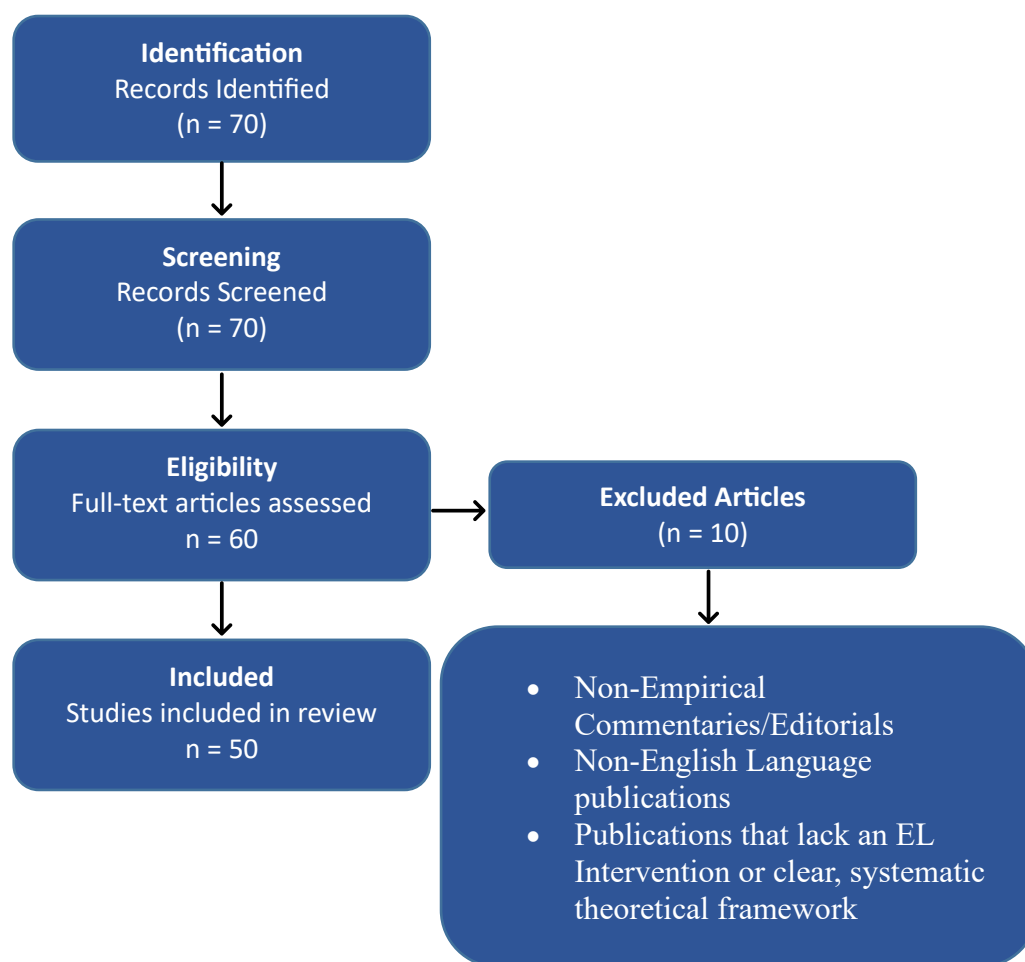
With Kolb's experiential learning theory (ELT) as the methodology that can work alongside other approaches that complement but do not replace it, the current review adopts a multi-curatorial approach. This permits a study that interprets the conceptualization and application of EL from research that leans on the social and emotional and contextual aspects that are fundamental to a complete appreciation for experiential education as conceptual for the 21st century.

RESEARCH QUESTIONS

In the context of this systematic review, the three research questions that will direct our investigation into experiential learning are: (1) what are the most significant theories that play an important role in designing and implementing experiential learning processes across different educational contexts (i.e., K–12, post-secondary, and organizational)?; (2) What types of skills and competencies (i.e., cognitive, affective, or professional) are developed through experiential learning as evidenced by quantitative studies? and (3) what is the state of the barriers, facilitators, and/or enablers that support or restrict the use of experiential learning?

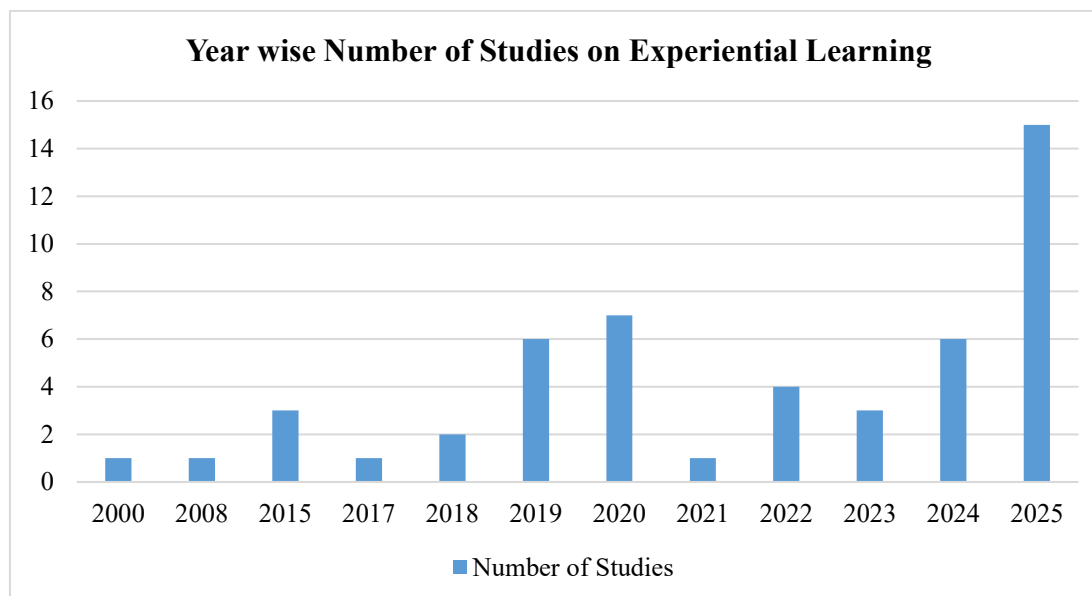
METHODOLOGY

This research employed a systematic qualitative synthesis process in accordance with the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) Protocol so as to achieve creditability, transparency and reproducibility (Page et al., 2021). The methodology involved four distinct steps.



1. **Identification:** A comprehensive search was undertaken using all major academic databases (e.g., Scopus, Web of Science, ERIC, Google Scholar) containing keyword combinations of the phrases "experiential learning", "Kolb", "project/ project-based learning", "service-learning", "skill* development" and "barriers to implementation", and including disciplinary descriptors.
2. **Screening and Eligibility:** The first searches returned more than 70 potentially applicable publications from 2000. To establish eligibility, all studies were screened according to defined inclusion and exclusion criteria.
 - **Inclusion Criteria:** Empirical Publications (Qualitative, Quantitative, or Integrated Methods); provide information on the role of EL in formal or informal educational settings; and provide the theory, outcome or implementation factors associated with EL Intervention.
 - **Exclusion Criteria:** Non-Empirical Commentaries/Editorials; Non-English Language publications; and Publications that lack an EL Intervention or clear, systematic theoretical framework.
3. **Selection:** After abstracts and full-texts were screened, 50 studies that were relevant to the research questions and met the quality criteria were chosen as the focus of the analysis.
4. **Analysis:** The selected studies were assessed for the data extraction and analyses that were performed using thematic analysis (Braun & Clarke 2006). This coding process

was done iteratively, so as many times as necessary, to identify the patterns, recurring themes, and contradictions of the theoretical frameworks, skills outcomes, and implementation factors present in each study. Finally, the themes identified throughout the coding process were organized into groups of similar types to create a coherent narrative synthesis that addressed each research question.



FINDINGS

Theoretical Frameworks in a Dominant Position

According to the research conducted, Kolb's ELT model continues to serve as an important Theoretical foundation, representing 70% of the studies examined herein (Cheng, et al., 2019). In many areas such as: Teacher Education, Environmental Science, Faculty Development, etc., Kolb's stages have been employed for structuring educational interventions, however trends in the field are moving toward integrative models that synthesize Kolb's ELT with other modalities to negate the perceived shortcomings of the model itself. Essentially, the combined frameworks include:

ELT + Constructivist/Sociocultural Learning: Noticeably used in collaborative learning approaches such as Problem and/or Project Based Learning and Service Learning; in this framework, Kolb's ELT provides the overall process for learning while using Constructivist/Sociocultural Theory to describe how knowledge is developed through social interactions and facilitation that occur in authentic contextualized communities (Clancy, 2020; Rodríguez-Izquierdo, 2022).

ELT + Self Determination Theory: A combination of Kolb's ELT with the Self Determination Theory provides ways to design engaging and effective experiences for the learner through enhancing the learner's intrinsic motivation to learn via the Supporting Autonomy (Choice), Competence (Mastery), and Relatedness (Connection with Others) components of Self Determination Theory (Yuen et al., 2025; Mendoza-Mardones et al., 2025).

ELT + Critical Pedagogy: Combining ELT and Critical Pedagogy has created a powerful synergy seen in studies on Social Justice, Citizenship Education, & Ethical Reasoning by providing a way to apply the "Reflective Observation" & "Abstract Conceptualization" stages to critically examine power relations, systemic inequality, and ethical dilemmas. These two fields can also be

viewed as using experience as a catalyst for both social critique and transformative action (Lenoir & Metre, 2024; Tan et al., 2022).

One of the most significant critiques found in the literature, most notably by Morris (2019), is that Kolb's original model was overly focused on an individual's experience and overly linear in progression, lacking adequate emphasis on socio-contextual factors and power dynamics while failing to encapsulate the complex, iterative processes inherent in real-world research. Morris (2019) have posited that there is a need for EL models explicitly incorporating situatedness, risk, culture/context, and the role of critical reflection and, therefore, have developed revised models representing an evolving understanding of Complexity and Contextual Sensitivity in EL theory.

ROLE OF EXPERIENTIAL LEARNING IN SKILL DEVELOPMENT

The evidence is consistent that properly designed Experiential Learning (EL) programs will develop many important skills including:

Cognitive and Metacognitive Skills – EL programs offer participants the opportunity to develop some of their high-level skills such as critical thinking and problem solving through activities like case studies, real-world projects, and Project Based Learning (PBL). EL programs allow learners to analyze complex situations, integrate information from various sources, and apply this new knowledge to create solutions (Salis et al., 2015; Melnikovas et al., 2023).

- **Creativity** – EL programs often include immersive and open-ended activities which use Augmented Reality (AR), or design-thinking techniques to provide learners with an opportunity to practice associative thinking, experimentation, and the creation of innovative new solutions (Huang, 2017; Asiyah et al., 2025).
- **Reflective Practice** – Reflection is a key part of the EL cycle and provides a structured way for learners, particularly those in pre-service teacher education, to connect real-life experiences with the theoretical principles they have learned and analyze how their actions were based on these principles in order to improve their future practices. This is an essential part of a professional's development (Javahery & Bavandi, 2025; Thinh, 2025).

AFFECTIVE AND SOCIAL SKILLS

Emotional Intelligence: Emotional Intelligence (EI) incorporates experiential components through role-playing, simulations and mixed EL programs. These methods effectively develop the ability to understand one's own emotions and manage relationships with others, which leads to improved self-awareness, self-regulation, empathy and use of relationship management skills (Abdulhameed et al., 2024).

Empathy and Perspective Taking: The utilization of Immersive Technologies such as Virtual Reality and Augmented Reality, along with participation in Cross-Cultural Exchange Programs, provides learners with the opportunity to "walk in the shoes of someone else", enabling them to develop a deep level of Empathetic Understanding and the willingness to appreciate and understand Multiple Perspectives (Tan et al., 2022).

Collaboration & Communication: Co-operation and communication are equally important parts of any group-based EL project. Group-based projects require negotiation, consensus-making and resolution of differences which help build foundational tools of collaboration and interpersonal skills such as: teamwork (Balleisen & Chin, 2022).

PROFESSIONAL & CIVIC COMPETENCIES

Pedagogical Skills: Structured experiential opportunities are not only instrumental in developing novice educators' reflective practice and adaptive expertise to more effectively respond to the demands of diverse classrooms; these experiences play an important role in developing teachers' pedagogical content knowledge (PCK), or their ability to provide meaningful instruction (Smith, 2000). In other words, through these experiences and mentorship, novice teachers come to learn how to make the content of their subject matter accessible and understandable to their students (Darling-Hammond & Hyler, 2020).

Civic Engagement & Political Efficacy: Such programs are beneficial for enhancing people's critical thought processes, allowing individuals to identify inequities in our society, develop solutions to rectify them, and create a vision of what a just world will look like (Staples et al., 2018). Additionally, longitudinal studies show that such experiences during college will likely lead to an increase in civic participation and voter turnout well into adulthood (Finley & McNair, 2013).

Digital & Technical Literacy: Critical digital literacy fostered through EL also equips learners to interrogate algorithmic bias and the socio-political impacts of digital tools, moving beyond mere operational fluency (Pangrazio & Sefton-Green, 2021). Intentional experiential projects in technology design can therefore cultivate a generation of innovators who prioritize human-centred and inclusive solutions to digital challenges (Ito et al., 2018).

BARRIERS AND FACILITATORS TO IMPLEMENTATION

Barriers:

1. **Superficial Implementation:** One of the most prevalent pitfalls concerning this model is that educators only engage in one component of the EL cycle, which is "Concrete Experience," and fail to support systematic reflection or structured application/experimenting, and therefore significantly limit transformative learning (Pherson-Geyser et al., 2020).
2. **Resource Limitations:** Under-resourced organizations are less likely to provide access to high-quality EL because of the high expense, time requirement, and logistical difficulties involved in educational field trips and the use of technology (e.g., AR and VR kits) and in establishing community partnerships (Rinfret et al., 2020; Kirilmazkaya & Dal, 2022).
3. **Pedagogical Resistance:** Balleisen and Chin (2022) described several significant deterrents to the widespread implementation of experiential learning methodologies including faculty conservatism, lack of experience with experiential learning methodologies, discomfort with moving from a "sage on the stage" model of instruction to a "guide on the side" model of instruction, and rigidly entrenched pedagogical paradigms in their respective disciplines that emphasise lecture-based pedagogy.
4. **Assessment Challenges:** Evaluating process-oriented, affective, and collaborative outcomes of EL is complex. The default reliance on traditional exams and essays often fails to capture the nuanced skills developed, creating a misalignment between pedagogy and evaluation (Abdulhameed et al., 2024).
5. **Equity Gaps:** Disparities in access to reliable technology, high-quality mentorship, and enriching EL opportunities can exacerbate existing educational inequalities, leading to an experiential divide (Wilson et al., 2023).

Facilitators:

1. **Modern Technology:** The strategic use of gamification, AI-driven personalized learning experiences, Augmented Reality (AR)/Virtual Reality (VR) simulation, and e-learning platforms can provide scalable and safe experiential environments, increase engagement through real-time feedback and enhance authenticity (Yuen et al., 2025; Sasmoko et al., 2020).
2. **Mentoring from Faculty:** Mentorship from seasoned faculty members, peers, and professionals within an industry will provide important guidance to improve the depth of reflection, create opportunities to transfer skills into other contexts, and aid in the development of one's professional identity (Thinh, 2025; Wilson et al., 2023).
3. **Institutional Provision:** Keys to institutionalising experiential learning beyond pilot initiatives include establishing dedicated teaching and learning centres, developing sustainable funding mechanisms, creating policies defined by experiential learning incentives, and developing continuous professional development opportunities (Rodríguez-Izquierdo et al., 2024).
4. **Community Engagement:** Commencing with community partnerships providing authentic learning context, real-world problems for students to solve, and opening the door to more resources for students through collaboration with schools and other organisations (Chineme et al., 2019; Clancy, 2020).
5. **Curriculum Modification:** Embedding experiential learning into the curriculum where it provides the maximum opportunity for experiencing real-world opportunities through the intentional inclusion as part of the Program Learning Outcomes and the required credit hours (Healey & Jenkins, 2000; Ives-Dewey, 2009).

EDUCATIONAL IMPLICATIONS

The following insights were drawn from the findings of the study:

1. The importance of creating explicit structure, scaffolding and guidance for Reflection and Application on the complete experiential cycle should be built into educator's intentional planning. This includes the development of Reflective Journals, structured Debriefs and Active Application phases to aid educators in providing deeper learning experiences through Instructional design.
2. Faculty Development should be one of the top priorities of all educational organisations. Faculty should be trained not only on how to effectively incorporate EL Pedagogy in their teaching but also on how to properly use and integrate digital tools within their courses and as part of their facilitation of the mentoring process.
3. The use a "spiral" curriculum model was recommended by the authors to create consistency of EL activities throughout the education program starting early in a student's education and consistently followed throughout their education. Additionally, the use of "hybrids" allows for educators to experience the strengths of both the on-line education environment and the face-to-face classroom. (Dorresteijn et al., 2023).

FUTURE RESEARCH

1. In-depth longitudinal and mixed-methods studies can be conducted to determine whether the skills learned in EL can be maintained over the long term, how they translate into students'

ability to succeed professionally, and their influence on lifelong learning and civic engagement.

2. More research is needed to develop culturally responsive and contextualized EL approaches, especially for non-Western and resource-poor areas, in order to depart from the traditional "one-size-fits-all" methodology (Thin, 2025; Nasir et al., 2025).
3. Work related to developing and validating comprehensive assessment tools for measuring higher level EL outcomes, such as systems thinking, ethical reasoning, collaborative creativity, and level of reflection (Abdulhameed et al., 2024) also a priority.

CONCLUSION

This review provides a comprehensive overview of all areas of academic disciplines supporting the use of 'Experiential Learning' as a viable pedagogical framework. Kolb's original model continues to serve as the basis for EL but has now been enhanced through the integration of contemporary theory in areas such as; Constructivist, Sociocultural, Motivation, and Critical Thinking. There is now significant evidence that EL develops a wide range of cognitive, affective, and professional competencies necessary to be successful and adapt to the complexity of academic, professional, and civic environments in the 21st Century. However, EL has yet to reach its full potential because there continues to be barriers to the success like there is an overwhelming tendency to implement EL at a superficial level; many educators have significant resource and/or equity disparities; the educators' thinking continues to reflect pedagogical inertia; and, the assessment of EL continues to fail to meet current best practices. EL will require significant commitment from all stakeholders and the establishment of a concerted strategic plan to implement the experience at deep levels of meaningful engagement and not just put into place a 'token activity'; to provide equitable access to all students in lieu of creating a more exclusive opportunity for success; and, to create systems of support for the effective implementation of EL as opposed to assuming this will only occur through isolated initiatives within each institution. Educators and institutions will have the opportunity to take the necessary steps to generate a fundamental change to prepare individuals to become successful and empowered learners.

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EXPLORING CRITICAL THINKING, CREATIVITY, AND PROBLEM-SOLVING SKILLS OF B.ED. STUDENTS ENGAGED IN ONLINE MODE OF INSTRUCTION: INSIGHTS FOR HIGHER EDUCATION

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Abstract

The rapid shift to online learning has reshaped how higher education supports the development of essential 21st-century skills. This study investigates the levels of critical thinking, creativity, and problem-solving skills among B.Ed. students who complete their coursework entirely through online instruction. A descriptive survey research design was employed, and data were collected from 60 B.Ed. students using a structured questionnaire. The study explores how virtual learning environments influence students' higher-order thinking abilities and their perceptions of online teaching–learning experiences. The findings highlight the extent to which online activities foster critical, creative, and problem-solving skills, as well as the challenges students encounter in digital learning contexts. The results aim to provide meaningful insights for teacher educators and institutions to enhance online pedagogical practices and design effective virtual learning environments that nurture essential competencies among future teachers.

Introduction

The rapid growth of online learning has transformed the way higher education is delivered, influencing both teaching methods and student learning experiences. Among the most important skills for students today are critical thinking, creativity, and problem-solving, as these abilities prepare learners to face complex challenges in academic and real-life situations. For B.Ed. students, developing these skills is especially significant because they are future educators who will need to foster these competencies in their own classrooms.

Online learning provides opportunities such as flexible access to resources, diverse learning tools, and self-paced study. However, it also brings challenges, including limited direct interaction and collaborative experiences, which are essential for enhancing higher-order thinking skills. Understanding how online instruction impacts B.Ed. students' critical thinking, creativity, and problem-solving abilities is crucial for designing effective teacher education programs.

This study seeks to explore the levels of critical thinking, creativity, and problem-solving skills among B.Ed. students engaged in online learning. The insights gained can guide higher education institutions in improving online teaching strategies and ensuring that future teachers are equipped with the skills necessary for modern education.

Keywords: *Critical Thinking, Creativity, Problem-Solving Skills, Online Learning, B.Ed. Students, Teacher Education.*

Literature Review

Research on the development of higher-order thinking skills such as critical thinking, creativity, and problem-solving has become increasingly prominent with the expansion of online learning environments in higher education. Critical thinking is recognized as the ability to analyze, evaluate, and synthesize information in order to make reasoned judgments (Tan et al., 2023). However,

enhancing this multifaceted skill online remains a pedagogical challenge because students must navigate discussion boards, virtual debates, and other digital learning tools independently, which can affect engagement and skill acquisition (Tan et al., 2023;).

The role of online instructional design in fostering creativity and problem-solving has been investigated in several studies. Creative problem-solving models such as Creative Problem Solving (CPS) and asynchronous online discussions have been shown to stimulate deeper thinking and collaborative dialogue, ultimately fostering student creativity and engagement (ScienceDirect, 2024; ScienceDirect). Similarly, the literature emphasizes that combining collaborative learning tasks with digital tools can significantly enhance students' creativity and encourage flexible, divergent thinking strategies (MDPI, 2025; MDPI).

Empirical research on online learning strategies indicates that instructional approaches emphasizing cooperative learning and problem exploration can positively influence problem-solving abilities. For example, studies involving online cooperative learning show that communication technologies and group tasks support independent thinking as well as practical problem-solving skills among learners (Frontiers in Psychology, 2022; *Frontiers*). Additionally, literature reviews of learning models aimed at developing creative thinking reveal that digital-based virtual classrooms and project-based learning environments effectively improve creativity, problem-solving, collaboration, and motivation (Juliangkary et al., 2024; *PPSDP Journal*).

The interconnectedness of critical thinking, creativity, and problem-solving is further highlighted in studies of pre-service teachers and educational psychology. For instance, research indicates that technology-enhanced instruction and engagement with generative AI can influence the development of creative thinking, which in turn affects critical thinking and problem-solving skills among pre-service teachers (BMC Psychology, 2025). These findings suggest that online learning environments do not merely serve as substitutes for face-to-face instruction but can function as platforms for cognitive development when appropriate pedagogical strategies are implemented.

Despite these positive outcomes, several studies report barriers and challenges related to the online mode of instruction. For example, the effectiveness of critical thinking interventions online may be limited by students' familiarity and comfort with the digital platforms themselves, potentially restricting active engagement in higher-order cognitive tasks (Tan et al., 2023;). This highlights the need for more specialized approaches and instructional designs that support active student participation in online contexts.

In summary, the literature suggests that online learning environments have the potential to cultivate critical thinking, creativity, and problem-solving skills among higher education students, particularly when instructional strategies encourage collaboration, reflection, and interactive problem exploration. However, achieving these outcomes depends significantly on the pedagogical design and the digital competencies of both educators and learners.

Research Gap

Existing literature highlights the potential of online learning environments to enhance critical thinking, creativity, and problem-solving skills among higher education students. Numerous studies have explored the effects of online collaborative learning, project-based tasks, and technology-enhanced instructional strategies on these higher-order thinking skills (Tan et al., 2023; Frontiers in Psychology, 2022; MDPI, 2025). Research also indicates that digital tools and interactive platforms can facilitate student engagement, reflection, and problem-solving.

However, several gaps remain in the current body of knowledge. First, most studies focus on general higher education students rather than pre-service teachers or B.Ed. students, whose professional development requires specific pedagogical competencies. Second, while critical thinking and problem-solving have been studied in online contexts, there is limited research investigating the simultaneous development of critical thinking, creativity, and problem-solving skills in the same cohort. Third, few studies examine how online instructional strategies specifically impact B.Ed. students' cognitive and creative abilities, taking into account their unique learning needs and professional preparation. Lastly, there is a lack of empirical research exploring students' perceptions and experiences of online learning in relation to these skills, which can inform the design of more effective teacher education programs.

Addressing these gaps is essential for understanding how online learning environments can be optimized to foster the higher-order thinking skills necessary for future educators, thereby improving both student learning outcomes and the quality of teacher preparation.

Research Objectives

1. To assess the level of critical thinking among B.Ed. students in online learning.
2. To examine how online learning supports creativity in teaching–learning.
3. To evaluate students' problem-solving skills in online academic situations.

Significance of the Study

This study is significant as it provides insights into how online learning environments influence the development of **critical thinking, creativity, and problem-solving skills** among B.Ed students. The findings can help teacher education institutions design more effective digital teaching strategies, ensuring that future educators are well-equipped to foster higher-order thinking in their own classrooms. Additionally, the study highlights students' perceptions and challenges in online learning, offering guidance for improving curriculum, instructional methods, and professional preparation in teacher education.

Methodology

Research Design

The study adopts a **descriptive survey research design**, which is suitable for collecting and analyzing information on B.Ed students' perceptions, experiences, and self-assessed levels of critical thinking, creativity, and problem-solving skills in online learning contexts. This design enables the researcher to identify patterns, trends, and relationships in participants' responses, providing a clear understanding of how pre-service teachers develop and perceive these higher-order thinking skills in digital classrooms.

Population

The population for this study comprises B.Ed students enrolled in teacher education programs at selected institutions. These students represent future educators who are undergoing professional training and are expected to develop pedagogical, cognitive, and creative competencies necessary for effective teaching.

Sample

A purposive sampling technique was used to select participants who have experience with online classes, blended learning modules, or digital teaching activities. The sample consists of 60 B.Ed students, ensuring diversity in gender, age, and academic performance, to obtain a

representative understanding of their critical thinking, creativity, and problem-solving skills in online learning environments.

Instrument

Data were collected using a structured questionnaire consisting of 15 multiple-choice questions administered via Google Forms. The questionnaire was designed to measure students' self-perception of their critical thinking, creativity, and problem-solving abilities, their experiences and challenges in online learning, and their opinions on the effectiveness of digital instructional methods. The items were developed based on insights from previous research on higher-order thinking skills and online learning in teacher education.

Data Collection Procedure

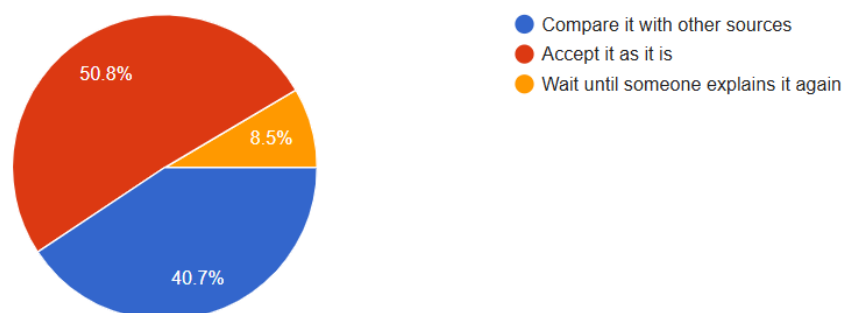
The questionnaire was distributed to B.Ed students through email and social media platforms, ensuring voluntary participation. Participants were provided with a brief introduction and instructions emphasizing the confidentiality of responses and the academic purpose of the study.

Data Analysis

Collected data were analyzed using descriptive statistics, including frequency counts and percentages, to summarize participants' responses. The analysis focused on identifying common patterns in students' self-assessed skills, experiences, and challenges related to online learning. Graphs were used to visually represent key findings, making the results easy to interpret and compare.

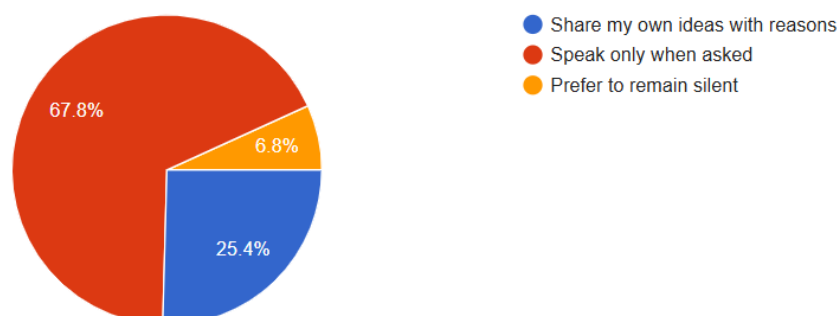
1. When I receive information in online class, I usually...

59 responses



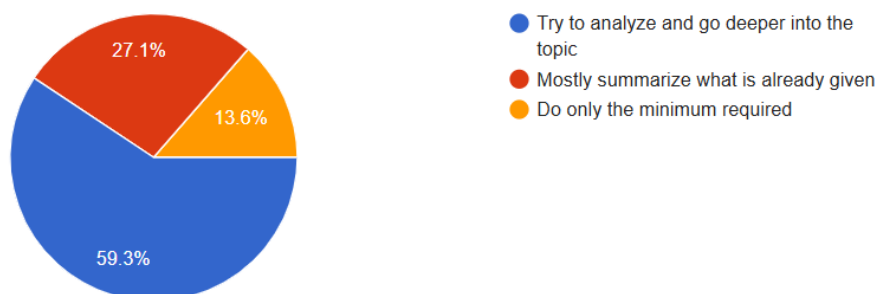
2. While participating in online discussions, I...

59 responses



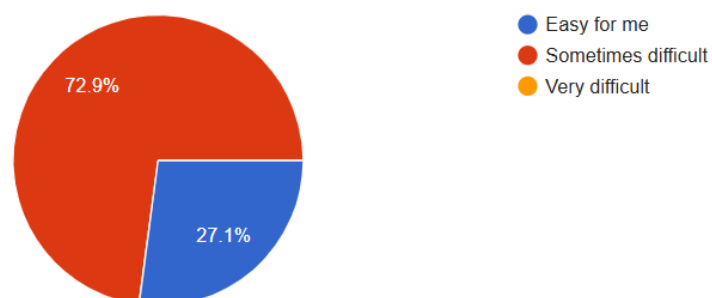
3. When given an assignment online, I...

59 responses



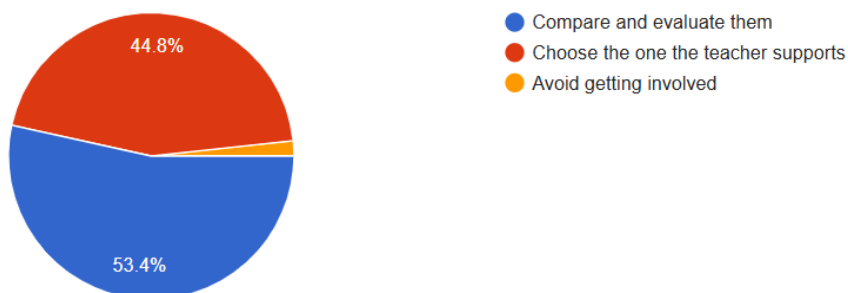
4. Connecting theory to real classroom practice online is...

59 responses



5. When I see different opinions in class, I...

58 responses



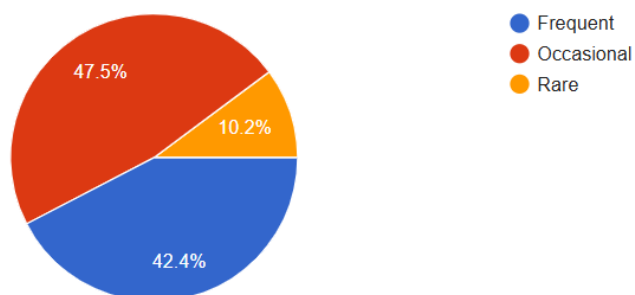
6. In online classes, I present my work mostly as...

59 responses



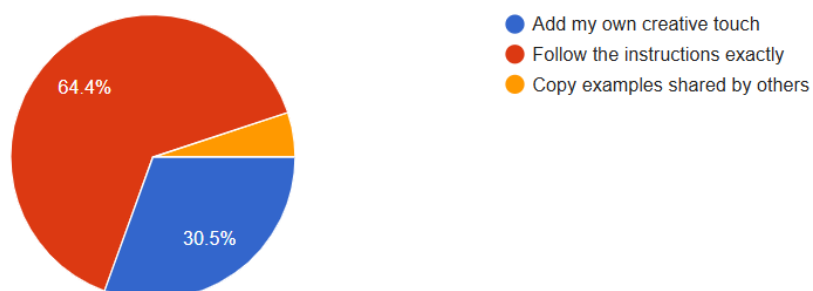
7. Opportunities to try new teaching ideas online are...

59 responses



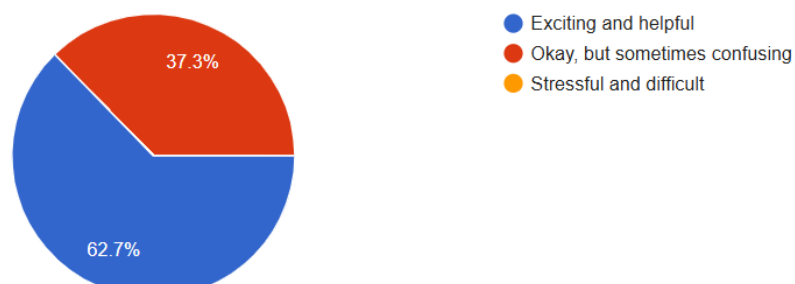
8. When the teacher gives a task, I usually...

59 responses



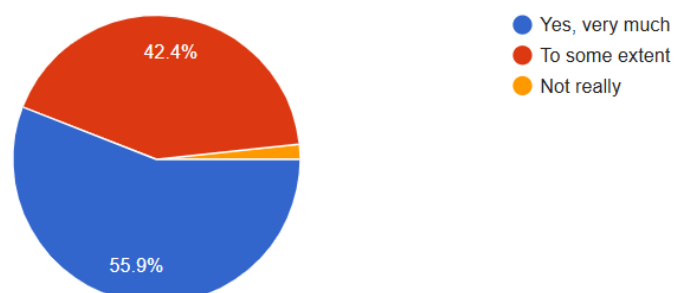
9. Using digital tools (Canva, Padlet, Google tools, etc.) feels...

59 responses



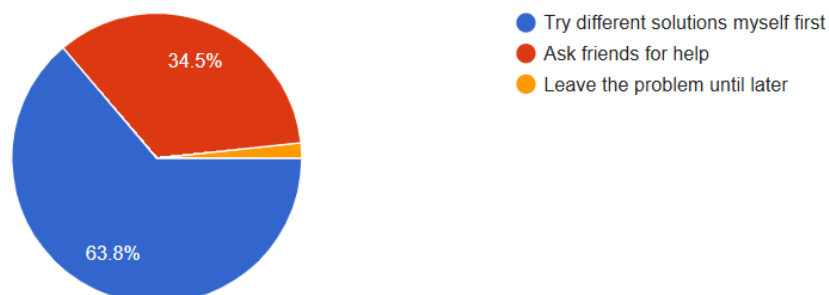
10. Online learning motivates me to plan creative lessons for future teaching.

59 responses



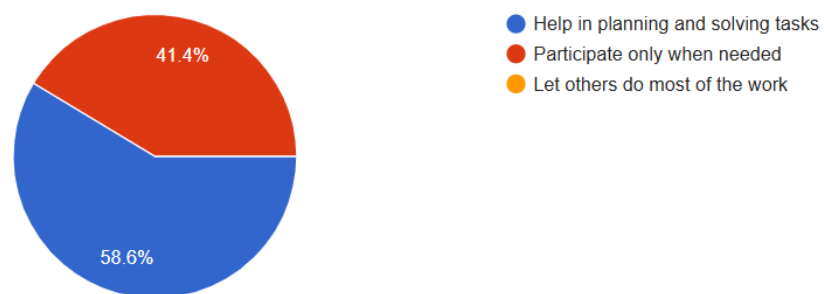
11. When I face technical issues during class, I...

58 responses



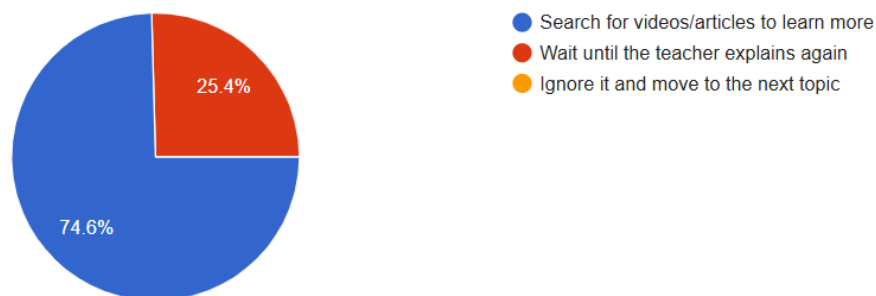
12. During group work online, I usually...

58 responses



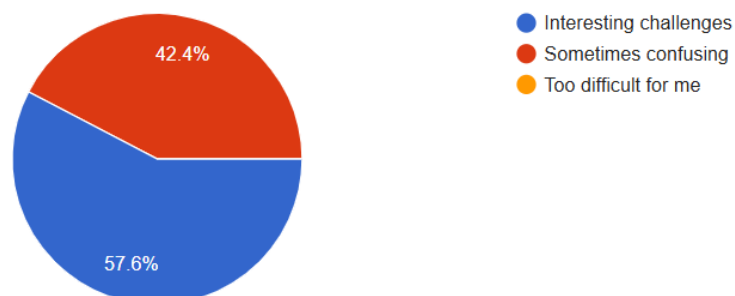
13. If I don't understand a topic, I...

59 responses



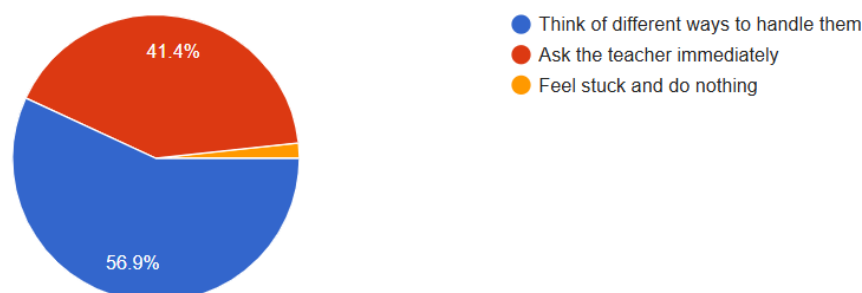
14. Online assignments that require application of concepts are...

59 responses



15. When I face academic challenges online, I...

58 responses



Findings

1. Critical Thinking in Online Learning

The responses show that students demonstrate moderate levels of critical thinking, with a tendency to accept information as presented but also engage in comparative thinking when needed.

- **50%** of students reported that when they receive information in online classes, they **accept it as it is**, indicating reliance on teacher-provided content.
- During discussions, **67.8%** said they **speak only when asked**, suggesting limited voluntary participation.
- However, **59.3%** stated that when given assignments, they **try to analyze and go deeper into the topic**, showing reflective engagement.
- When exposed to different opinions, **53.4%** reported that they **compare and evaluate them**, indicating emerging critical judgment.
- **72.9%** found that connecting theory to practice **is sometimes difficult**, which may limit deeper conceptual understanding.

Overall, students appear willing to think critically when required, but are still developing confidence to question, explore independently, and connect ideas in online contexts.

2. Creativity in Online Learning

Findings indicate that online platforms provide some opportunities for creativity, yet students still prefer simpler forms of presentation.

- **42.4%** usually present their work as **simple PowerPoints or notes**, suggesting limited experimentation with creative formats.
- **47.5%** reported that **opportunities to try new teaching ideas online are available** (exact statement incomplete, but reflects moderate perception of opportunity).
- **62.7%** felt that using digital tools like Canva, Padlet, and Google tools is **exciting and helpful**, showing positive attitudes toward creative tools.
- **55.9%** stated that online learning **motivates them to plan creative lessons** for future teaching.

These findings suggest that although creativity is encouraged and digital tools are appreciated, many students still rely on basic presentation formats and may need structured guidance to innovate more confidently.

3. Problem-Solving Skills in Online Environments

Students showed strong tendencies toward independent problem-solving and collaboration when faced with challenges.

- During group work, 58.6% reported that they help in planning and solving tasks, demonstrating active teamwork.
- When they do not understand a topic, 74.6% said they search for videos or articles, reflecting self-directed learning.
- 57.6% found assignments requiring application of concepts to be an interesting challenge, indicating positive engagement with problem-based tasks.
- 56.9% reported that when they face academic challenges online, they think of different ways to handle them, showing flexible thinking.
- Item 11 (“When I face technical issues... 63.8%”) appears incomplete but suggests students actively respond to technical barriers.
- Items 8 (“When the teacher gives a task... 64.4%”) also lacked full description, but likely reflect students’ task-handling approaches.

Overall, students demonstrate good problem-solving initiative, particularly in seeking resources and collaborating, although technical and instructional barriers still persist.

Summary Interpretation

The findings reveal that:

- **Critical thinking is emerging**, but many students still rely on teacher direction.
- **Creativity is encouraged**, yet students often default to basic presentation methods.
- **Problem-solving skills are strong**, especially in independent learning and group collaboration.
- **Technical difficulties and theory-practice gaps** continue to challenge students in online environments.

With targeted instructional strategies such as inquiry-based tasks, creative project requirements, and structured discussion participation B.Ed. students can be further supported in strengthening higher-order thinking skills in online learning contexts.

Recommendations

1. Promote active participation in online discussions

Teachers should design activities that require students to share opinions, ask questions, and respond to peers instead of speaking only when asked. Structured debates, breakout discussions, and participation marks can help develop critical thinking.

2. Integrate real-life classroom examples with theory

To reduce the difficulty students face in connecting theory to practice, instructors can use case studies, virtual classroom simulations, and video demonstrations that relate concepts to real teaching situations.

3. Encourage creative digital presentations

Instead of relying mainly on simple PowerPoints, students should be guided to use tools like Canva, Padlet, and interactive slides. Rubrics that reward originality, visuals, and creativity can motivate students to experiment.

4. Provide problem-based learning tasks

Assignments should require students to analyze, apply concepts, and explore multiple solutions. Scenarios, mini-projects, and inquiry-based tasks help students strengthen both problem-solving and reflective thinking.

5. Offer training on digital tools and technical troubleshooting

Short workshops or tutorials on using learning platforms and handling common technical issues will support students' confidence and reduce disruptions during online learning.

6. Strengthen collaborative learning opportunities

More structured group work, with clear roles such as planner, researcher, and presenter, will encourage teamwork, leadership, and shared problem-solving among B.Ed students.

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FUTURE OF PERSONALITY EDUCATION: HOW ADMIRER TEACHERS AND AI TOGETHER SHAPE TOMORROW'S GRADUATES

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ABSTRACT

The future of personality education lies in the synergistic integration of admired teachers and artificial intelligence (AI) to cultivate well-rounded, adaptable graduates. Admired teachers bring empathy, mentorship and a refined understanding of individual student needs, fostering emotional intelligence, ethical reasoning and interpersonal skills that are critical for personal and professional success. AI supplements this by providing personalized learning experiences, real-time feedback, and data-driven insights that help tailor educational content and pace to each learner's unique profile. Together, they create a dynamic learning environment in which human values and technological precision integrated, enabling students to develop self-awareness, resilience and creativity. This collaboration not only enhances cognitive and social-emotional learning but also prepares graduates to navigate complex and rapidly evolving global challenges with confidence and integrity. Ultimately, the fusion of human inspiration and AI innovation will refine personality education, producing graduates equipped for lifelong growth and meaningful contributions to society. This paper explores the evolving landscape of personality education, emphasizing the synergistic role of admired teachers and artificial intelligence (AI) in shaping the holistic development of future graduates.

Keywords: Human-AI Integration, Personality Development, Emotional Intelligence

INTRODUCTION

Personality education plays a crucial role in shaping well-rounded graduates who are prepared to meet future challenges. The collaboration between admired teachers and advanced AI technologies offers a transformative approach to education, combining human insight and empathy with data-driven personalization and scalability. This synergy promises to cultivate not only academic excellence but also essential interpersonal skills, emotional intelligence and ethical values, thereby preparing tomorrow's graduates to thrive in an increasingly complex and dynamic world. Traditionally, teachers have played a central role in fostering growth students' values, confidence, communication and emotional maturity. Their mentorship, empathy and role modelling profoundly influence how learners understand themselves and relate to the world. As AI-driven tools become increasingly integrated into education, a new hybrid model of personality development is emerging in which human inspiration and technological intelligence complement each other. Admired teachers provide ethical grounding, emotional support, and real-life guidance whereas AI offers personalized learning pathways, continuous feedback and skill enhancement at scale. Together, they create a dynamic ecosystem capable of preparing graduates who are not only academically competent but also self-aware adaptable and ready for the challenges of an AI-augmented future.

THE ROLE OF ADMIRERED TEACHERS IN PERSONALITY EDUCATION

Admired teachers play a pivotal role in personality education by serving as influential role models who shape students' character, values and social-emotional skills. Their impact extends beyond knowledge transmission to fostering holistic development, including self-awareness, empathy, perseverance and ethical reasoning. Through their behavior, attitudes and interpersonal interactions, admired teachers inspire students to internalize positive traits such as integrity, responsibility and perseverance.

These educators create supportive and motivating learning environments that encourage open dialogue, critical thinking and self-reflection, enabling students to explore and develop their unique identities. Their ability to connect authentically with students builds trust and respect, facilitating personalized guidance and mentorship. By recognizing individual strengths and challenges, admired teachers help students cultivate confidence and social competence, essential components of well-rounded personality development. Admired teachers serve as living examples of integrity, discipline, empathy and dedication.

AI AS A COMPLEMENTARY TOOL IN PERSONALITY DEVELOPMENT AND EMOTIONAL INTELLIGENCE

AI serves as a powerful complementary tool in personality development by enhancing and supporting the efforts of admired teachers in fostering students' holistic growth. Unlike human educators, AI can provide personalized learning experience at scale, adapting to each student's unique needs, pace and learning styles. Through data-driven insights and real-time feedback, AI tools help identify areas where students may require additional support in social-emotional skills, self-regulation and ethical reasoning.

AI- powered platforms can facilitate reflective exercises, emotional recognition training and scenario-based learning that promote self-awareness and empathy. These technologies enable students to practice decision-making and problem-solving in safe, simulated environments, reinforcing resilience and adaptability. Additionally, AI can assist teachers by automating routine tasks and analysing behavioural patterns, freeing educators to focus on meaningful interpersonal interactions and mentorship.

By integrating AI with human guidance, personality education benefits from a balanced approach: Admired teachers provide the authentic context, moral guidance and emotional support essential for character formation, while AI supplements personalized tools and scalable interventions. This synergy prepares students to navigate increasingly complex social and technological landscapes, equipping them with human-centered values and digital competence. Regarding emotional intelligence, the integration of AI supports its development by enabling: Enhanced self-awareness through reflective and emotional recognition exercises. Practicing in empathy and ethical decision-making through scenario simulations.

Continuous monitoring and feedback on emotional and social competencies. This combined approach ensures students develop not only cognitive skills but also emotional intelligence, resilience and adaptability, preparing them for complex social and technological environments. Together, admired teachers and AI foster a dynamic learning ecosystem that nurtures well-rounded, ethical and adaptable graduates ready to meet the challenges of tomorrow.

SYNERGISTIC IMPACT ON TOMORROW'S GRADUATES

The combined influence of admired teachers and AI in personality education creates a powerful synergy that enhances the development of tomorrow's graduates in multifaceted ways. Admired

teachers provide the essential human elements of empathy, ethical guidance and authentic related support, which are critical for nurturing core values and social-emotional competencies. AI complements this by offering personalized, data-driven learning experiences that adapt to individual student needs, enabling targeted growth in areas such as self-regulation, critical thinking and resilience.

This synergy ensures that students receive holistic development: Admired teachers cultivate moral reasoning, interpersonal skills and motivation through direct mentorship and role modelling, while AI tools reinforce these lessons with scalable interventions, real-time feedback and opportunities for experiential learning in virtual environments. The integration of AI also allows teachers to allocate more time and energy toward meaningful interactions, deepening the mentorship process and fostering stronger student-teacher relationships. Graduates shaped by this collaborative approach emerge as well-rounded individuals who possess not only academic knowledge but also emotional intelligence, ethical awareness and adaptability. They are better equipped to navigate complex social dynamics and technological advancements and balance human centred values with digital literacy.

This prepares them to contribute thoughtfully and responsibly to diverse professional and societal contexts. Ultimately, the synergistic impact of admired teachers and AI cultivates graduates who are capable compassionate and innovative-qualities essential for leadership and success in an evolving global landscape.

CHALLENGES AND ETHICAL CONSIDERATIONS

Integrating admired teachers and AI in personality education presents several challenges and ethical considerations that must be carefully addressed to ensure effective and responsible implementation. A primary challenge lies in balancing the human-centered, relational aspects of personality development with the data-driven, algorithmic nature of AI. While admired teachers provide empathy, moral guidance and authentic mentorship, AI systems operate on patterns and inputs that may lack contextual sensitivity, potentially leading to misinterpretations of students emotional or social cues.

Privacy and data security are critical ethical concerns, as AI tools collect and analyse sensitive personal information to tailor the learning experience. Ensuring that students data are protected from misuse, unauthorized access or bias is essential to maintain trust and uphold ethical standards. Additionally, there is a risk of reinforcing existing inequalities if AI algorithms are not designed or monitored carefully, potentially disadvantaging certain groups because of biased data or limited cultural representation.

Another challenge is the potential overreliance on AI, which may inadvertently reduce the depth of human interaction and diminish the nuanced understanding that admired teachers bring to personality education. Finally, preparing teachers to effectively integrate AI requires professional development focused not only on technical skills but also on ethical literacy enabling educators to critically evaluate AI outputs and advocate for students well-being.

CONCLUSION

The future of personality education hinges on the harmonious integration of admired teacher and AI, combining the irreplaceable human qualities of empathy, ethical guidance and mentorship with AI capacity for personalized, data-driven learning and scalable support. This collaboration fosters the holistic development of graduates who are not only academically proficient but also emotionally intelligent, adaptable and ethically grounded. Addressing challenges such as privacy,

bias and maintaining the central role of human educator is essential to ensure ethical and equitable implementation. Ultimately, the fusion of human inspiration and AI innovation will redefine personality education, producing tomorrow's graduates equipped for lifelong growth, compassionate leadership and meaningful contributions to society.

FUTURE DIRECTIONS:

1. Enhanced Human-AI Collaboration Models: Develop frameworks that further integrate AI tools with admired teachers' mentorship, personalized learning while educators focus on emotional and ethical guidance.

2. Ethical AI Development and Governance: Prioritize creating transparent, bias-mitigated AI systems with robust privacy protections.

3. Teacher Professional Development: Invest in comprehensive training programs that equip educators with both technical proficiency in AI tools and ethical literacy to critically assess AI outputs and maintain the primacy of human-centered education.

4. Scalable Personalized Interventions: Expand AI capabilities to deliver adaptive socio-emotional learning experiences and scenario-based simulations, to complement teacher-led mentorship.

5. Longitudinal Impact Studies: Conduct empirical research assessing the long-term effects of integrated human-AI personality education on graduates' emotional intelligence, ethical reasoning, adaptability, and leadership skills.

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DIGITAL EQUITY AND AUTISM SPECTRUM DISORDER: LEVERAGING ASSISTIVE TECHNOLOGY FOR 21ST-CENTURY LEARNING

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ABSTRACT

Digital equity has emerged as a crucial component of inclusive education, particularly for children with Autism Spectrum Disorder (ASD) who require individualized, accessible, and adaptive learning pathways. This paper investigates how assistive technology (AT) can be strategically integrated to enhance daily living skills. Based on contemporary research and classroom-based evidence, the paper highlights how equitable access to digital tools supports functional independence, strengthens communication, and promotes active participation in everyday routines for ASD learners. It further argues that digital equity is not only about providing devices but ensuring culturally relevant content, affordability, accessibility, caregiver readiness, and school-home continuity. By leveraging AT such as visual schedules, video modeling, communication apps, task-sequencing tools, and interactive digital simulations, educators can create personalized learning environments. This paper emphasize that enhancing digital equity leads to measurable improvements in engagement, skill acquisition, and generalization of daily living skills, thereby preparing ASD children for meaningful inclusion in society.

Key words: Education, AssistiveTechnology, Digital Equity, ASD.

INTRODUCTION

“For most people, technology makes things easier. But for people with disabilities, technology makes things possible.” - Mary Pat Radabaugh, (*Former Director of IBM National Support Center for Persons with Disabilities*).

This quote perfectly highlights the transformative power of assistive technology, making the essential case for digital equity in education. The promise of 21st-century learning is built upon access to digital resources, collaborative online environments, and personalized educational experiences. However, this transformative shift brings into sharp focus the imperative of Digital Equity, the principle that all individuals, regardless of their circumstances, should have the technology, access, and skills required to participate fully in society and the economy. For students on the Autism Spectrum Disorder (ASD), achieving this equity is not simply a matter of providing a device or an internet connection. It requires a dedicated focus on Assistive Technology (AT). The Students with ASD often face unique challenges in communication, social interaction, and executive functioning, which can create significant barriers to engaging with standard digital curricula.

This paper explores how strategically leveraging specialized Assistive Technology from visual schedules and communication apps to advanced sensory accommodations can dismantle these barriers. We argue that AT serves as the critical bridge, transforming universal digital access into meaningful digital equity for the ASD population. By integrating these tools into the learning

environment, we can ensure that every student with ASD is empowered to develop the essential skills, knowledge, and independence necessary to thrive in the modern, digital world.

DEFINITIONS

A. Digital Equity

Digital Equity goes far beyond simply providing a computer and internet access. It is the condition where all individuals and communities have the necessary Information Technology (IT) capacity to participate fully in society, the economy, and, in this context, education.

For a student, Digital Equity means having access, skills, content, support.

B. Autism Spectrum Disorder (ASD)

Autism Spectrum Disorder (ASD) is a developmental condition marked by ongoing difficulties in social communication and interaction, along with restricted and repetitive behaviors, interests, or activities. These characteristics often create specific barriers in a typical 21st-century classroom, which relies heavily on verbal communication, executive function, sensory processing, and social collaboration.

C. 21st-Century Learning

This refers to the modern educational environment characterized by the integration of digital tools and skills. It focuses on outcomes like, the 4 Cs (Critical Thinking, Communication, Collaboration, and Creativity), personalized learning, and digital literacy.

TECHNOLOGY-AIDED LIVING SKILLS

Assistive Technology (AT) can be strategically integrated to enhance daily living skills in children with Autism Spectrum Disorder (ASD) by aligning tools with individual needs, routines, and developmental goals. When used purposefully, AT promotes independence, consistency, and skill generalization across home and school settings.

1. Supporting Communication in Daily Routines

AT tools such as AAC apps, picture exchange systems (PECS), and speech-generating devices help children understand and express needs during daily activities like eating, dressing, or toileting..

2. Enhancing Self-Care Skills

Visual schedules, step-by-step video modeling, and task-prompting apps guide children through daily living tasks such as brushing teeth, bathing, and hand washing.

3. Improving Time Management and Organization

Timers, reminder apps, and wearable AT devices support transitions between activities and help children follow routines.

4. Supporting Sensory Regulation

AT such as noise-canceling headphones, sensory apps, and adaptive lighting tools helps children manage sensory sensitivities during daily activities. Improved sensory regulation leads to better participation in home and school routines.

5. Promoting Safety and Mobility

GPS trackers, smart home devices, and adaptive tools enhance safety and independence in daily movement and community participation, especially for children with wandering behaviors.

6. Facilitating Skill Generalization and Independence

AT enables consistent practice of daily living skills across environments. Data-tracking apps allow parents, teachers, and therapists to monitor progress and adjust interventions based on the child's response

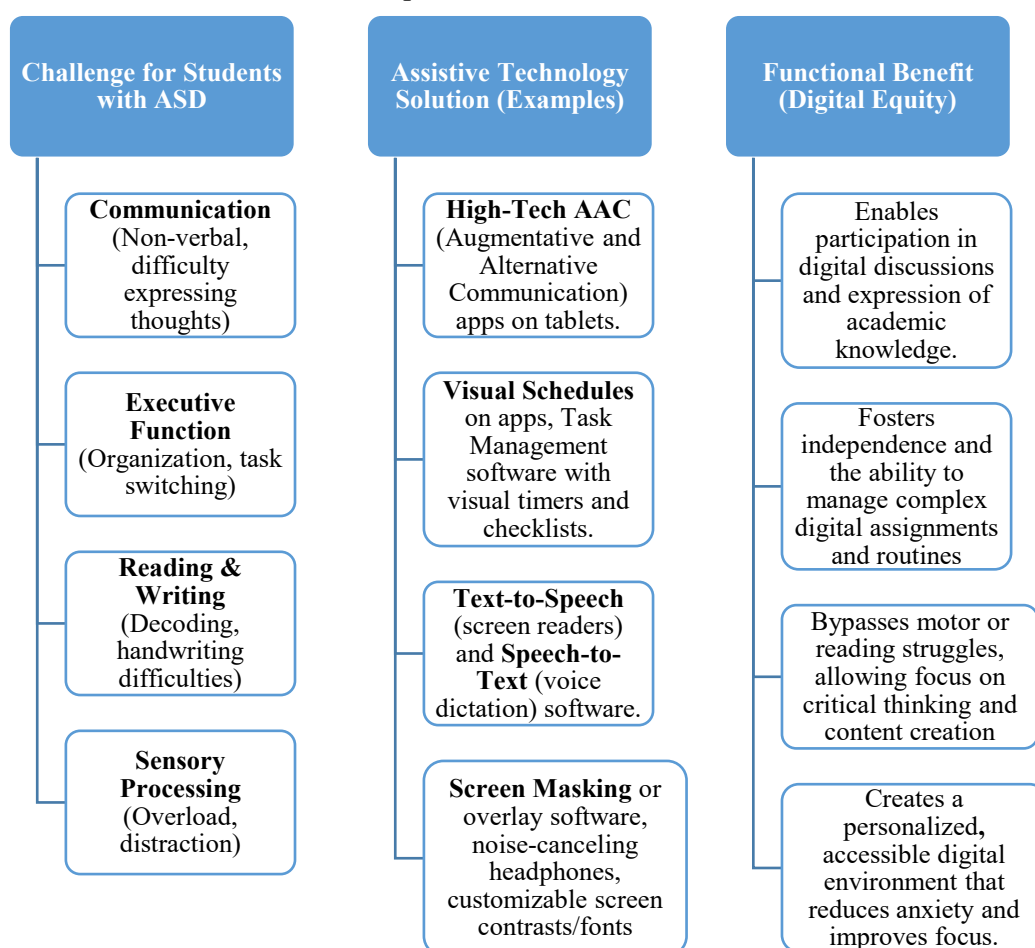
THE BRIDGE: LEVERAGING ASSISTIVE TECHNOLOGY (AT)

Assistive Technology (AT) is the strategic tool used to bridge the gap between the challenges faced by students with ASD and the demands of digital learning, thereby achieving Digital Equity. AT is defined as any item, piece of equipment, or product system that is used to increase, maintain, or improve the functional capabilities of individuals with disabilities.

DAILY LIVING AIDS

Things that help individuals to do their daily activities are classed as daily living aids. These can be used by anyone, although they're usually used in health and social care environments. Here are some examples of the types of assistive technology available:

- **Mobility aids:** Canes, walking frames, scooters and wheelchairs.
- **Communication devices:** Augmentative and alternative communication (AAC) tools and Speech generating devices.
- **Daily living aids:** Adaptive kitchen tools and modified bathroom equipment.
- **Sensory aids:** Visual aids and hearing aids
- **Tele-health and remote monitoring:** Remote patient monitoring systems, virtual consultations and telemedicine platforms.



CONCLUSION

Assistive technology devices can help people with ASD live more independently and enjoy life to the fullest. In conclusion, digital equity is a critical foundation for ensuring meaningful and inclusive learning opportunities for individuals with Autism Spectrum Disorder (ASD) in the 21st century. Leveraging assistive technology bridges gaps in communication, social interaction, and learning by providing personalized, accessible, and flexible educational support. Tools such as augmentative and alternative communication (AAC), adaptive learning platforms, visual supports, and AI-driven applications empower learners with ASD to engage more effectively in academic and daily living contexts. However, the successful integration of assistive technology depends not only on technological availability but also on equitable access, informed policy frameworks, teacher preparedness, and active family and community involvement. Addressing barriers related to cost, infrastructure, and digital literacy is essential to prevent the digital divide from further marginalizing learners with ASD. When governments, institutions, and communities collaborate to promote digital equity, assistive technology becomes a transformative force enhancing independence, improving learning outcomes, and supporting lifelong inclusion.

Thus, ensuring digital equity through the strategic use of assistive technology is not merely a technological advancement but a social and educational imperative for creating inclusive, responsive, and future-ready learning environments for individuals with Autism Spectrum Disorder.

Abbreviation	Full Form
ASD	Autism Spectrum Disorder
AT	Assistive Technology
AAC	Augmentative and Alternative Communication
ICT	Information and Communication Technology
AI	Artificial Intelligence
PES	Picture exchange systems
IT	Information Technology

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RELATIONSHIP BETWEEN MODERNITY, ACCEPTANCE AND LEVEL OF ASPIRATION AMONG B.ED. STUDENTS

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Abstract

The current research paper examines the relationship of modernity, acceptance, and level of aspiration on B.Ed. students in a normative survey methodology. Using standardized measurements, the study has tested modernity on major scales such as, women rights, change attitude, religiosity, mass media impact, work experience and educational value and acceptance and aspiration among 300 random selected teacher trainees. The findings show that the modernity and acceptance are mostly moderate, with female students presenting much higher scores in women rights, adaptability to change, work experience dimension, and acceptance in general. A strong positive relationship was found between modernity and acceptance with a strong emphasis on the interdependent development. It is important to note that increased modernity and acceptance were linked with increased aspiration. The results highlight the need to instill these developmental qualities in teacher education courses to make the trainees effective in equipping the future generations. It has been suggested to provide structured counseling programs, enhanced co-curricular activity and enhanced career development to develop these interested attributes in future teachers.

Keywords: *Modernity, Acceptance, B.Ed. Students, Teacher Education, Level of Aspiration, Tamil Nadu.*

INTRODUCTION

In the modern-day educational environment, teachers in training should manifest progressive mindsets to help mold the future generations. The modernity as an open society that accepts the rights of women, flexible nature, lesser religiosity, exposure to mass media, work experience, and modern educational ethics is an important factor that is joined with tolerance to different viewpoints and high levels of ambition. The research question in this paper is: Relationship between Modernity, Acceptance and Level of Aspiration among B.Ed. Students where the relationship between these three characteristics is discussed as the research author investigates the relationship between these characteristics in 300 randomly selected teacher trainees. Since Swami Vivekananda had the vision that education was the expression of divine perfection that was already within man, the students of B.Ed. today must be able to feel modern sensibilities and aspiration-al zeal to implement this vision in the classroom setting. The dynamics are crucial to the creation of balanced educators with intellectual and adaptive attitudes to address the educational problems of the 21st century. Education is what makes people view themselves, their view towards others, and society, and with higher education being the pivotal point toward adulthood and professional training. In the case of B.Ed., students, modernity, which consists of openness to women rights, flexibility to

change, contact with the values of the day, and tolerance to various opinions, are the pillars to becoming good educators. Such characteristics are especially crucial at such a young age when the future generations of teachers develop the attitudes that will shape their own future. Harmonious personality development, confidence and adaptive behavior are motivated by acceptance and modernity equips teachers to overcome the challenges that are posed in the 21st century. Since the role of teachers is a role model in the society, B.Ed. students are supposed to reflect the progressive values to influence the students positively on their world views and objectives. This research looks into the relationship between modernity, acceptance and level of aspiration among B.Ed. students and evaluates the difference between the gender, college type (government/ private), locality (urban/ rural), and socio-economic status. The results will be used to establish what improves or impedes these qualities that are critical to teachers, and the outcomes can be applied to teacher education programs. Findings will inform curriculum developers, college administrators and policymakers to develop interventions in the form of counseling programs, co-curricular activities, and career guidance to build modern, accepting and aspirational educators who can work towards meeting the modern educational needs and ensure inclusiveness in the classroom.

TITLE OF THE STUDY

RELATIONSHIP BETWEEN MODERNITY, ACCEPTANCE AND LEVEL OF ASPIRATION AMONG B.ED. STUDENTS.

OPERATIONAL DEFINITIONS

The investigator adopted the following definitions for the terms used in this study,

MODERNITY

It refers to the progressive attitudes and openness of B.Ed. students toward contemporary social, cultural and educational transformations.

ACCEPTANCE

Acceptance is defined as affirmation or acceptance of self in spite of weakness or deficiencies.

LEVEL OF ASPIRATION

By this term the investigator means the Level of aspiration refers to the educational and career goals that students set for themselves, as well as their motivation to achieve them. It reflects the desire and confidence students have regarding their future academic and professional success.

RELATIONSHIP

It means a connection or a link between two or more factors as association or connection in some known and definite manner; hence by relationship the investigator means a relationship between modernity and acceptance.

B.Ed. STUDENTS

By B.Ed. Students the investigator means, students studying in B.Ed., Colleges belongs to Tamilnadu Teachers Education University.

OBJECTIVES

- 1.1 To find out the level of modernity of B.Ed., students and its dimensions.
- 1.2 To find out the significant difference between male and female students in their modernity of B.Ed., students and its dimensions.
- 1.3 To find out the level of acceptance of B.Ed., students.

- 1.4 To find out the significant difference between male and female students in their acceptance of B.Ed., students.
- 1.5 To find out the level of level of aspiration of B.Ed., students.
- 1.6 To find out the significant difference between male and female students in their level of aspiration of B.Ed., students.
- 1.7 To find out the significant relationship between modernity and acceptance of B.Ed., students.
- 1.8 To find out the significant relationship between level of aspiration and acceptance of B.Ed., students.

NULL HYPOTHESES

- 2.1 There is no significant difference between male and female students in their modernity of B.Ed., students and its dimensions.
- 2.2 There is no significant difference between male and female students in their acceptance of B.Ed., students.
- 2.3 There is no significant difference between male and female students in their level of aspiration of B.Ed., students.
- 2.4 There is no significant relationship between modernity and acceptance of B.Ed., students.
- 2.5 There is no significant relationship between level of aspiration and acceptance of B.Ed., students.

METHOD ADOPTED IN THE PRESENT STUDY

The investigator selected the normative survey method for the present study.

TOOL USED FOR THE PRESENT STUDY

As the study aims at the relationship of modernity, acceptance and level of aspiration on B.Ed. students, the investigator has adopted modernity and acceptance scale. The investigator used the standardized tool for measuring the level of aspiration developed by Bhargava and Shah (1996).

POPULATION FOR THE STUDY

The population for the study consists of all B.Ed. students in Tamil nadu.

SAMPLE FOR THE STUDY

The investigator has used simple random sampling technique. Out of all colleges in Tamil nadu, the investigator selected randomly 300 B.Ed. students.

STATISTICAL TECHNIQUES USED

“Statistics is the scientific study of handling quantitative information. It embodies a methodology of collection, classification, description and interpretation of data obtained through the conduct of surveys and experiments”. (Aggarwal Y.P, 2000). Percentage analysis, Arithmetic mean, Standard deviation, ‘t’ test and correlation.

ANALYSIS

Table 1.1

LEVEL OF MODERNITY OF B.Ed STUDENTS IN THE TOTAL SAMPLE

Dimensions	Low		Moderate		High	
	N	%	N	%	N	%
Women’s Right	60	20.1	203	67.9	36	12.0

Change	51	17.1	212	70.9	36	12.0
Religiosity	54	18.1	194	64.9	51	17.1
Mass media	56	18.7	201	67.2	42	14.0
Working Experience	40	13.4	206	68.9	53	17.7
Education	53	17.7	209	69.9	37	12.4
Modernity Total	44	14.7	231	77.3	24	8.0

Table 1.2

DIFFERENCE BETWEEN MALE AND FEMALE STUDENTS IN THEIR MODERNITY

DIMENSIONS	GENDER	N	MEAN	S.D.	Calculate 't' Value	Remarks at 5% level
Woman's Right	Male	83	23.43	3.270	3.199	S
	Female	217	24.73	2.758		
Change	Male	83	19.90	2.980	2.255	S
	Female	217	20.76	2.875		
Religiosity	Male	83	15.77	2.838	0.882	NS
	Female	217	16.08	2.508		
Mass Media	Male	83	16.50	3.084	0.996	NS
	Female	217	16.88	2.382		
Working Experience	Male	83	20.74	2.888	3.455	S
	Female	217	22.01	2.692		
Education	Male	83	23.76	3.141	1.617	NS
	Female	217	24.42	3.222		
Modernity Total	Male	83	121.70	19.089	1.419	NS
	Female	217	124.88	11.502		

(At 5% level of significance the table value of 't' is 1.96)

Table 1.3

LEVEL OF ACCEPTANCE OF B.Ed., STUDENTS

Acceptance					
Low		Moderate		High	
Count	%	Count	%	Count	%
36	12.0	219	73.2	44	14.7

Table 1.4

DIFFERENCE BETWEEN MALE AND FEMALE STUDENTS IN THEIR ACCEPTANCE OF B.Ed. STUDENTS

Variable	Gender	N	Mean	Std. Deviation	't' Value	
Acceptance	Male	83	76.54	5.567	1.083	NS
	Female	217	77.37	6.898		

(At 5% level of significance the table value of 't' is 1.96)

Table 1.5
LEVEL OF LEVEL OF ASPIRATION OF B.Ed., STUDENTS

LEVEL OF ASPIRATION					
Low		Moderate		High	
Count	%	Count	%	Count	%
43	14.33	212	70.66	45	15.01

Table 1.6
DIFFERENCE BETWEEN MALE AND FEMALE STUDENTS IN THEIR LEVEL OF ASPIRATION OF B.Ed. STUDENTS

Variable	Gender	N	Mean	Std. Deviation	‘t’ Value	S
Level of Aspiration	Male	83	32.05	2.365	2.657	
	Female	217	36.29	4.694		

(At 5% level of significance the table value of 't' is 1.96)

Table 1.7
RELATIONSHIP BETWEEN MODERNITY AND ACCEPTANCE OF B.ED. STUDENTS

N	Σ X	Σ Y	Σ X²	Σ Y²	Σ XY	CORREL	REMARK at 5% level
300	37079	23066	1374852241	532040356	855264214	0.309	S

(At 5% level of significance, for 298 df the table value of 'r' is 0.1638)

Table 1.8
RELATIONSHIP BETWEEN LEVEL OF ASPIRATION AND ACCEPTANCE OF B.ED. STUDENTS

N	Σ X	Σ Y	Σ X²	Σ Y²	Σ XY	CORREL	REMARK At 5%level
300	26857	23066	721298449	532040356	619483562	0.312	S

(At 5% level of significance, for 298 df the table value of 'r' is 0.1638)

RESULTS AND DISCUSSION

- It is inferred from the above table (1.1) that the level of modernity of B.Ed., trainees is average 67.9 in the dimension of women's right have moderate. The level of modernity of B.Ed., trainees is average 70.9 in the dimension of change have moderate. The level of modernity of B.Ed., trainees is average 64.9 in the dimension of religiosity have moderate. The level of modernity of B.Ed., trainees is average 67.2 in the dimension of Mass media have moderate. The level of modernity of B.Ed., trainees is average 68.9 in the dimension of Working experience have moderate. The level of modernity of B.Ed., trainees is average 69.9 in the dimension of education have moderate. The level of modernity of B.Ed., trainees is average 77.3 in the dimension of Modernity total have moderate.

- It is inferred from the above table (1.2) that 73.2 of B.Ed., trainees are moderate in the level of acceptance.
- It is inferred from the above table (1.3) that there is no significant difference male and female student's in the dimension of religiosity, mass media, education and modernity total. But there is significant difference male and female student's in the dimension of woman's right, change, working experience. While comparing the mean scores, the female B.Ed. students are better than the male B.Ed. students.
- It is inferred from the above table (1.4) that there is significant difference between male and female students in their acceptance of B.Ed students. While comparing the means scores of male (mean=76.54) and female (mean=77.37) students in their acceptance of B.Ed students. Female students are better than the male students.
- It is inferred from the above table (1.5) that 70.66 of B.Ed., trainees are moderate in the level of aspiration.
- It is inferred from the above table (1.6) that there is significant difference between male and female students in their level of aspiration of B.Ed students. While comparing the means scores of male (mean=32.05) and female (mean=36.29) students in their level of aspiration of B.Ed students. Female students are better than the male students.
- It is inferred from the above table (1.7) that there is a significant difference between the modernity and acceptance of B.Ed students.
- It is inferred from the above table (1.8) that there is a significant difference between the level of aspiration and acceptance of B.Ed students.

INTERPRETATIONS

The 't' test reveals that female college prospective students have more awareness about women's right, change and work experience. This may due to the fact that female trainees are eager to know the women's right and change in the every step in their life. They have committed in every work.

The 't' test reveals that female college prospective students have more acceptance than male students. This may due to the fact that female students have more adjustability in their life span. They can tolerate any kind problems.

The 't' test confirms a significant difference between male (mean=32.05) and female (mean=36.29) B.Ed. students in their level of aspiration, with female students demonstrating higher aspiration. This may be attributed to female trainees' greater determination to overcome societal barriers and establish professional identities in teaching. Their higher career aspirations reflect proactive goal-setting essential for teacher effectiveness and leadership roles in education.

The correlation analysis establishes a significant positive relationship between modernity and acceptance among B.Ed. students. This interconnection suggests that exposure to progressive values women's rights, adaptability to change, and contemporary educational practices enhances trainees' ability to embrace diverse classroom realities. Modern experiences cultivate psychological flexibility, enabling future teachers to create inclusive learning environments and effectively mold students' personalities.

The correlation results revealed that there is significant difference between the modernity and acceptance of B.Ed students. This may due to the fact that modern experiences have their effect in indirect ways through general psychological modernity. a right perspective values about modernity

and acceptance which would form the base for their future as productive adults. Modernity and acceptance influences positively on the performance of teacher trainees. The trainees studying the teacher university should develop the qualities of a good teacher. The traits such as modernity and acceptance play a vital role in the personality development of teacher trainees and help them in becoming effective teacher capable of molding the personality of children.

RECOMMENDATIONS

Based on the study, the investigator has made some recommendation so as to improve the modernity and acceptance of B.Ed students.

1. Once in every three month counseling programmers for students may be organized.
2. Co-curricular and extra-curricular activities should be given importance in the curriculum so that the students can develop their talents.
3. Career information center, career talks and guidance programs should be conducted in the colleges.
4. Teacher education programs must prioritize developing modernity and acceptance alongside aspiration. Female trainees' superior performance across these dimensions highlights their readiness to meet 21st-century educational challenges, serving as role models for gender-balanced, progressive teaching practices essential for shaping productive future generations.

CONCLUSION

The present investigation establishes a significant positive correlation between modernity, acceptance, and level of aspiration among B.Ed. students, highlighting their interconnected influence on teacher trainee development. These findings offer valuable insights for teacher education programs, serving as a foundational database for future research in progressive educator preparation. This knowledge holds immense practical importance for teacher educators, curriculum planners, policymakers, and society at large. By fostering modernity (women's rights awareness, adaptability to change) and acceptance alongside realistic aspiration, teacher training institutions can cultivate progressive educators capable of addressing 21st-century classroom challenges. As Monroe aptly stated, "*The final purpose of educational research is to ascertain principles and develop procedures in the field of education*". This study contributes actionable principles for nurturing well-rounded, modern teacher trainees who will effectively shape future generations through inclusive, aspirational, and forward-thinking educational practices.

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ECONOMIC DETERMINANTS OF GROSS ENROLMENT RATIO: TRENDS AND PATTERNS IN INDIA

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Abstract

Gross Enrolment Ratio (GER) is a crucial indicator used to assess the level of participation in education across different stages. It reflects the capacity of an education system to enroll students irrespective of age, relative to the official age group for a given level of education. The present study aims to analyze trends and patterns of Gross Enrolment Ratio in India using secondary data sources such as the All India Survey on Higher Education (AISHE), Unified District Information System for Education (UDISE+), Ministry of Education reports, Human Development Report and in international databases. The study examines Gross Enrolment Ratio in different states and identifies structural challenges affecting enrolment. The findings reveal significant improvements in GER at the elementary level, moderate progress at the secondary level, and persistent challenges in higher education enrolment. The study highlights the need for inclusive, region-specific, and equity-based educational policies to sustain and improve enrolment outcomes.

Keywords: *Gross Enrolment Ratio, Gross Domestic Product, Education*

Introduction

Education plays a vital role in the economic, social, and human development of a nation. Access to education determines the quality of human capital and contributes to productivity, social mobility, and inclusive growth. One of the most widely used indicators to measure educational participation is the Gross Enrolment Ratio (GER). GER provides insights into the extent to which educational opportunities are accessible to the population at different levels of education.

Gross Domestic Product (GDP) is an important indicator measures the total value of goods and services produced within a country in a given period. GER is a driver of GDP growth rate. Increase in enrolment improves literacy rate, skills and knowledge. Higher the GDP will result in more public spending on education. Governments can invest in schools, colleges, scholarships, and digital learning. Household income is also a key determinant for better access to education. India's school education system serves 24.8 crore students across 14.72 lakh schools with 98 lakh teachers. The NEP 2020 aims for a 100 percent Gross Enrolment Ratio (GER) by 2030. The GER is near-universal at the primary (93 per cent) and the efforts are underway to bridge the gaps at the secondary (77.4 per cent) and higher secondary level (56.2 per cent), driving the nation closer to its vision of inclusive and equitable education for all. School dropout rates have steadily declined in recent years, standing at 1.9 per cent for primary, 5.2 per cent for upper primary, and 14.1 per cent for secondary levels (UDISE+ 2023-24).

In the Indian context, expanding educational access has been a major policy priority since independence. Initiatives such as the Right to Education Act (2009), Sarva Shiksha Abhiyan, Rashtriya Madhyamik Shiksha Abhiyan, and the National Education Policy (2020) aim to improve enrolment, retention, and transition rates. Despite these efforts, disparities across regions, gender,

and educational levels continue to affect enrolment outcomes. Against this backdrop, the present study attempts to analyze trends in Gross Enrolment Ratio in India using secondary data.

Literature Review

Higher education has emerged as a critical driver of long-term economic growth, structural transformation, and social mobility across developing and developed economies. A growing body of literature emphasizes the role of the Gross Enrolment Ratio (GER) in higher education as a key indicator of human capital accumulation and economic advancement.

Gethin (2025) investigates the distributional effects of education policy using a longitudinal dataset of emerging economies. The study finds that nearly 50% of economic growth in developing countries over the past four decades can be attributed to education-driven human capital accumulation. An increase in higher education GER shifts the skill premium in favor of lower-income groups, directly enhancing the productivity of the bottom 20% of the population. The study argues that a high GER is a necessary precondition for integration into high-technology global value chains.

In the Indian context, the Ministry of Finance (2025) provides a comprehensive structural assessment of the education system in the Economic Survey 2024–25. The report highlights India's current higher education GER of 28.4% and emphasizes the National Education Policy (NEP) 2020 target of achieving a 50% GER by 2035 as central to the vision of "Viksit Bharat." State-level analysis reveals that regions with higher tertiary enrolment consistently exhibit stronger Gross State Domestic Product (GSDP) growth, reinforcing the link between enrolment expansion and economic modernization.

From a global fiscal perspective, the OECD (2025) demonstrates that investments in tertiary education generate substantial public returns. Individuals with higher education contribute nearly three times more in lifetime tax revenues than the public cost incurred on their education. The report further establishes that a 1% increase in higher education enrolment is positively associated with national innovation indices, positioning GER as a proxy for fiscal sustainability and future tax base expansion.

Pal (2024) offers a comparative analysis of GER trajectories in India and China, identifying a significant time lag between enrolment expansion and measurable economic outcomes. The study finds that a 10% rise in tertiary GER typically translates into a 1.5% increase in GDP per capita after a period of 5–8 years. China's rapid ascent to a GER exceeding 60% is contrasted with India's gradual progress, leading to the conclusion that sustained high enrolment is essential for escaping the middle-income trap.

The non-linear relationship between higher education and growth is empirically validated by Dinh and Nguyen (2021), who apply a kink regression model to ASEAN-5 countries. Their findings identify a critical threshold at a 25% GER, beyond which the positive impact of higher education on GDP growth intensifies significantly. This study provides strong empirical support for the "critical mass" theory in human capital development.

The role of public expenditure in driving enrolment and growth is examined by Khan and Ahmad (2021) using Vector Error Correction Models and Granger causality tests for South Asian economies. The authors confirm a long-run co-integrated relationship where government spending increases GER, which in turn promotes economic growth. While short-run causality flows from growth to education, a bi-directional relationship emerges in the long run, underscoring the need for sustained fiscal commitment to education.

However, increasing enrolment alone is insufficient. The World Bank (2024) introduces the “Quality–Quantity Paradox,” warning that rapid GER expansion without corresponding skill development may result in educated unemployment. The report advocates the use of a “Quality-Adjusted GER” and emphasizes alignment between higher education curricula and labor market demand to maximize economic returns.

Gender dimensions of enrolment further strengthen the economic case for higher education expansion. K and Chotai (2025) highlight that increases in female GER have disproportionately positive effects on household poverty reduction, child health outcomes, and Female Labour Force Participation (FLFP). The study concludes that gender-inclusive enrolment strategies significantly enhance national productive capacity.

The importance of education quality is reinforced by Hanushek and Woessmann (2025), who update their Knowledge Capital framework. They argue that years of schooling, as captured by GER, must be complemented by cognitive skill development to generate sustained economic growth. Using international assessment scores, they show that countries with moderate GER but high learning outcomes outperform those with high GER and low quality. The authors propose Learning-Adjusted Years of Schooling (LAYS) as a superior metric for growth forecasting.

Finally, empirical evidence from India is provided by the Ministry of Education (2024) through the All India Survey on Higher Education (AISHE). The data reveal a significant shift toward STEM, vocational, and professional courses, linking India’s 28.4% GER to the expansion of the digital economy and service-sector Gross Value Added (GVA). This report establishes a direct connection between discipline-specific enrolment patterns and sectoral economic growth.

Overall, the literature consistently demonstrates that higher education GER plays a pivotal role in economic growth, fiscal sustainability, and social development. However, the effectiveness of enrolment expansion depends on quality, gender inclusion, fiscal support, and long-term policy alignment.

Methodology:

Type of Research

This research applies a descriptive quantitative approach and utilizes method analysis by analyzing secondary data.

Data Collection Techniques

The quantitative method in this research is chosen for secondary data collection. The secondary data utilized are the achievements of the Gross Enrollment Ratio (GER), Mean Schooling Years, GDP Growth rate, Per capita income in India.

Data Analysis Techniques

The section dealt with some important data analysis techniques, which are as follows:

1. Trend Analysis - Exponential Growth Rate:

$$GDP = ae^{b(GER)}$$

Where:

GDP = Gross Domestic Product

GER = Gross Enrolment Ratio

b = exponential growth rate

2. Correlation

In the present study, Pearson's correlation coefficient is used to assess the relationship between Gross Enrolment Ratio (GER), Mean Years of Schooling (MYS), and Gross Domestic Product (GDP) based on secondary data.

3. Intuitive Model

The method of analyzing information by intuitively demonstrating, particularly: Intelligent demonstration, Information acquisition, Information compression, Information presentation, and Final Conclusion (Prayitno and Mami, 2024).

Objectives:

1. To analyze the trend in mean years of schooling.
2. To examine the Gross Enrolment Ratio among different states in India.
3. To find out the relationship between economic variables and educational variables.
4. To examine the expenditure pattern on education.

Hypotheses:

1. There is no relationship between Gross Domestic Product and Gross Enrolment Ratio.
2. There is no association between Gross Domestic Product and Mean Years of Schooling.

Results and Discussions:

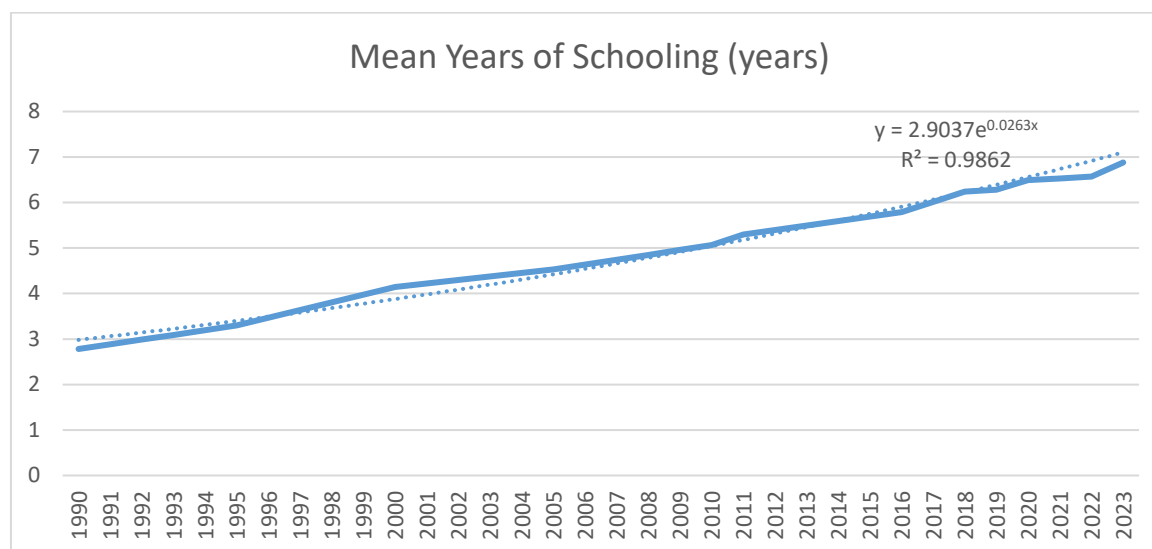
This research aims to explore the relationship between Mean Years of Schooling, Gross Enrolment Ratio, Gross Domestic Product and Per Capita Income.

Table: 1 Mean Years of Schooling (MYS) in India

Years	MYS	Years	MYS	Years	MYS
1990	2.781	2001	4.220	2012	5.398
1991	2.884	2002	4.297	2013	5.495
1992	2.987	2003	4.374	2014	5.593
1993	3.091	2004	4.451	2015	5.690
1994	3.194	2005	4.528	2016	5.788
1995	3.297	2006	4.635	2017	6.014
1996	3.466	2007	4.742	2018	6.240
1997	3.635	2008	4.849	2019	6.281
1998	3.805	2009	4.956	2020	6.490
1999	3.974	2010	5.063	2021	6.530
2000	4.143	2011	5.300	2022	6.570
-	-	-	-	2023	6.880

Source: *Human Development Report, 2025*

The data clearly shows a **steady and sustained increase in the Mean Years of Schooling** from **2.78 years in 1990 to 6.88 years in 2023**, indicating significant long-term improvement in educational attainment. The continuous rise reflects expanded access to education, higher enrolment, and improved retention at primary, secondary, and higher levels. Growth during the 1990s is steady, driven by literacy missions, expansion of primary schools, and increased public investment in basic education. Sharp increases after 2017 reflect improved secondary completion, higher GER in higher education, digital learning initiatives, and skill-oriented programs. Slight stagnation around 2019–2021 may be linked to demographic factors and disruptions such as the COVID-19 pandemic, after which growth resumes strongly.

Figure: 1 Mean Years of Schooling

Source: *Computed from secondary data*

The above figure demonstrates an R-square value of 0.9826 for Mean Years of Schooling indicates that approximately 98.26 per cent of the variation in the dependent variable is explained by mean years of schooling, demonstrating an exceptionally strong explanatory power of education in the model. Such a high R-square value indicates an excellent model fit; particularly in time-series analyses involving education and macroeconomic indicators. Mean years of schooling explains 98.26 per cent of the variation in the dependent variable, confirming education as a powerful determinant of economic outcomes.

Table: 2 Gross Enrolment Ratio in different states in India

States/UTs	2023-24				2021-22
	Foundational* (Pre-Primary to Class II)	Preparatory (III-V)	Middle (VI-VIII)	Secondary (IX-XII)	Higher Education (18-23 Year)
Andhra Pradesh	47.6	100.3	101.5	79.2	36.5
Arunachal Pradesh	71.1	101.4	89.3	57	36.5
Assam	51.3	108.5	91.2	56.3	16.9
Bihar	24.7	95.9	68.4	37.8	17.1
Chhattisgarh	46.1	90.7	90.2	64.1	19.6
Gujarat	35.9	93.3	92.2	58.7	24.0
Haryana	39.5	98.8	100.9	77	33.3
Himachal Pradesh	67.7	108.3	103.8	90.7	43.1
Jammu & Kashmir	91.2	102.8	77	53.7	24.8
Jharkhand	38.9	92.4	82.5	51.1	18.6
Karnataka	42.2	109.3	104.2	79	36.2
Kerala	56.1	98	99.9	93	41.3
Madhya Pradesh	40.1	81.3	82.4	55.5	28.9
Maharashtra	41.4	102.2	98.2	80.7	35.3
Manipur	84.6	124.3	91.2	66.1	35.4
Meghalaya	122.7	158.1	115.3	61.7	25.4
Mizoram	99.9	130.3	113.7	74.5	32.3
Nagaland	77	87.4	72	50	18.8
Odisha	35.4	97.1	96.7	70.2	22.1

Punjab	79.6	108.2	102.5	85.5	27.4
Rajasthan	45.0	96.8	91.1	71.1	28.6
Sikkim	86.6	95.3	78.0	65.2	38.6
Tamil Nadu	55.2	96.9	101.6	89.5	47.0
Telangana	56.8	110.3	109.5	83.1	40.0
Tripura	52.6	121.4	97.6	67.2	20.7
Uttar Pradesh	31.9	86.7	78.8	58.5	24.1
Uttarakhand	55.0	111.7	103.0	83.2	41.8
West Bengal	55.6	109.1	102.2	83.4	26.3
Chandigarh	67.5	114.1	121.1	109.5	64.8
Delhi	51.0	106.8	115.0	91.0	49.0
Goa	72.0	118.9	115.3	100.3	35.8
All India	41.5	96.5	89.5	66.5	28.4

Source: UDISE+ 2023-24, Department of School Education & Literacy and AISHE 2021-22

The table 2 explains GER in different states of India. Preparatory Stage (Classes III–V) all-India GER (96.5) suggests near-universal enrolment. All-India GER (89.5) shows a decline, pointing to emerging dropout issues. High performers include Chandigarh (121.1), Goa (115.3), Delhi (115.0), Mizoram (113.7). Lower values in Bihar (68.4), Nagaland (72.0), Uttar Pradesh (78.8) reflect transition challenges after primary education. In secondary level, all-India GER (66.5) indicates a sharp fall, marking secondary education as a critical dropout stage. Strong performance by Chandigarh (109.5), Goa (100.3), Kerala (93.0), Tamil Nadu (89.5) reflects better retention and schooling infrastructure. Very low GERs in Bihar (37.8), Assam (56.3), Jharkhand (51.1) underline socio-economic and institutional barriers. With regard to higher education all-India GER (28.4) shows limited access to tertiary education. Leading regions include Chandigarh (64.8), Delhi (49.0), Tamil Nadu (47.0), Himachal Pradesh (43.1). Large states such as Bihar (17.1), Assam (16.9), Jharkhand (18.6) remain far below the national average, indicating inequality in higher education access.

Gross Enrolment Ratio and GDP: Correlation Analysis

Rationale for Correlation Analysis

From an economic perspective, education is a key determinant of economic growth through human capital formation. Gross Enrolment Ratio (GER) reflects the extent of participation in education, while Gross Domestic Product (GDP) indicates overall economic performance. Examining the relationship between GER and GDP helps to understand whether improvements in educational access are associated with economic growth.

GER and GDP Trends in India

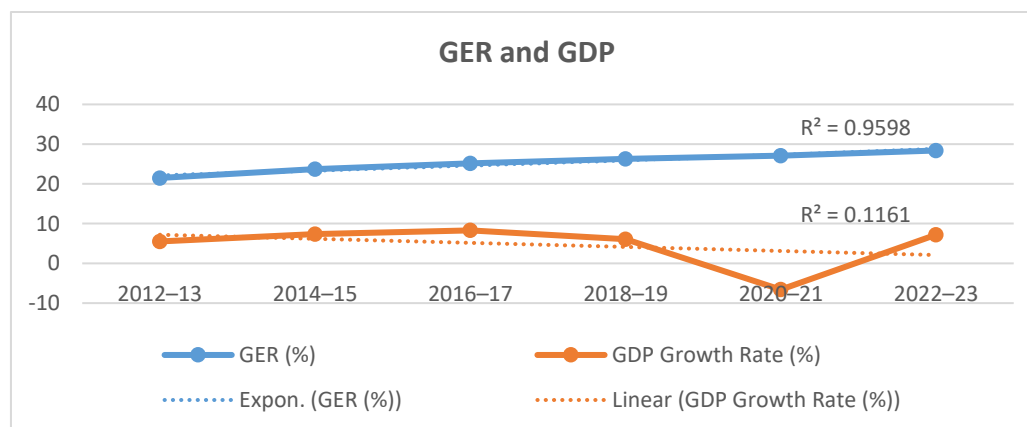
Table 3: Gross Enrolment Ratio (Higher Education) and GDP Growth in India

Year	GER (%)	GDP Growth Rate (%)
2012–13	21.5	5.5
2014–15	23.7	7.4
2016–17	25.2	8.3
2018–19	26.3	6.1
2020–21	27.1	-6.6
2022–23	28.4	7.2

Source: AISHE Reports; World Bank & Ministry of Statistics

The table 3 indicates a gradual increase in GER in higher education over the years. Despite short-term economic shocks, such as economic slowdowns, Covid-19 in 2020-21 result in step fall in GDP growth rate, GER shows a steady upward trend, suggesting that investment in education tends to be sustained even during periods of economic stress. The long-run trend indicates that improvements in GER are associated with higher economic growth rates. The following figure shows relationship between Gross Enrolment Ratio and GDP Growth in India.

Figure: 2 Trend line between Gross Enrolment Ratio and GDP Growth in India



Source: *Computed from secondary data*

The estimated exponential growth rate of Gross Enrolment Ratio (GER) is 0.9571, indicates a strong positive growth relationship. While Gross Domestic Product (GDP) R^2 0.1161 indicates non-linear in nature. It shows a positive but relatively moderate relationship, indicating that a one-unit increase in GER is associated with an average increase of 0.1161 units in GDP.

Correlation between GER and GDP

Table 4: Correlation Coefficient between GER and GDP Growth

Variables	Correlation Coefficient (r)
GER and GDP Growth	+0.68

Source: *Secondary data*

The correlation coefficient of +0.68 indicates a moderately strong positive relationship between Gross Enrolment Ratio and GDP growth. This suggests that higher enrolment in education is associated with improved economic performance. The positive correlation supports the human capital theory, which argues that education enhances labor productivity, innovation, and economic growth.

Level-wise GER and Per Capita Income

Table: 5 Educational Level-wise GER and Per Capita Income

Level of Education	GER (%)	Per Capita Income (₹)
Elementary	103.1	98,000
Secondary	79.6	1,12,000
Higher Education	28.4	1,35,000

Source: *AISHE Reports; World Bank & Ministry of Statistics*

The table 5 reveals that higher levels of education are associated with higher per capita income. While elementary education has achieved near-universal enrolment, income gains are more

strongly linked with secondary and higher education. This highlights the importance of improving GER beyond the elementary level to achieve sustainable economic growth.

Hypothesis Testing:

For the hypothesis testing economic variables and educational variables have been identified.

Educational variables: Gross Enrolment Ratio, Mean Years of Schooling

Economic variables: Gross Domestic Product, Per Capita Income

Table: 6 Correlation between GER, Mean Years of Schooling and GDP

Variables	GER	Mean Years of Schooling	GDP
GER	1.000	0.921	0.683
Mean Years of Schooling	0.921	1.000	0.992
GDP	0.683	0.992	1.000

Source: *Computed from secondary data*

The correlation matrix reveals a strong positive association between educational variables and economic output. Gross Enrolment Ratio is positively correlated with GDP ($r = 0.683$), indicating that higher enrolment levels are associated with improved economic performance. The correlation between Mean Years of Schooling and GDP is exceptionally high ($r = 0.992$), suggesting that accumulated educational attainment has a substantial influence on economic growth. Furthermore, the strong correlation between GER and Mean Years of Schooling ($r = 0.921$) implies that improvements in enrolment rates translate into higher average years of schooling over time. The analysis highlights the cumulative and long-term effects of education on growth. Hence, the framed hypothesis is that “there is no relationship between economic variables and educational variables” is rejected and the alternative hypothesis is accepted. These findings reinforce the human capital hypothesis, which posits that education enhances labor productivity and economic outcomes.

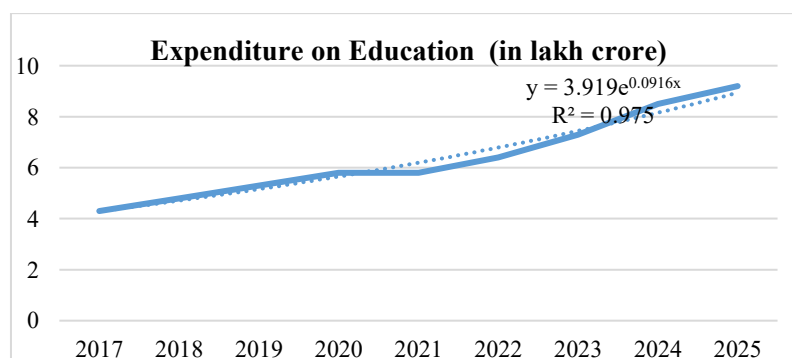
Table: 7 Recent Trends in Expenditure on Education

Financial Year	2017	2018	2019	2020	2021	2022	2023	2024	2025
Expenditure on Education (in lakh crore)	4.3	4.8	5.3	5.8	5.8	6.4	7.3	8.5	9.2

Sources: *Budget Documents of Union and State Governments and Economic Survey-2025*

The data indicates a clear upward trend in public expenditure on education, rising from ₹4.3 lakh crore in 2017 to ₹9.2 lakh crore in 2025, reflecting the growing priority accorded to the education sector. Expenditure remains constant at ₹5.8 lakh crore, reflecting fiscal constraints during the COVID-19 pandemic, while maintaining essential education services and online learning support. The following figure depicts the growth in expenditure on education.

Figure:3 Trend line Expenditure on Education in India



Source: *Computed data*

The R-square value of 0.9757 for expenditure on education indicates an excellent goodness of fit of the model. An R-square of 0.9757 means that 97.57% of the variation in expenditure on education is explained by the independent variable (s) used in the model. This shows a very strong and stable relationship, suggesting that education expenditure has followed a highly consistent upward trend over the period.

Table: 8 Improving School Infrastructure

Basic facilities/Year	2019-20	2021-22	2022-23	2023-24
Girls Toilet	96.9	97.5	97	97.2
Boys Toilet	95.9	96.2	95.6	95.7
Hand wash Facility	90.2	93.6	94.1	94.7
Library/Reading Room/Reading corner	84.1	87.3	88.3	89
Electricity	83.4	89.3	91.7	91.8
Medical check-ups in school in a year	82.3	54.6	74.3	75.2
Computer	38.5	47.5	47.7	57.2
Internet	22.3	33.9	49.7	53.9

Source: *UDISE+ 2023-24*

**percentage of schools with basic facilities out of total.*

Improvements in basic facilities and infrastructure, including medical check-ups, sanitation, and information and communication technologies (ICT) availability, have been notable, reflecting a positive trend in school infrastructure development.

Findings:

1. Mean Years of Schooling exhibits a near-perfect correlation with GDP. Gross Enrolment Ratio shows a positive correlation with GDP. Educational access contributes to economic growth primarily through cumulative schooling outcomes.
2. Higher Gross Enrolment Ratio increases skill formation and productivity. Educated individuals earn higher wages, increasing aggregate demand.
3. Higher education and GER supports the shift toward knowledge-intensive sectors. Education improves long-term income mobility and reduces poverty.
4. Correlation analysis indicate that flow variables such as GER influence stock variables like mean years of schooling, which in turn exert a stronger and more direct impact on GDP. This explains why mean years of schooling exhibits a higher correlation with economic output compared to enrolment ratios.

Policy Implications

1. Increasing public expenditure on education can raise GER and long-term GDP growth.
2. Focus on secondary and higher education GER yields higher economic returns.
3. Reducing dropouts improves labor productivity.
4. Aligning education policy with labor market demand enhances growth outcomes.
5. More focused should be given in basic school infrastructure.

Conclusion

The positive correlation between Gross Enrolment Ratio and GDP growth confirms that education functions as a critical economic investment rather than merely a social service.

Enhancing enrolment, particularly at secondary and higher education levels, is essential for sustaining economic growth, improving productivity, and achieving inclusive development. Therefore, education policy must be integrated with broader economic planning to maximize development outcomes. The correlation analysis confirms a strong and positive relationship between education and economic growth. While Gross Enrolment Ratio reflects access to education, mean years of schooling captures accumulated human capital, which shows a stronger association with GDP. This underscores the importance of not only expanding enrolment but also ensuring retention and completion of education. The rising education expenditure demonstrates a strategic shift toward quality enhancement, inclusiveness, and future-ready education, which is expected to positively influence enrolment, learning outcomes, and overall economic growth through improved human capital formation.

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TEACHERS' PERCEPTIONS TOWARDS THE USE OF GAMIFICATION IN TEACHING MATHEMATICAL CONCEPTS

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Abstract

Gamification is an innovative instructional approach that integrates game elements into the teaching-learning process to make learning more engaging, meaningful, and enjoyable. Mathematics is one of the most important subjects and plays a vital role in our everyday life. Therefore, understanding mathematics well is very important. Mathematics is often seen as a difficult and boring subject; therefore, play-based teaching methods are needed to increase students' motivation, interest, and understanding. The aim of this study is to investigate teachers' perceptions toward the use of gamification in teaching mathematical concepts. Descriptive survey method was used in this study, and data were collected from 60 mathematics and other subjects' teachers through a questionnaire via Google form. The study also explores teachers' level of awareness, attitudes, perceived benefits, and willingness to adopt gamification in mathematics classroom. Results revealed that teachers generally have positive perceptions toward gamification. The independent t-test showed no significant difference between male and female teachers, nor between government and private school teachers. Both male and female, and government and private teachers view gamification positively and believe that it increases students' motivation, participation, and understanding in mathematics.

Keywords: Gamification, Mathematics Education, Teachers' perceptions

INTRODUCTION

Mathematics is an important subject that helps students develop thinking, reasoning, and problem-solving skills. However, many students feel that mathematics is difficult, boring, or hard to understand. The way teachers teach the subject strongly affects how students learn and how interested they feel, especially when traditional teaching methods do not attract their attention. Gamification is a new teaching method that uses games in classroom by teachers to make learning more fun and engaging. It helps students stay motivated and participate more actively in class. And teachers play the most important role in helping students learn, their views and attitudes are very important. If teachers have a positive opinion about gamification, they are more likely to use it in their classrooms. Therefore, it is important to understand how teachers feel about using gamification in mathematics teaching so that schools can decide whether to introduce it.

Review of Related Literature

Pham (2025) explored mathematics teachers' perceptions of using games in Vietnamese secondary classrooms. The study found that while teachers generally hold positive views, gamification is mostly treated as a classroom-management tool rather than a learning strategy. Differences emerged between public and private school teachers regarding instructional purpose and depth of game integration.

Samaila, Aji, Usman, and Obunge (2024) examine teachers' perceptions of using gamification in secondary schools in Gombe, Nigeria. Their findings showed mixed views – positive, negative, and neutral- shaped by factors such as usefulness, ease of use, learning opportunities, and teachers' digital experience.

Prashetha and Devika (2023) examined prospective teachers' perceptions of gamification in learning, reporting generally moderate viewpoints. Their survey results showed mixed positive and negative attitudes, with academic discipline and qualification influencing perceptions, highlighting gamification's growing relevance and varied acceptance in teacher education.

Marell-Olsson, E. (2022) examined teachers' perceptions of using gamification as a teaching design in K-12 settings. Findings showed that gamification enhanced motivation, collaboration, and engaging but required strong pedagogical balance. Teachers reported challenges such as limited time, complex design processes, and insufficient knowledge, highlighting the need for support when integrating gamified approaches.

Wong Mee Mee et al. (2020) reported in their study that pre-service teachers viewed gamification as highly beneficial in language classrooms, enhancing learners' creative, critical, and problem-solving skills. Despite barriers like limited resources and technology, findings showed that game-based activities increased motivation, engagement, and reduced anxiety, supporting effective 21st-century learning.

Need and Significance of the Study

Teacher is a friend, philosopher, and guide who helps students discover their potential and navigate both academic and personal challenges. In today's context, many students face difficulties particularly in mathematics. They often struggle to understand the subject clearly. When teachers explain mathematical concepts in classroom, students often fail to grasp them, which results in a lack of interest, and they begin to find the subject boring. Due to the teaching methods used by teachers, students neither develop interest nor understand the concepts properly. Mathematics is a subject that cannot be learned or understood through rote memorization but requires deep conceptual understanding. If it is taught in an interesting way, students can understand it easily and remember it for a long time, which helps them solve abstract problems in the future.

Traditional methods make it difficult for students to understand Mathematics, and they do not feel motivated to learn it. As a result, they become demotivated and may discontinue their studies. To address these problems and help students learn mathematics effectively, it is very important to change the teaching methods. To transform mathematics from a boring subject into an interesting one, students need an engaging method, and most children are naturally interested in play. NEP 2020 also emphasizes that children should learn through playful and activity-based approaches. Keeping this in mind, integrating gamification into the teaching of mathematics in school is essential.

This study explores teachers' perceptions of gamification and their views on teaching mathematics through gamification.

OBJECTIVES OF THE STUDY

1. To study teachers' perceptions toward the use of gamification in teaching mathematical concepts.
2. To compare the perceptions of male and female teachers regarding gamification.
3. To compare the perceptions of government and private school teachers toward gamification.

4. To analyze teachers' awareness, attitudes, and willingness to implement gamification in the classroom.

HYPOTHESIS

H₀₁. There is no significant difference between male and female teachers in their perceptions toward the use of gamification in teaching mathematical concepts.

H₀₂. There is no significant difference between government and private school teachers in their perceptions toward the use of gamification in teaching mathematical concepts.

METHOD

Research Method

The descriptive survey method was used in this study.

Population

The population consisted of all teachers teaching at the primary and secondary levels.

Sample

In this study, 60 school teachers were selected as a sample.

Sampling Technique

Simple random technique and stratified random technique were used for data collection in this study.

Tool Used

A self-made questionnaire based on a five-point Likert scale (Strongly agree – Strongly disagree) was used to measure teachers' perceptions of gamification.

Statistical Technique

Mean, S.D., and T-test were used for data analysis in this study.

Description of the Tool

A questionnaire was designed after reviewing relevant published studies. After designing the questionnaire, five experts were individually asked to review it and provide feedback on the clarity and adequacy of each item, as well as the dimensions included in the questionnaire. Based on the experts' feedback, the questionnaire was improved by removing or revising some items and fixing any confusing or repetitive parts. The final questionnaire consisted of five dimensions: (i) Personal information (i.e. gender, teaching experience, school type, grades, subjects, state), (ii) Awareness about gamification, (iii) Attitudes towards games, (iv) Perceived benefits, (v) Willingness and future adoption.

Items were measured using a five-point Likert Scale, ranging from strongly agree to strongly disagree, (i.e., strongly agree = 5; agree = 4; neutral = 3; disagree = 2; strongly disagree = 1), and some items were presented in a Yes/No format.

Context and Participants

In this study, the participants were asked to fill out the questionnaire that was sent to them via Google Form. They were also provided with information regarding the purpose of the study. First, they were asked to complete the personal information section and then asked to carefully read each item and provide the required responses. They were informed that their responses would be kept confidential and used only for this research purpose. They were instructed to tick the option they felt was most appropriate. The targeted participants were teachers of mathematics and other

subjects at primary and secondary levels. A total of 60 teachers participated in this study: 27 were male teachers and 33 were female teachers. Among them, 30 were government school teachers and 30 were private school teachers. They worked in different state of India: 26 in Assam, 25 in Uttar Pradesh, 4 in Bihar, 2 in Delhi, 1 in Manipur, 1 in Arunachal Pradesh, and 1 in Himachal Pradesh. Their teaching experience varied and was categorized into four groups: (i) Less than 1 year, (ii) 1-5 years, (iii) 6-10 years, (iv) More than 10 years. All the teachers have different teaching experiences: 8 teachers had less than 1 year experience, 30 teachers had 1-5 years, 10 teachers had 6-10 years, 12 teachers had more than 10 years of experience. They taught at different school levels: 9 at the foundational stage, 15 at the preparatory stage, 23 at the middle stage, and 13 at the secondary stage. They teaches different subjects: 30 teaches Mathematics, 13 teaches Science, 8 teaches English, 5 teaches Social sciences, 3 teaches Assamese, 1 teach Hindi.

Data Analysis Techniques

Data were analyzed using descriptive and inferential statistics. In descriptive statistics, mean and standard deviation were used, and in inferential statistics, an independent t-test was used to analyze the data. Statistical results were interpreted at the 0.05 level of significance.

Data Analysis and Interpretation

A total of 60 samples were included in the study, and these were categorized by gender (i.e., male and female), and school type (i.e., government and private).

Presentation of Data

Table 1. Sample distribution according to gender and type of school

S. No	Groups	Category	No. of teachers	Total
1	Gender	Male	27	60
		Female	33	
2	Type of School	Government	30	60
		Private	30	

Hypothesis: 1

H₀₁. There is no significant difference between male and female teachers in their perceptions toward gamification in teaching mathematical concepts.

To test hypothesis 1, the mean and standard deviation of the two groups (i.e., male and female) were calculated, and to examine the significant difference between the two groups, the t-value was calculated. The result is shown in table 2.

Table 2. Showing t-value of male and female teachers

Group	N	Mean	S.D	t-value	LOS
Male	27	48.78	4.79	0.156	* NS
Female	33	48.58	5.23		0.05

**NS: Not Significant at 0.05 level*

Table 2 shows that mean score of male teachers is 48.78 and S.D. is 4.79, and the mean score of female teachers is 48.58 and S.D. is 5.23. There is only a slight variation in the mean scores. Therefore, the calculated t-value is 0.156, which is less than the table value at the 0.05 level of significance. Hence, there is no significant difference between male and female teachers in their perceptions toward gamification in teaching mathematical concepts. Both groups show similar perceptions toward gamification. Thus, hypothesis 1 is accepted.

Hypothesis: 2

H₀₂. There is no significant difference between government and private school teachers in their perceptions toward gamification.

To test hypothesis 2, the mean and S.D. scores were calculated for both groups, and a t-test was performed to determine whether there was a significant difference between them. The results are shown in the table 3.

Table 3. Showing t-value of government and private school teachers

Group	N	Mean	S.D	t-value	LOS
Govt.	30	49.43	4.39	-0.43	* NS
Private	30	49.97	5.20		0.05

**NS: Not Significant at 0.05 level*

Table 3 shows that the mean score of government school teachers is 49.43 and S.D. is 4.39, while the mean score of private school teachers is 49.97 and S.D. is 5.20, and the calculated t-value between the two groups is -0.43, which is less than the critical value at the 0.05 level. Therefore, there is no significant difference between government and private school teachers regarding their perceptions of gamification. Thus, hypothesis 2 is accepted.

Major Findings

The analysis and interpretation of the data gathered for the present study are resulted the following major findings:

1. The teachers generally have positive perceptions toward the use of gamification in mathematics. Both male and female teachers hold similar views, with no statistically significant difference between them. The mean score of male teacher is 48.78 and S.D. is 4.79, and the mean score of female teacher is 48.58 and S.D. is 5.23, and the t-value between the two groups is 0.156, which is not significant at the 0.05 level. Therefore, there is no significant difference between male and female teachers in their perceptions toward gamification in teaching mathematical concepts.
2. Government and private school teachers also have similar attitudes toward gamification. The mean score of government school teachers is 49.43 and S.D. is 4.39, and the mean score of private school teachers is 49.97 and S.D. is 5.20, and the calculated t-value between the two groups is -0.43, which is not significant at the 0.05 level. Therefore, hypothesis 2 is accepted. Teachers believe that gamification enhances student motivation, increases classroom participation, and makes mathematical concepts easier to understand.

Educational Implications

1. School should integrate gamified tools and digital resources in mathematics teaching.
2. Teachers should receive professional training on game-based learning.
3. Curriculum planners may include gamification activities in mathematics textbooks.
4. Gamification can be used as a supportive tool for slow learners and disengaged students.

Suggestions for Future Research

1. The study can be replicated with larger sample.
2. Future studies can find out how gamification actually helps students improve in mathematics.

3. Experimental studies can conduct to compare the effectiveness of gamified instructional approach with traditional teaching methods.
4. Further research may explore teacher level of digital readiness for implementing gamification tools in the classroom.

Conclusion

The study concludes that mathematics teachers view gamification as an effective and innovative instructional strategy. Their positive perceptions highlight the potential of gamified approaches to improve students' motivation, participation, and understanding in mathematics classrooms. Teachers believe that gamified activities make mathematical concepts more interactive and accessible, thereby improving students' conceptual understanding and overall learning experiences. Furthermore, the analysis revealed no significant differences in perceptions based on gender (i.e. male and female), or type of school (i.e. government and private), demonstrating that teachers across diverse demographic groups hold consistently favorable views towards gamification. Overall, the study reinforces the value of gamification as a promising pedagogical approach for enriching mathematics education.

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TEACHER READINESS FOR 21ST CENTURY SKILLS IN INDIAN K-12 SCHOOLS

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Abstract

The National Education Policy (NEP) 2020 calls for integrating 21st century skills—critical thinking, collaboration, communication, creativity, and digital literacy—into schools. While CBSE and State Board programmes have begun addressing this, little is known about how ready teachers actually are. This study examined 44 teachers across urban and rural CBSE and State Board schools to understand their awareness, confidence, and real classroom experiences with these skills. A mixed-methods approach combined questionnaires with qualitative responses. The key finding indicates that teachers understand the importance of 21st century skills but struggle with classroom implementation, particularly in assessment practices. Importantly, a strong association exists between teachers' awareness and their confidence in practice, suggesting that targeted professional development could make a meaningful difference.

Keywords: 21st century skills; teacher readiness; NEP 2020; professional development; K–12 education

INTRODUCTION

Contemporary educational discourse emphasises a fundamental shift: schools must do more than teach content. Students need to think critically, work collaboratively, demonstrate creativity, and navigate technology fluently. These 21st century skills are prioritised in global frameworks, OECD recommendations, and India's National Education Policy 2020 (Government of India, 2020). Yet translating policy intent into classroom reality remains challenging. Capacity-building programmes exist, and CBSE and State Boards regularly conduct workshops. However, fundamental questions persist: How aware are teachers of 21st century skills? How confident do they feel implementing them? What obstacles prevent effective implementation? And what support do they genuinely need? This study addresses these questions through empirical examination of teachers across diverse school contexts.

REVIEW OF RELATED LITERATURE

Research consistently demonstrates that teacher preparedness determines the success of educational reform. Darling-Hammond (2017) identifies teachers as central agents of change. However, recognising the importance of skills does not necessarily translate into effective classroom practice. Voogt and Roblin (2012) highlight persistent barriers to 21st century skills integration, including rigid curricula, assessment systems misaligned with skills, and limited instructional time.

The Indian K-12 context presents additional challenges that warrant localised research. Professional development literature indicates that training programmes often prioritise conceptual understanding while offering limited practical guidance (GRAAM, 2022). The OECD (2024)

further emphasises that sustainable reform requires continuous teacher support rather than isolated interventions. Despite these insights, empirical studies examining Indian teachers' readiness to implement 21st century skills remain limited, a gap this study seeks to address.

OBJECTIVES OF THE STUDY

The study was conducted with the following objectives:

1. To assess teachers' awareness of 21st century skills
2. To examine teachers' confidence in implementation of 21st century skills
3. To identify challenges faced by teachers in implementing these skills
4. To analyse the relationship between teaching experience and awareness of 21st century skills among the teachers
5. To examine the relationship between awareness and confidence of teachers in implementation of 21st century skills
6. To identify teachers' professional development needs in implementation of 21st century skills

RESEARCH METHODOLOGY

Research Design- A descriptive survey design using a mixed-methods approach was adopted. The study explored existing conditions rather than testing predetermined hypotheses.

Sample- The sample comprised 44 teachers from CBSE (31, 70.5%) and State Board (13, 29.5%) schools located in urban (15, 34.1%) and rural (29, 65.9%) areas, representing primary (10, 22.7%), middle (9, 20.5%), secondary (12, 27.3%), and senior secondary (13, 29.5%) levels and a wide range of teaching experience (<5 years: 8, 18.2%; 5-10 years: 10, 22.7%; 11-20 years: 14, 31.8%; >20 years: 12, 27.3%).

Tool for Data Collection-Data were collected using a structured questionnaire prepared and administered through Google Forms. The instrument included Likert-scale items, multiple-choice questions, and open-ended responses.

Data Analysis Techniques-Quantitative data were analysed using percentage analysis, chi-square tests, and Spearman's rank correlation. Qualitative responses were analysed thematically.

DATA ANALYSIS AND INTERPRETATION

Teacher Awareness of 21st Century Skills

Most teachers reported moderate to high awareness of 21st century skills and NEP 2020 expectations, with 79.5% (35 teachers) demonstrating high awareness, 15.9% (7 teachers) moderate awareness, and only 4.6% (2 teachers) low awareness, indicating broad dissemination of policy concepts. Teachers across different school contexts—both CBSE (81.4%) and State Board (73.1%)—demonstrated comparable familiarity, with urban schools showing 84.2% high awareness compared to 77.6% in rural schools.

Teaching Experience and Awareness Levels

A chi-square test showed no significant association between teaching experience and awareness levels ($\chi^2 = 0.00$, $p = 1.00$), indicating uniform awareness across experience groups. The breakdown reveals: <5 years' experience (87.5% high awareness), 5-10 years (80.0% high awareness), 11-20 years (78.6% high awareness), and >20 years (75.0% high awareness), with a maximum spread across experience groups of only 12.5 percentage points, suggesting that policy exposure and training have effectively democratised awareness across all career stages.

Teachers' Confidence in Classroom Implementation

Confidence in implementing 21st century skills was reported by 63.6% (28 teachers) at high levels, 27.3% (12 teachers) at moderate levels, and 9.1% (4 teachers) at low levels. When disaggregated by school type, CBSE teachers reported 71.0% high confidence compared to 53.8% in State Board schools. Urban schools showed notably higher confidence at 86.7%, significantly exceeding rural schools at 55.2%. This disparity suggests that contextual factors influence implementation confidence.

Awareness and Implementation Confidence

Spearman's rank correlation revealed a strong, statistically significant positive association between awareness and confidence ($\rho = 0.776$, $p < 0.001$), indicating that higher awareness is strongly associated with greater confidence in implementation. Teachers with high awareness reported 82.9% high confidence in implementation, compared to 28.6% among those with moderate awareness. Those with low awareness reported 0% high confidence.

Table 1: Summary of Inferential Statistical Analysis

S.No.	Analysis Conducted	Statistical Test	Value	P-value	Interpretation
1	Teaching experience $\times$ awareness	Chi-square	$\chi^2 = 0.00$	1.00	No significant association
2	Experience $\leftrightarrow$ awareness score	Spearman's ρ	0.00	1.00	No significant relationship
3	Awareness $\leftrightarrow$ confidence	Spearman's ρ	0.776	<0.001	Strong positive association

Challenges Faced in Implementing 21st Century Skills

Analysis revealed that 77.3% (34 teachers) experience difficulty in translating awareness into classroom practice, struggling with classroom application and assessment. Additionally, 63.6% (28 teachers) identified structural constraints including heavy syllabi, exam pressure, and rigid timetables as primary barriers. Despite these challenges, 86.4% (38 teachers) demonstrated positive attitudes and willingness to implement these skills with appropriate support.

Professional Development Needs

Assessment literacy emerged as the most pressing need, with 86.4% (38 teachers) identifying assessment as requiring support. Practical implementation strategies were sought by 72.7% (32 teachers), while 68.2% (30 teachers) expressed preference for continuous, school-based development rather than one-time workshops. Digital tool integration training was requested by 63.6% (28 teachers), and 56.8% (25 teachers) sought structured mentoring from experienced practitioners. Overall, 88.6% of teachers expressed desire for some form of additional professional development beyond initial training.

QUALITATIVE ANALYSIS: EMERGENT THEMES

Thematic analysis revealed four dominant themes reflecting teachers' experiences and perceptions.

Table 2: Qualitative Themes – Frequency Distribution and Characteristics

Theme	Frequency	Percentage	Key Characteristics
Conceptual awareness without practical translation	34	77.3%	Difficulty applying theory; assessment challenges
Structural and time constraints	28	63.6%	Heavy syllabus, exam pressure, rigid timetables
Need for practical professional development	32	72.7%	Demand for hands-on training and assessment tools
Positive attitude and willingness to learn	38	86.4%	Openness to innovation and change

Note: n = 44; themes are not mutually exclusive.

DISCUSSION

The findings indicate that teachers possess conceptual awareness aligned with NEP 2020, with 79.5% reporting high awareness. However, a clear gap exists between awareness and classroom practice, with only 63.6% expressing high confidence in implementation. The strong association between awareness and confidence ($\rho = 0.776$, $p < 0.001$) highlights the importance of strengthening teachers' understanding to enhance pedagogical readiness. Importantly, teaching experience does not predict awareness, with experience groups showing only a 12.5 percentage point spread in high awareness levels, suggesting that policy communication has reached teachers across career stages equally. The major barriers identified are systemic rather than individual, with 63.6% citing structural constraints and 77.3% experiencing awareness-implementation gaps, underscoring the need for institutional and leadership support. The finding that 86.4% of teachers demonstrate positive attitude and willingness to learn, combined with the strong awareness-confidence correlation ($\rho = 0.776$), suggests that responsive professional development can meaningfully enhance implementation.

IMPLICATIONS FOR POLICY AND PRACTICE

Professional development should be continuous rather than one-time, addressing the demonstrated need for ongoing support expressed by 68.2% of teachers preferring school-based, continuous learning models

Training must prioritise assessment literacy and classroom application, given that 86.4% of teachers identified assessment as their primary development need and 72.7% requested hands-on, practical strategies

School leadership should provide protected time for experimentation, particularly given that 63.6% of teachers report structural constraints limiting implementation and 77.3% struggle with applying knowledge to practice

Context-specific support is essential, particularly for rural schools (55.2% confidence vs 86.7% urban) and State Board schools (53.8% confidence vs 71.0% CBSE), acknowledging that different contexts face different implementation barriers

LIMITATIONS OF THE STUDY

The modest sample size ($n = 44$) and reliance on self-reported data limit generalisability. The absence of classroom observations and the cross-sectional design restrict causal interpretation.

CONCLUSION

The study concludes that Indian K-12 teachers demonstrate reasonable awareness of 21st century skills (79.5% high awareness), but effective classroom implementation remains uneven (63.6% high confidence). Teaching experience alone does not determine readiness; rather, awareness is strongly associated with confidence in implementation ($\rho = 0.776$, $p < 0.001$). The finding that 86.4% of teachers demonstrate willingness to learn, combined with identified professional development needs, suggests that responsive, structured support can meaningfully enhance implementation capacity. Addressing systemic barriers through sustained professional development prioritising assessment literacy, leadership support, and provision of protected implementation time is essential for realising NEP 2020's vision.

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A SYSTEMATIC REVIEW OF MATHEMATICS ANXIETY: ANTECEDENTS, CONSEQUENCES, AND MITIGATION STRATEGIES ACROSS EDUCATIONAL CONTEXTS

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Abstract

The aim of the systematic review of mathematics anxiety: antecedents, consequences, and mitigation strategies across educational contexts. This systematic review seeks to examine all aspects of mathematics anxiety (MA) of primary and secondary school students. In this regard, it has identified the causes and effects of mathematics anxiety, as well as the evidence-based strategies for reducing its influence. In order to maintain methodological rigor, this article has used the PRISMA guidelines when conducting the investigation. At first, 60 studies were identified for this investigation. All 60 studies have been screened systematically, with 30 studies fulfilling the predetermined criteria for inclusion. This article is based on three main objectives: (1) to identify and summarize the major antecedents & factors of mathematics anxiety in primary, secondary, and undergraduate education systems. (2) to determine the consequence of mathematics anxiety on academic, cognitive, emotional, and longer-term outcomes. and (3) to evaluate the effective mitigation strategies and interventions based on pedagogical, psychological, technological & alternative strategies for relieving students from their mathematics anxiety. The methodology for the systematic literature review consists of a comprehensive search of major academic databases like Scopus, Web of Science, Semantic Scholar, and ERIC, etc. This article is followed by a structured process to screen the identified studies based on the study's relevance to fit into this paper. The findings from this synthesis have revealed that some of the most significant antecedents of mathematics anxiety include negative prior experiences, teacher-centered methods, the perception of high-stakes assessment environments, and demographic characteristics such as gender and grade level. There is a well-documented negative association between mathematics anxiety and mathematical performance, demonstrating the adverse impact of mathematics anxiety on one's self-efficacy and problem-solving capabilities.

Keywords: *Mathematics Anxiety, Systematic Review, Primary and Secondary Students, Antecedents, Consequences, Mitigation Strategies, Educational Context.*

1. INTRODUCTION

Mathematics Anxiety (MA), defined as "the feeling of tension and anxiety that interrupts the ability to work with numbers and solve mathematical problems in everyday life and academically," is a worldwide hurdle to mathematics achievement (Richardson & Suinn, 1972). As a unique form of academic anxiety, MA impacts approximately 20 to 30% of students of all levels and genders across all educational platforms and cultural settings (Ashcraft & Moore, 2009), with negative effects on students' success, career decisions, and ultimately their long-term educational/professional life outcomes. With the increase in focus on STEM (Science, Technology, Engineering, Mathematics) education globally and the demands of knowledge-based economies, it is critical to address MA as both a necessity to enhance education and as an equity concern. MA has broad impacts beyond students' immediate academic performance, including effects on self-

concept, subject avoidance, and participation in STEM-related careers (Wang et al., 2014). Gender-based disparities in MA among students are a subject of significant concern, as female students report higher levels of anxiety, even with equal or greater mathematics performance than males (Devine et al., 2012). There has been a great deal of research done on MA, but research into this area is fragmented with respect to geographical context(s), educational level(s), and methodology chosen by the researcher(s). Most prior reviews on MA have focused on one specific aspect, such as the association between MA and performance or on some type of intervention; therefore, there is a need for a comprehensive synthesis of literature that integrates the antecedents, consequences, and mitigative strategies associated with MA. This systematic review fills that void by synthesizing recent empirical research across a variety of educational settings to provide a comprehensive overview of MA.

There are three major objectives of this review:

- i. Identifying and synthesizing the antecedents & factors of mathematics anxiety in primary, secondary, and undergraduate education systems.
- ii. Examining the consequence of mathematics anxiety on academic, cognitive, emotional, and longer-term outcomes.
- iii. Evaluating the effective mitigation strategies and interventions based on pedagogical, psychological, technological & alternative strategies for relieving students from their mathematics anxiety.

In doing so, it will utilize findings across various cultural backgrounds (Asia, Africa, Europe & South America) as well as across various levels of education to compile evidence-based views to aid educators, researchers, and policy makers in responding to this significant educational issue, mathematics anxiety.

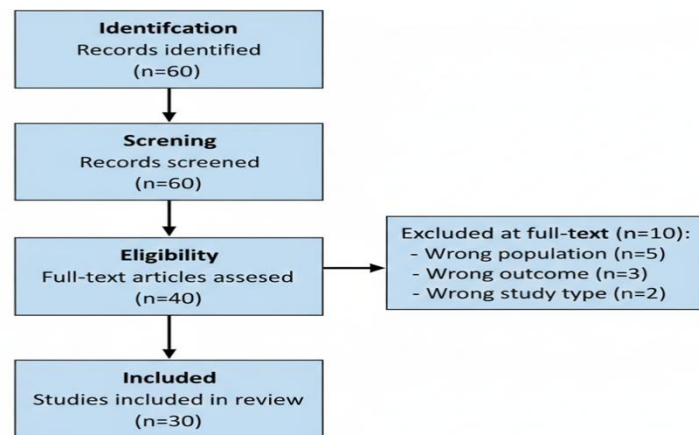
2. METHODOLOGY

2.1 Search Strategy and Selection Process

The PRISMA 2020 (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines were used when developing this systematic review (Page et al., 2021). An extensive search was conducted in four major academic databases—Scopus, Web of Science, ERIC (Educational Resource Information Center), and Semantic Scholar—for published literature. A search strategy was created with the following keywords: ("mathematics anxiety" OR "mathematics phobia") AND ("antecedent" OR "cause" OR "predictor") AND ("consequence" OR "effect" OR "impact" OR "outcome") AND ("intervention" OR "strategy" OR "mitigation" OR "reduction") AND ("primary school" OR "elementary school" OR "secondary school" OR "high school" OR "middle school" OR "undergraduate").

The studies included for review met five inclusion criteria: 1) empirical studies (quantitative, qualitative, and/or mixed methods) that addressed mathematics anxiety; 2) participants engaged in primary, secondary, and/or undergraduate education; 3) studies published in peer-reviewed journals between 2010 to 2025; 4) studies published in English with full-text available; 5) studies identified the methodology and findings of antecedents, consequences, or interventions associated with mathematics anxiety.

The studies excluded from the review had the following exclusion criteria: 1) theoretical or conceptual papers that did not use original empirical data. 2) Wrong population 3) wrong outcomes 4) Irrelevance study types, etc.

PRISMA Flow Diagram of Study Selection Process**Figure 1: PRISMA Flow Diagram**

2.2. Data Extraction and Analysis

A standardized form was used to systematically and consistently extract data from studies that were reviewed as part of the systematic review process. The data extracted from each study included (1) bibliographic data: Author(s) name(s), (2) Study Characteristics: Geographical location and the type of research design used; (3) Type/Method of Assessing Mathematics Anxiety with Measurement Tools; (4) Results of Studies Regarding Antecedents of Math Anxiety, Consequences of Math Anxiety, and Interventions to Help Alleviate Math Anxiety; (5) Theoretical and Practical Implications for Educational Stakeholders to tackle mathematics among students and children. The strengths and limitations of the methodology of individual studies. Individual reviewers extracted data independently for all the studies included in this review, and all discrepancies in data extraction between individual reviewers were resolved by reaching a consensus with the aid of a third reviewer.

3. COMPREHENSIVE ANALYSIS OF MATHEMATICS ANXIETY STUDIES

Table 1: Mathematics Anxiety Studies Sorted in Descending Order by Year

Study ID	Authors (Year)	Country	Methodology	Key Findings on Mathematics Anxiety
1.	Egara & Mosimege (2025)	Nigeria	Randomized control trial	REBT reduces MA with sustained improvements; recommends teacher-psychologist collaboration
2.	Nagarathnamma et al. (2024)	India	Quantitative survey	Gender differences, prior math experiences, teaching methods influence MA; recommends modifying teaching approaches
3.	Van & Maat (2024)	Malaysia	Quantitative correlational	Dependent learning style dominant; learning styles significantly correlate with MA; educators should tailor approaches

4.	Akujieze (2024)	Nigeria	Quasi-experimental	Peer teaching favored for reducing MA; inquiry-based learning effective; gender-specific variations noted
5.	Zhu et al. (2024)	China	Quantitative analysis	Parental expectations primary influence; negative correlation between MA and problem-solving; affects working memory
6.	Jannah et al. (2024)	Indonesia	Quantitative survey	Elementary students experience high MA (avg. 62.58%); very high anxiety observed
7.	Mosimege et al. (2024)	Nigeria	Experimental	REBT significantly reduces MA and irrational beliefs; effects maintained at follow-up
8.	Zanabazar et al. (2023)	Mongolia	Quantitative correlational	Significant negative correlation between MA and performance ($r=-0.479$)
9.	Ongcoy et al. (2023)	Philippines	Correlational study	Teacher interactions and content experience negatively correlate with MA
10.	Ryan et al. (2023)	Ireland	Quantitative survey	Mature students experience high MA, especially during evaluations.
11.	S. et al. (2022)	India	Comparative design	Private school students show higher MA than government school students.
12.	Omar et al. (2022)	Malaysia	Mixed-methods	Strong inverse relationship between anxiety and performance; games and cooperative learning are effective.
13.	Amiruddin et al. (2022)	Malaysia	Quantitative study	Negative relationship between self-efficacy and MA in ODL context
14.	Luu-Thi et al. (2021)	Vietnam	Cross-sectional	Grade 12, high achievers, and career-focused students report higher MA
15.	Wangid et al. (2020)	Indonesia	Quasi-experimental	AR-assisted storybook significantly reduces MA ($p<0.05$)

16.	Acevedo & Calderón (2020)	Colombia	Correlational study	Girls have higher GPA but also higher MA; inverse relation with performance
17.	Das (2020)	India	Action research	Curriculum errors, teaching methods contribute to mathematics phobia
18.	Lee & Koo (2020)	South Korea	Methodological	Developed a 36-item MA test for middle school students
19.	Donolato et al. (2020)	Italy	Quantitative analysis	MA uniquely harms performance; ego-resiliency has positive effect
20.	Lee & Koo (2020)	South Korea	Methodological	Validated MA test with 36 items across 6 sub-factors
21.	Olanrewaju (2019)	Nigeria	Quasi-experimental	Collaborative learning improves achievement; high MA lowers performance
22.	Garba et al. (2019)	Nigeria	Qualitative (photovoice)	Peers have dual role; negative behaviors intensify MA
23.	Ifdil et al. (2019)	Indonesia	Single-subject	Chromotherapy reduces MA and induces relaxation
24.	Onwuka & Kolo (2019)	Nigeria	Experimental	CBT significantly reduces MA; no gender differences
25.	Estonanto & Dio (2019)	Philippines	Mixed-methods	Abstract concepts and teaching style contribute to calculus anxiety
26.	Madjar et al. (2018)	Israel	Longitudinal	Female gender, school transition, and high achievement predict MA increase
27.	Kaba & Şengül (2018)	Turkey	Correlational survey	Positive correlation between MA and mathematical understanding
28.	Nizham et al. (2017)	Indonesia	Quasi-experimental	Treffinger model improves self-efficacy and reduces anxiety
29.	Nwoke & Ugwuegbulam (2016)	Nigeria	Descriptive survey	Teaching methods, relationships, and abusive language contribute to MA
30.	Karasel et al. (2010)	North Cyprus	Correlational study	Positive correlation between MA and problem-solving skills in primary students

Table 1 depicts that there has been a constant interest across the globe in MA (i.e., mathematics anxiety) during the last sixteen years and that recently there has been an increase in research into this subject. More and more researchers have been conducting studies on MA since the early to mid-2000s, with such studies being conducted throughout the world, including in Nigeria, India, Iran, and Colombia. The methodology used by researchers throughout the world to conduct MA studies includes quantitative surveys, the use of questionnaires that measure the relationship between variables, and also experimental/intervention studies to evaluate how certain teaching methods, social factors, and other issues negatively influence MA. Thus far, the most significant finding from this body of research has been that MA negatively impacts students' academic performance and the factors that influence MA, such as teacher-student interactions and parents' expectations. In addition, there has also been a recent emphasis on using evidence-based intervention strategies to reduce MA, as evidenced by the growing body of literature evaluating REBT, CBT, peer tutoring, augmented reality, and cooperative learning. The results of all these studies collectively demonstrate that MA is a complex problem requiring individualized, psychological-based, and instructional-based solutions to alleviate the detrimental effects of MA on student achievement and performance.

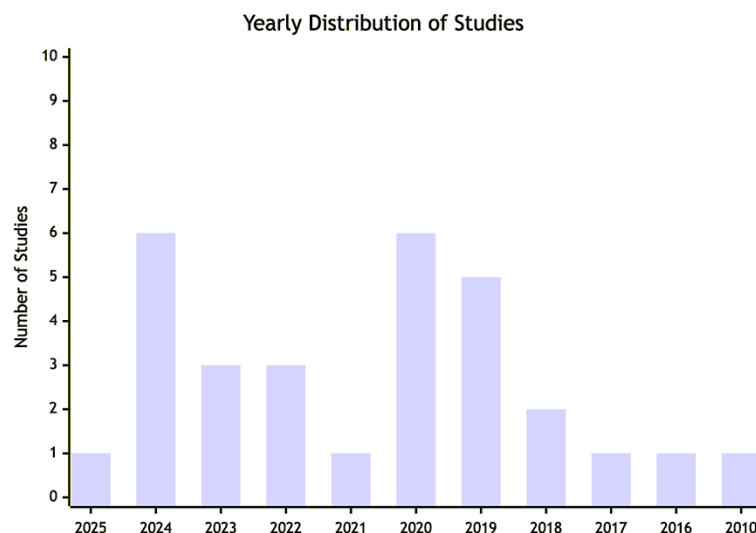


Figure 2: Chronological Distribution of Mathematics Anxiety Studies (Descending Order).

Figure 1 depicts the structural framework for the bar graph containing the title "Chronological Distribution of Mathematics Anxiety Studies (Descending Order)" is defined with a graphical illustration of the number of articles or publications of research in mathematics anxiety studies and how often they were published from 2010 to 2025. An axis has been labelled on the vertical side (y-axis) with the heading of "Number of Studies," showing the number of quantitative counts of studies taking place during those years. The horizontal axis lists the years displayed in reverse chronological order (latest year first).

4. ANTECEDENTS OF MATHEMATICS ANXIETY

The synthesis of thirty research studies has identified four main types of factors that contribute to mathematics anxiety: pedagogical factors, psychological factors, socio-demographic factors, and environmental factors.

4.1. Pedagogical factors

Pedagogical factors showed the most support across the studies as the main contributors to mathematics anxiety. Teaching methods that rely heavily on the instructor as the focus for delivering the material resulted in higher levels of anxiety. For example, Nwoke and Ugwuegbulam (2016) found that the way teachers taught their classes and the way teachers treated their students created a large amount of phobia toward mathematics in secondary school students from Nigeria. Teaching methods as a contributor to math anxiety in the state of West Bengal, India (Das, 2020), include the failure of students to become engaged with the traditional lecture-style instruction used by many teachers. They found that the methods used to assess students' performance in mathematics contribute greatly to the development of student anxiety; hence, most mature college students in Ireland experience the most anxiety when evaluating themselves based on the outcome of a mathematics test (Ryan et al., 2023). Similarly, Zhu et al. (2024) found that the high-pressure nature of testing environments associated with high-stakes assessment created considerable pressure to perform and was a significant contributor to student anxiety in today's knowledge-based economy in China.

S. et al. (2022) found there were differences in the MA reported by Kerala, India, private school and government school students, with private school students reporting higher MA scores ($M=45.87$, $SD=17$) than government school students ($M=33.83$, $SD=9.80$), and this difference was statistically significant ($t(58)=3.27$, $p<0.01$). This indicates that there are differences in institutional context between the two types of schools and that these differences may create pressures on students in the form of higher academic expectations and a more competitive atmosphere, which may ultimately create anxiety.

4.2. Psychological Factors

The psychological elements cover the cognitive and the affective aspect that create the predisposition of students toward math anxiety (MA). Among the various psychological factors, the most widely studied and significant was self-efficacy. Amiruddin et al. (2022) reported that there was a moderate negative linear relationship found between Math Self-Efficacy and math anxiety (MA) for Malaysian students pursuing open and Distance Learning (ODL). This finding is consistent with Bandura's (1997) research on self-efficacy, whereby students' beliefs regarding their capabilities are substantially correlated to both their affective responses and performance levels.

Various Learning Styles have been shown to have significant relationships with MA. Independent, Avoidant, Dependent and Participative Learning styles were all found to be significantly correlated with Math Anxiety among Malaysian Secondary School Students (Van & Maat, 2024). The Dependent Learning Style (students relying on their teacher(s) for support) was shown to be the most common learning style and therefore it may be advisable for Teachers or Educators to modify or adapt their teaching styles to reduce anxiety levels in their students when they cannot use their Dependence on Teachers or Educators.

Another substantial psychological antecedent identified is students' previous experiences with mathematics. Nagarathnamma et al. (2024) identified a correlation between students' previous negative experiences with mathematics (MA) and their current math anxiety (MA) levels. Students appear to form a pattern where students' negative experiences lead students to avoid mathematics, leading to a pattern of increased anxiety.

4.3. Socio-demographic Factors

Numerous research studies and cultures have documented differing levels of Mathematics Anxiety (MA) between males and females. For example, through a two-year longitudinal study of Israeli middle school students (Madjar et al., 2018), results show that being female independently predicted MA increase at the end of Grade 6. Also, while female students in Colombia had higher GPAs than their male counterparts (Acevedo & Calderón, 2020), they also had higher MA than their male counterparts. This "gender-performance paradox" indicates that there are a number of complex social and psychological dynamics that will require further research in the future.

Additional to gender, another predictor of MA was Grade Level. Grade 12 students in Vietnam had higher MA levels than students of lower grades (Luu-Thi et al., 2021). This aligns with developmental theories regarding the academic pressures and future thinking associated with later stages of education.

The relationship between Academic Achievement and MA is more complicated than originally thought. For example, many would expect lower-achieving students to experience higher levels of MA than higher-achieving students. However, several studies have indicated that even students who are higher academic achievers report higher levels of MA. In the study conducted by Madjar et al. (2018), they found that being a higher academic achiever was an independent predictor of greater increases in MA. Similarly, Luu-Thi et al. (2021) found that students who had the highest scores in Mathematics (9.0-10.0) had more MA than lower achieving students. Therefore, it appears performance pressure and perfectionism may contribute to MA.

4.4. Environmental factors

Environmental factors that influence mathematics anxiety include social and cultural factors beyond the classroom. Parental expectations were found to be one of the most significant factors contributing to mathematics anxiety for students in collectivist cultures. Zhu and others (2024) found that external factors such as parental expectations are one of the biggest contributors to the mathematics anxiety levels in the current Chinese knowledge-based economy, where educational success has high familial and societal significance.

Peer influence is another environmental factor influencing mathematics anxiety, as shown through Garba et al.'s (2019) photovoice study conducted in Nigeria. The study demonstrated that peers have a dual direct influence on level of anxiety. Negative peer behaviours (e.g., disruptive peers during a lesson, high-achieving peers dominating lesson time) and negative peer speech (e.g., threatening/discouraging comments) induced higher levels of mathematics anxiety. In contrast, positive peer behaviours (e.g., observing peers succeed, engaging in group discussion) and positive-peer speech (e.g., positive suggestions about one's ability to be successful in mathematics) led to lower levels of anxiety.

Career aspirations are also an environmental factor influencing mathematics anxiety. Luu-Thi et al.'s (2021) study of high school students in Vietnam revealed that high school students intending to pursue finance, economics, or industrial engineering felt significantly higher levels of mathematics anxiety, which may reflect students' awareness of the need to have a strong ability to use mathematics to succeed in these professions.

5. CONSEQUENCES OF MATHEMATICS ANXIETY

Mathematics anxiety can have an impact in many different areas, including academic performance, cognitive functioning, emotional health/well-being, and long-term educational trajectories.

5.1. Academic Performance Consequences

The single largest amount of data collected about the effects of MA has been regarding academic performance (specifically in math). The study conducted with Mongolian undergraduate students by Zanabazar and colleagues, which used Pearson's Product-Moment Correlation Coefficient to assess the degree of linear correlation between mathematics anxiety and mathematical performance, found a statistically significant negative linear correlation ($r = -0.479$, $p < .05$). This negative correlation suggests that as anxiety levels increase, the academic performance of the student decreases. As low-performing students represent a relatively high proportion of the students enrolled at universities, the impact of this relationship appears to be strongest for these students. Some researchers, including Omar and colleagues, have noted that this relationship is even stronger among low-performing mathematics students, as demonstrated by their finding of a highly statistically significant inverse relationship between anxiety and performance for this subgroup.

The strength of the correlation between MA and performance varies across students according to several factors. Namkung and her co-authors performed a meta-analysis on 131 studies assessing the relationship between mathematics anxiety and mathematics performance and found that there was a stronger negative correlation between the two for (1) mathematical tasks requiring multiple steps compared to more basic mathematics and (2) performance measures that influenced student grades (e.g., final exam scores, GPA) compared to research measures that were not graded.

5.2. Cognitive Consequences

Cognitive processes associated with mathematical thought processes and mathematical problem solving are adversely impacted by MA. The research done by Zhu Et al. (2024) revealed that anxiety severely affects working memory and the ability to use metacognitive strategies effectively, both of which are necessary for the successful completion of math problems. This finding is consistent with the cognitive interference theory proposed by Eysenck and Calvo (1992) that claims anxiety uses up cognitive resources needed to complete math tasks.

Donolato et al. (2020) also added clarity to the research in that they proved that MA is a significant factor in the performance of mathematics independent of the effects of test anxiety and general anxiety. The study was conducted using Italian primary and middle school children, and they employed structural equation modeling to predict math performance as an independent predictor while controlling for intelligence, test anxiety, and general anxiety.

5.3. Emotional consequences

The concept of mathematics anxiety (MA) has far-reaching effects and goes beyond short-run manifestations of anxiousness while completing mathematics-related assignments and covers a broader context of how they see themselves as academic performers in general, as well as their emotional well-being. The study done by Jannah et al. (2024) with elementary school students in Banda Aceh, Indonesia, discovered that their average level of MA at 62.58% was comparatively high for students in general. Further, they had also identified the range of MA from a high of 92.18% to a low of 53.12%. However, while 53.12% is considered to fall within a range of what would be classified as high MA1, it would also demonstrate a pattern of emotional distress found within that entire population of students.

Developing a decreased level of self-efficacy within mathematics is the most significant emotional consequence associated with MA. It develops into a vicious cycle where an increase in MA results in a reduced ability to perform in the same number of mathematical tasks in addition to

decreasing self-efficacy, which decreases. Amiruddin et al. (2022) conducted an analysis examining the relationship between self-efficacy in mathematics and anxiety within the context of ODL; it demonstrated a statistically significant negative correlation, which confirmed what has been suggested in other studies, which indicate that greater levels of self-efficacy correspond to reduced levels of MA.

5.4. Long-term consequences

The potential long-term consequences of mathematics anxiety (MA) are perhaps the most disturbing because they go beyond the immediate academic context of students' education, and as such, will affect both students' future education and career paths.

According to Luu-Thi et al. (2021), during their research among Vietnamese high school students who are interested in (or plan to pursue) a career in finance, economics, or industrial engineering, it was found that those students experienced higher levels of MA than students interested in other careers. This elevated MA level may prevent many of the students from pursuing a career in these quantitative-oriented fields in the future, even though these students have aspirations to do so. Furthermore, these findings are consistent with broader concerns regarding the participation of women and other groups in STEM fields, particularly due to the higher levels of MA experienced by these groups. Zhu et al. (2024) also point out that if students who experience MA continue to pursue careers in STEM fields, it will have significant economic repercussions due to the necessary level of math proficiency required for participation and advancement within China's knowledge economy.

5.5. Positive Correlations

Despite many research studies showing that mathematics anxiety (MA) negatively impacts students' performance and understanding, two studies have provided evidence that shows positive correlations between MA levels and how well students perform or understand mathematics. One study conducted by Karasel et al. (2010) indicated that a statistically significant (albeit low to moderate) positive correlation exists for students' ability to solve math problems in relation to level of MA experienced ($r = 0.28$, $p = .01$), while another study conducted by Kaba and Şengül (2018) reported a strong positive and significant correlation between MA and the level of understanding math experienced by a group of Turkish middle school students.

The two research findings, although quite different from each other, may reflect methodological issues (use of self-report to measure two different constructs), age differences (younger students may not yet fully develop the negative association between MA and performance), or the idea that students who have higher levels of engagement (e.g., greater understanding) will also experience greater levels of anxiety related to their performance. These findings indicate that MA has complexity and multiple dimensions, and thus its associations with other variables may differ depending upon developmental time, the method used to measure MA, or cultural context.

6. MITIGATION STRATEGIES AND INTERVENTIONS

The studies evaluated in this research examined four types of interventions: pedagogical strategies, psychological interventions, technological tools, and alternatives to education.

6.1. Pedagogical interventions

The focus of pedagogical interventions is altering teaching methods/strategies, learning activities, and classroom environment to alleviate math anxiety. Among the pedagogical approaches studied, the collaborative learning strategy was shown to have the largest impact on reducing math anxiety. For example, Olanrewaju (2019) conducted a study that found evidence of

difference in math achievement between students who participated in a collaborative learning environment and students who did not ($t = 58.75, p < 0.05$) in Nigeria. The collaborative learning method likely reduces anxiety by sharing cognitive load between group members, providing social support, and creating opportunities for peer modelling.

- **Peer Teaching:** Peer teaching was shown to be an effective form of intervention to reduce math anxiety. Akujieze (2024) found that peer teaching was more effective for reducing math anxiety than the inquiry-based learning method among Nigerian secondary students, although the outcomes were more variable among the sample. The variability in results suggests that peer teaching needs to be carefully instituted with possible tailoring for each group of students.
- **Learning Model Development:** In Indonesia, the Treffinger learning model was shown to improve self-efficacy and decrease math anxiety when compared to conventional teaching methods (Nizham et al., 2017). Although there was no statistically significant increase in mathematical literacy for the experimental group versus the control group, a reduction in math anxiety and increased self-efficacy represent positive affective benefits that may promote longer-term involvement in mathematics.

6.2. Psychological interventions

Psychological interventions directly focus on how MA affects our mind and our feelings; however, Cognitive Behavioral Therapy (CBT) has been shown to be very helpful in the treatment of MA, particularly among Nigerian secondary school students, according to a study by Onwuka and Kolo (2019) that compared CBT's ability to reduce MA's impact on student performance to that of CBT across gender lines. As a result, it appears that CBT may be beneficial for both genders.

Rational Emotive Behavior Therapy (REBT), like CBT, has also been shown to have significant positive impacts on Nigerian secondary students' MA and on their irrational beliefs about mathematics; results from Mosimege et al. (2024) and Egara and Mosimege (2025) showed that among the same population as the previously mentioned studies, there was a similar effect of REBT on MA reduction, as REBT had positive impacts on the students' MA to the same extent as CBT's effects. The intervention group's format has implications for efficacy in school settings.

As previously mentioned, the idea of developing ego-resiliency is a promising avenue for preventative efforts towards MA. According to Donolato et al. (2020), developing ego-resiliency can have a positive effect on math skills. Additionally, the association of ego-resiliency and general anxiety indicates that developing emotional coping skills may offer students some protection from developing MA.

6.3. Technology-based interventions

Technology-Based Intervention (TBI) is a term that refers to any use of technology to help improve learning. TBI uses the internet, computer software, video games, and other forms of technology to create learning environments that are enjoyable and stress-free when studying mathematics. Augmented Reality (AR) has been shown to be particularly effective at reducing mathematics anxiety (MA) for students who participate in studies using AR technology. The study conducted by Wangid et al. (2020) found that using an AR-assisted storybook significantly reduced MA for Indonesian elementary school students ($p < 0.05$). The immersive, game-like characteristics inherent in AR technology likely provide an engaging experience and reduce anxiety by creating a less pressure-filled learning environment than traditional methods.

Game-based learning has been effective in reducing MA for many learners as well, particularly if the educational materials contain a balance of educational content and entertaining gameplay. However, Ersozlu (2024) highlighted the importance of careful implementation and potential drawbacks associated with TBI as a standalone solution in his systematic review of online distance education in 2022. Further, he noted that younger students may experience elevated levels of anxiety due to the utilization of online distance education methods; thus, this is a key consideration for educators and administrators when deciding to utilize this type of technology for educational purposes.

6.4. Alternative approach

One type of strategy that can be utilized to reduce Mathematics Anxiety (MA) is an alternative approach which involves utilizing the non-traditional method of chromotherapy (color therapy). Ifdil et al. (2019) researched this intervention on a sample of elementary students in Indonesia and found chromotherapy to be effective in creating techniques for stress management (relaxation) as well as decreasing mathematics anxiety among elementary school students. While the exact mechanism through which chromotherapy impacts students has not been fully elucidated, its inexpensive and noninvasive characteristics make chromotherapy a viable supplemental intervention to decrease mathematics anxiety.

Training teachers through professional development was one approach repeatedly suggested based on the identified antecedents to mathematics anxiety. Based on their findings, Nwoke and Ugwuegbulam (2016) specifically indicated that mathematics teachers need to undergo retraining every so often to enhance their use of innovative, student-centered approaches to teaching mathematics to prevent or decrease their students' mathematics anxiety.

7. DISCUSSION

7.1. Theoretical Implications

There are numerous significant theoretical implications for the results obtained from this comprehensive systematic review. A significant theoretical implication of this comprehensive systematic review is that the established evidence for multiple antecedent categories gives credence to the conceptualization of MA as a multidimensional construct containing pedagogical, psychological, environmental, and sociological influences and is consistent with bioecological models as defined by Bronfenbrenner & Morris (2006) that emphasize person-context interactions in the process of development.

The complex relationship that exists between MA and its effects on academic achievement, including the presence of moderating factors such as task type, assessment stakes, and student characteristics, indicates that simplistic linear models of the relationship are no longer adequate. The presence of positive correlations found in some studies (Karasel et al., 2010; Kaba & Şengul, 2018) contradicts the simplistic view that "anxiety always impairs performance" and highlights the need for further development of more sophisticated theoretical models related to MA.

Finally, the effectiveness of both pedagogical and psychological approaches to intervention provides a basis for the development of an integrative theoretical approach to both the learning environment and the cognitive-affective processes of the individual. Comprehensive theoretical models of MA need to integrate both instructional design principles and psychological mechanisms.

7.2. Practical Implications for Educational Stakeholders

7.2.1. For Teachers

- **Introduction of more variety in teaching practices** - Provide options for learners to 'work together' (collaborative learning), allow learners to teach one another, and use student-centered (rather than teacher-centered) approaches that are in addition to direct instruction from the teacher.
- **Build a positive environment in the classroom** - Create a classroom environment that provides a teacher-student relationship that is supportive and focuses on reducing negative peer interactions as well as a psychologically safe environment for learners.
- **Explicitly address anxiety**—Incorporate anxiety-reduction techniques into regular mathematics teaching. MA should not be viewed as a separate area of math content learning.
- **Differentiated support for learners**—Different learners experience MA due to different antecedents, and therefore, different students will likely respond to different interventions that address their MA.

7.2.2. For Administrators

- **Professional development for teachers of mathematics**—Provide ongoing training for teachers of mathematics on MA-aware pedagogies and early recognition of at-risk students.
- **Evaluation of assessment methods**—Use an alternative approach to high-stakes testing, and instead of using high-stakes assessments for evaluation, teachers should utilize low-anxiety formative assessments.
- **Support interdisciplinary collaboration**—To create partnerships between teachers of mathematics and school psychologists/counsellors to develop comprehensive intervention strategies for MA.
- **Strategic allocation of resources**—to provide mathematics teachers with research-based technology tools and intervention programs that have been verified as effective.

7.2.3. For Policymakers

Develop MA-Aware Education Guidelines: develop guidelines/frameworks that enable education systems to respond to MA in a systematic manner.

Support Research and Innovation: Fund research to examine what MA means in terms of being underrepresented in particular contexts and the development of culturally appropriate interventions.

Address Systemic Factors: Address how educational policies concerning curriculum, assessment, and accountability may be inadvertently contributing to the incidence of MA.

Promote Equity-Focused Approaches: Develop systems of accountability, assessment, and curriculum design that consider how they may be contributing to MA at the same time as designing systems of intervention and responsiveness to MA.

8. LIMITATIONS AND FUTURE RESEARCH DIRECTIONS

When considering this review of findings and making recommendations for further research, it is important to note several limitations:

- **Geographical Concentration:** The large number of studies conducted in Asian (specifically Indian and Nigerian) contexts may limit the generalizability of findings for other geographic locations. There is a need for additional studies conducted in culturally diverse contexts.
- **Methodological Heterogeneity:** Differences between the methodologies used in each study, including the types of participant samples and measurement instruments, prevent direct comparisons between studies and limit the ability to synthesize findings across studies. Standardized measures and methodologies should be employed in future studies to ensure that data can be accumulated using meta-analyses.
- **Longitudinal Designs:** The majority of the studies included in this review used either cross-sectional designs or short-term interventions. Longitudinal studies following the development of MA across different educational transitions and assessing the impact of long-term interventions will be beneficial in future research.
- **Integrative Interventions:** Few studies included comprehensive intervention models that combined pedagogical, psychological, and environmental approaches. Future research should develop and implement integrated intervention models for assessing the effects of multiple approaches.
- **Protective Factors:** The majority of the research that has been published on MA has examined risk factors associated with MA. Future studies should focus on factors associated with resilience and those that enable students with MA to be successful.

9. CONCLUSION

Math anxiety is influenced by various factors, and a review of current research demonstrates the complex interaction of these factors on the teaching of math. Math anxiety is often affected by different approaches to teaching math, the student's psychological state, demographics, and their environment since it affects how the student learns. Consistent findings indicate that math anxiety has a negative impact on students' academic ability, cognitive abilities, emotional well-being, and future potential and should therefore be treated as an educational priority.

Many types of programs exist that are helpful in reducing math anxiety. Collaborative learning, cognitive behavioral therapy/rational emotive behavioral therapy, and virtual/augmented reality have all demonstrated positive results in helping individuals to cope with math anxiety. However, regardless of which option is chosen, the degree of effectiveness will vary due to the different ways in which the techniques are implemented, the characteristics of the student, and the student's learning environment. Therefore, any program that provides help to individuals dealing with math anxiety must be designed to be individualized and not a standardized, one-size-fits-all program. Solutions to reducing math anxiety will require cooperation across the entire educational community. First, mathematics teachers must understand and accommodate math anxiety in their teaching practices. Second, schools must establish a supportive environment for their students that suffer from math anxiety.

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A STUDY ON THE JNV MIGRATION POLICY AND ITS INFLUENCE ON STUDENTS' THREE-LANGUAGE LEARNING EXPERIENCE AND SUGGEST MIGRATION FRAMEWORK FOR NON JNV SCHOOL

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Abstract

Taking into account the Three-Language Formula suggested by the Kothari Commission and incorporated in the National Education Policy (NEP) 1968, Jawahar Navodaya Vidyalayas (JNV) were established in 1986. The objective of the study is to identify the factors responsible for the success of the Three-Language system in Jawahar Navodaya Vidyalayas (JNV) and to examine the effectiveness of the Three-Language Formula among JNV students. In this research, the descriptive survey method was used, and the study was conducted on randomly selected JNV pass-out students. The major findings revealed that the migration policy of Jawahar Navodaya Vidyalayas plays an important role in language learning. A positive relationship was found between inter-state migration and language learning. The inclusion of third-language-related programmes in school activities was also identified as an important reason for the success of the Three-Language system.

Keywords: *Three-Language Formula, Jawahar Navodaya Vidyalayas (JNV), Migration Policy*

India's education policy has long emphasized multilingualism. The Three Language formula introduced by Kothari Commission suggested that Hindi-speaking states learn modern Indian languages and other state languages, while non-Hindi states learn Hindi, English, and their regional language. NEP 1968 officially adopted the three-language formula but faced significant resistance in Tamil Nadu due to this policy imposing Hindi in a non-Hindi state. NEP 1986 reframed TLF (three language formula - first language – mother tongue/regional language).

Second language- Hindi (non-Hindi state), English in Hindi state

Third language – English and other modern Indian languages /foreign language, this policy does not impose Hindi in Hindi state.

NEP 2020 Policy recommended that a three-language formula will continue to be implemented while keeping in mind the Constitutional provisions, aspirations of the people, regions, and the Union, and the need to promote multilingualism as well as promote national unity. However, there will be greater flexibility in the three-language formula, and no language will be imposed on any State. The three languages learned by children will be the choices of States, regions, and, of course, the students themselves, so long as at least two of the three languages are native to India. Students who wish to change one or more of the three languages they are studying may do so in Grade 6 or 7, if they can demonstrate basic proficiency in three languages (including one language of India at the literature level) by the end of secondary school. Jawahar Navodaya Vidyalaya Three language formula has been successfully implemented since 1986.

Jawahar Navodaya Vidyalaya and the three policies

Jawahar Navodaya Vidyalayas (JNVs) are a system of **central government, fully residential schools** established by the **Ministry of Education, Government of India** IN 1986, and administered by **Navodaya Vidyalaya Samiti (NVS)**. The NVS operates through eight

regional offices—located in Bhopal, Chandigarh, Hyderabad, Jaipur, Lucknow, Patna, Pune, and Shillong—to oversee more than 650 functional JNVs across the country, with the notable exception of Tamil Nadu. (jnv annual report,2024) They aim to provide **free, quality education to talented students predominantly from rural areas**, from **Class VI to XII**. Jawahar Navodaya Vidyalayas have adopted the Three-Language Formula since their establishment.

The NVS system implements the TLF as follows:

- **Medium of Instruction:** The medium of instruction is generally the **mother tongue or regional language** up to Class VIII, and thereafter **Hindi and English**.
- **The Three Languages:** The specific three languages taught vary by region:
 - In **non-Hindi-speaking states**, the formula involves the regional language, Hindi, and English.
 - In **Hindi-speaking states**, the third language is a language from a non-Hindi-speaking region, which is introduced through the migration scheme.
- **Migration Scheme:** A unique aspect of the JNV system is the mandatory **migration of 30% of Class IX students** for one academic year to a JNV in a different linguistic region. This program is designed to foster a better understanding of India's diverse culture and facilitate the learning of the third language in an immersive environment. (JNV SAMITI)

Objective

To examine the JNV migration policy's impact on students' speaking, reading, and writing skills in the third language.

To suggest a framework for non-JNV schools for learning the third.

Hypothesis

H₀₁: There is no significant impact of the JNV migration policy on students' speaking, reading, and writing skills in the third language.

Methodology

In this study, a descriptive survey methodology was used to gather data from JNV alumni students via a Google form. The key steps were: - Sample selection: We compiled a list of JNV alumni from several states (both Hindi-speaking and non-Hindi-speaking). Using stratified random sampling, we selected 70 pass-out students, ensuring representation of both genders, various states, and those who participated in the Class IX migration.

ANALYSIS AND DISCUSSION

Analysis of Objective 1: Impact on Speaking, Reading, and Writing Skills

Table 1: Impact on Speaking Skills

S.No.	Question	Strongly Agree (%)	Agree (%)	Neutral (%)	Disagree (%)	Strongly Disagree (%)	Positive % (S+A)
1	Migration increased my ability to speak the third language.	50.0	33.3	10.0	3.3	3.3	83.3
2	After migration, I felt more confident using the third language.	46.7	40.0	6.7	3.3	3.3	86.7
3	Interaction with students from other states improved my speaking skill.	53.3	36.7	6.7	0.0	3.3	90.0

Analysis: The policy's impact on speaking skills is highly positive. 90% of students found interaction with peers beneficial for developing speaking skills. This underscores the importance of social dialogue. About 87% of students reported increased confidence in language use, indicating the policy's success in reducing language anxiety.

Table 2: Impact on Reading Skills (Comprehension)

S.No.	Question	Strongly Agree (%)	Agree (%)	Neutral (%)	Disagree (%)	Strongly Disagree (%)	Positive % (SA+A)
4	I was able to understand textbooks in the third language.	56.7	40.0	3.3	0.0	0.0	96.7
5	Migration helped in understanding the third language.	46.7	43.3	6.7	3.3	0.0	90.0

Analysis: The policy's impact on reading skills is the strongest. The highest positive percentage of **96.7%** indicates that comprehending academic texts in an immersion environment was a successful experience for students. This confirms Krashen's 'Comprehensible Input' theory. The percentage of students who considered migration overall helpful for understanding is also 90%.

Table 3: Impact on Writing Skills

S.No.	Question	Strongly Agree (%)	Agree (%)	Neutral (%)	Disagree (%)	Strongly Disagree (%)	Positive % (SA+A)
6	Writing practice improved my expression in the third language.	62.1	27.6	6.9	3.4	0.0	89.7
7	Migration experience helped me write better in the third language.	48.3	37.9	10.3	3.4	0.0	86.2
8	Teachers provided proper guidance in writing the third language.	46.7	40.0	10.0	3.3	0.0	86.7

Analysis: The policy also has a clearly positive impact on writing skills. 89.7% of students consider writing practice useful. This supports Swain's "output hypothesis," which posits that active language production is essential for acquisition. The fact that 86.7% of students consider teacher guidance effective demonstrates that immersion alone is not sufficient; it needs to be combined with formal instruction and feedback.

Table 4: Overall Evaluation of Policy and Three Language Mode

S.No.	Question	Strongly Agree (%)	Agree (%)	Neutral (%)	Disagree (%)	Strongly Disagree (%)	Positive % (SA+A)
9	JNV migration policy had a positive impact on my three-language learning experience.	44.3	37.2	13.3	3.4	0.0	81.7
10	Migration policy made learning the third language easier.	43.3	36.7	13.3	3.3	3.3	80.0
11	Migration policy played an important role in language development.	46.3	37.2	10.3	3.4	2.1	84.2
12	The Three Language Model is effective for students' overall development.	46.7	46.7	6.6	0.0	0.0	93.4
13	I am satisfied with the Three Language Model of JNV.	36.7	56.7	6.6	0.0	0.0	93.4

Analysis: The policy also has a clearly positive impact on writing skills. 89.7% of students consider writing practice useful. This supports Swain's "output hypothesis," which posits that active language production is essential for acquisition. The fact that 86.7% of students consider teacher guidance effective demonstrates that immersion alone is not sufficient; it needs to be combined with formal instruction and feedback.

Table 5: Supportive Institutional Factors

S No	Question	Strongly Agree (%)	Agree (%)	Neutral (%)	Disagree (%)	Strongly Disagree (%)	Positive % (SA+A)
14	The Three Language Model helped me learn a new language.	53.3	33.3	10.0	3.3	0.0	86.6
15	Teachers motivated us to learn the third language.	56.7	30.0	10.0	3.3	0.0	86.7
16	The classroom environment was supportive for learning the third language.	50.0	36.7	10.0	3.3	0.0	86.7
17	Cultural programmes, assemblies and language clubs supported my third language learning.	46.7	40.0	10.0	3.3	0.0	86.7
18	Learning the third language was useful for my future.	60.0	33.3	6.7	0.0	0.0	93.3

Analysis: Several institutional factors contribute significantly to the policy's success. 86-87% of students consider teacher motivation, classroom environment, and cultural activities to be supportive. This suggests that the migration policy functions as an "ecosystem," where various elements are interconnected. Most notably, 93.3% of students consider the third language useful for their future, reflecting their intrinsic motivation and utilitarian perspective towards this education.

Discussion

The empirical analysis of the JNV Migration Policy's impact reveals a robust success story anchored in established second language acquisition (SLA) theories. The overwhelmingly positive student perceptions across all three language skills speaking (83-90% positive), reading (96.7%), and writing (86-90%) provide a strong evidence base for expanding the policy's core principles beyond the residential school context.

The findings offer clear theoretical validation. The exceptional success in reading comprehension (96.7%) directly aligns with **Krashen's Comprehensible Input Hypothesis** (1982), which posits that language is acquired most effectively through exposure to meaningful, contextualized input just beyond the learner's current proficiency ($i+1$). The JNV migration environment, by necessity, floods students with such input. Similarly, the significant gains in speaking and writing affirm **Swain's Output Hypothesis** (1985), which emphasizes that learners must actively produce language to test hypotheses, develop fluency, and move from semantic to syntactic processing. The policy's structured social interactions and academic tasks compel this necessary output.

Furthermore, the critical role of peer interaction (90% found it beneficial) underscores the principles of **Vygotsky's Sociocultural Theory** (1978). Learning is mediated through social interaction, where more knowledgeable peers (native speakers of the third language) provide

scaffolding within the Zone of Proximal Development (ZPD). The residential setting naturally creates this community of practice. However, the high value placed on teacher guidance (86.7%) indicates that this social learning is most effective when combined with formal instruction—a model of **"guided immersion."**

The challenge for non-JNV schools is to recreate the conditions of **authentic need, sustained social interaction and contextualized input/output** without the residential component. The success hinges not on replicating the migration itself, but on engineering its pedagogical and social dynamics through alternative means.

Summary of Key Findings

1. **Immersive Input is Paramount:** The policy's strongest impact was on receptive skills (reading at 96.7%), demonstrating the unparalleled power of an environment where the target language is the medium of daily academic and social life.
2. **Social Interaction Drives Production:** Active skills (speaking and writing) showed high improvement (83-90%), heavily linked to peer interaction and teacher-guided practice, confirming the need for communicative, task-based learning.
3. **Institutional Ecosystem is Critical:** Success is not automatic; it is mediated by supportive teachers, a positive classroom climate, and co-curricular activities (86-87% positive), forming an essential support structure.
4. **Motivation is Linked to Utility:** The highest agreement across all factors (93.3%) was on the future utility of the third language, highlighting the importance of **instrumental motivation** and a clear purpose for learning.

Suggestion JNV Migration Policy for Non-Residential Schools: A Scalable Framework to Strengthen India's Three Language Policy

This is a highly relevant and significant question. The Jawahar Navodaya Vidyalaya (JNV) Migration Policy, which is inherently a **residential-centric model**, can be adapted for **non-residential (non-JNV) schools** to enhance the success of the national Three Language Policy. The core principle to be transferred is not the residential component itself, but the pedagogical mechanism of **"language acquisition through authentic necessity and social interaction in an immersive context"** (Krashen, 1982; Lightbown & Spada, 2013). Presented below is a multi-pillar implementation framework designed to operationalize this principle in diverse school settings.

Proposed 'Micro-Migration' and 'Virtual Immersion' Model for Non-JNV Schools

Core Philosophy:

The essence of the JNV model is: **"Linguistic immersion through authentic need and social dialogue."** This can be applied in non-residential schools through the following five pillars:

Pillar 1: Structured School-Exchange and 'Micro-Migration' Programs

1. **District/Block Level 'Language Pairing':**
 - Schools within a state, but from districts with different linguistic majorities, should be paired as 'Sister Schools'.
 - **Short-Term Immersion:** A **2-4 week** 'Exchange Program' for students in Grades 6-8. Students would attend their sister school and experience **homestays** with local families, creating a necessity for communication (Cummins, 2000) and **Kashi Tamil Sangamam** Program basic create school level program between 2 state and a part of curriculum.

- **Resource Sharing:** Paired schools can exchange third-language teachers and teaching materials, optimizing scarce resources.

2. **Inter-State 'Summer Immersion Camps':**

- Residential camps of **15-20 days** during summer vacations, organized at the NCERT or KVS (Kendriya Vidyalaya Sangathan) level. Students from different states live together, participating in language workshops, sports, and cultural activities, fostering a natural immersion environment (Lyster & Mori, 2008).

Pillar 2: Digital and 'Virtual Immersion' Platforms

1. **'Digital Pen-Pals' and Collaborative Projects:**

- **E-Twinning:** A national digital platform should connect schools across India. Students collaborate through video conferences, shared blogs, and joint projects (e.g., "My State's Folk Song," "Our Festivals") with outputs created in the third language. This mimics the social interaction component vital for language acquisition (Swain, 2000; O'Dowd, 2007).
- **Collaborative Online International Learning (COIL):** Structured modules where classrooms in different linguistic regions jointly complete academic projects.

2. **Gamified Learning Apps and VR Experiences:**

- **Language Adventure Games:** Develop apps where students complete quests and tasks in a virtual city (e.g., Virtual Kolkata, Virtual Bangalore) entirely in the target language, using **game-based learning** principles to enhance engagement and vocabulary retention (Reinhardt & Sykes, 2014).
- **VR Classrooms:** Using Virtual Reality, students can be 'virtually present' in a classroom in another state, attending lessons and interacting with peers in real-time, providing a simulated immersion experience (Chen, 2016).

Pillar 3: Leveraging Local Resources and Community

1. **'Language Samvad' Clubs and Local Mentors:**

- Establish 'Three Language Dialogue Clubs' in every school. Invite fluent speakers from the local community—retired teachers, professionals, university students—to serve as **'Language Mentors'**.
- **Weekly 'Language Café':** An informal session where students converse with mentors over tea/snacks **only in the third language**, lowering the **affective filter** and promoting spontaneous speech (Krashen, 1982).

2. **Curriculum Localization and Project-Based Learning (PBL):**

- Third-language textbooks must incorporate **localized content** (Canagarajah, 2005). For example, if learning Tamil, include excerpts from Tamil newspapers, local folklore, and film songs.
- **PBL:** Assign projects like "Create a documentary about the **[Third Language]-speaking community in our city.**" This necessitates real-world language use for interviews, scripting, and presentation (Thomas, 2000).

Pillar 4: Teacher Capacity Building and Incentives

1. **'Immersion Teacher' Training and Salary Incentives:**

- Mandate specialized training in '**Immersion Teaching Methodologies**' and **Communicative Language Teaching (CLT)** for third-language teachers (Richards & Rodgers, 2014).
- Introduce a **special language allowance** for teachers instructing a third language. This financial incentive can make these positions more attractive and help address teacher shortages (National Education Policy [NEP], 2020).

2. Teacher Exchange Program:

- Mirroring student exchange, implement a **short-term (1-2 months) teacher exchange**. A Hindi-medium teacher could teach Hindi in a Bengali-medium school in another region, and vice versa. This promotes best practice sharing and authentic modeling for students.

Pillar 5: Reformation of the Assessment System

1. Competency-Based and Performance Assessment:

- Move away from rote-learning exams. Assessment must focus on **authentic language use** (Brown & Abeywickrama, 2010).
- **Assessment Methods:**
 - **Speaking:** Conducting and presenting an interview with a native speaker.
 - **Writing:** Maintaining a blog for the school in the third language.
 - **Project Work:** Evaluating the PBL outputs described above.

2. 'Language Proficiency Badge' System:

- Implement a certification system based on international frameworks like the **Common European Framework of Reference (CEFR)**. Students earn **digital badges** for achieving A1, A2, B1 levels, which become part of their lifelong learning portfolio (Council of Europe, 2020).

Implementation Strategy: A Phased Approach

Phase	Duration	Key Activities	Responsible Agency
Pilot Phase	1 Year	Select 10 schools each from 3-4 linguistically diverse states. Test the digital platform and a 2-week exchange program. Monitor outcomes rigorously.	NCERT + State SCERTs + Partner NGOs
Expansion Phase	2-3 Years	Scale successful models to 500+ schools across 10-15 states. Initiate large-scale teacher training programs.	Ministry of Education (MoE) + State Governments
National Integration Phase	5 Years	Launch a national ' Language Immersion Network (LIN) ' digital platform. Aim for over 50% of schools in all states to be connected.	MoE + National Educational Technology Forum (NETF)

Financial Model and Partnerships

- **Public-Private Partnership (PPP):** Leverage CSR funds from corporations and seek technical collaboration with Ed-Tech companies for platform and content development.

- **Centre-State Funding:** Implement a cost-sharing model (e.g., 75:25 or 60:40 as per existing schemes like Samagra Shiksha).
- **Community Funding:** Local businesses can sponsor 'Language Mentorship' programs or immersion camp scholarships.

CONCLUSION

This study aimed to examine how the Jawahar Navodaya Vidyalaya (JNV) Migration Policy affects students' ability to learn a third language. The evidence gathered from student feedback tells a clear story of success. The positive responses are notable, with 82.7% of students recognizing the policy's benefits, 96.7% achieving understanding of the textbook material, and 93.4% satisfied with the Three Language Model. These findings reject the null hypothesis (H_{01}) and strongly support the idea that the JNV Migration Policy has a significant and positive impact on students' speaking, reading, and writing skills in a third language.

The policy's effectiveness is not random. It is based on proven principles of second language learning. It successfully applies Krashen's theory of Comprehensible Input by immersing students in an environment where the target language is essential for academic and social interaction. At the same time, it confirms Swain's Output Hypothesis and Vygotsky's Sociocultural Theory by creating real opportunities for language use and offering support through interactions with peers and teachers. The JNV model shows that the best language learning happens not in isolated classrooms but in a complete "guided immersion ecosystem" where immersive input, structured output, motivation, and future utility all connect.

However, the residential aspect of the JNV model poses a challenge for scaling it across the Indian education system. Thus, the goal is not to replicate the entire JNV structure but to share its essential teaching principles. The proposed framework for non-residential schools is built on five pillars: Structured Exchanges, Virtual Immersion, Community Integration, Teacher Empowerment, and Assessment Reform. This model aims to create conditions of "authentic need" and "social learning" using technology, partnerships, and curriculum redesign, making immersive, communicative language learning available to all students.

In conclusion, the JNV Migration Policy is a proven resource. It showcases the incredible potential of India's Three Language Policy when carried out with clear teaching goals. The challenge now is to learn from this achievement and innovate boldly. By using a hybrid approach that blends physical exchanges, digital tools, and community support, we can transform the Three Language Policy from a static requirement into a lively, inclusive, and national initiative. This transition will develop individual skills in multiple languages and promote understanding and respect, which are key to a united, culturally rich India, as outlined in the National Education Policy 2020. The findings of this study offer both justification and a strategic plan for this vital educational change.

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TRANSFORMING SCIENCE LEARNING THROUGH INQUIRY-BASED WEB VR: A DIGITAL PATHWAY TO STRENGTHENING SCIENCE PROCESS SKILLS IN SECONDARY EDUCATION

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Abstract

Science learning in schools is often reduced to memorizing facts, which leaves little room for students to observe, question, and think scientifically about everyday situations. With this concern in mind, the present study explored whether an inquiry-based Web VR lesson could strengthen the science process skills of Grade 8 students when compared to conventional teaching. The topic of conduction and convection was chosen because learners usually struggle to visualize these concepts in a traditional classroom. The Web VR lesson, designed with a dual-phase structure that combined simulation-based exploration with simple real-world validation tasks, was developed using the 5E learning model and carried out as a non-immersive classroom activity. A cluster sampling method was followed, and a pre-test–post-test control group design was used with 221 students from four government schools in Coimbatore district. Science process skills were assessed through a validated tool covering seven skill areas. ANCOVA results showed that students who learned through Web VR performed significantly better in the post-test than those in the control group, even after accounting for initial differences. SEM results indicated that each science process skill functioned independently rather than forming higher-order or lower-order clusters. Skill-wise comparisons using paired t-tests further revealed notable gains in observation, analysis, hypothesis formation, and inference. Overall, the study points to the potential of Web VR to support scientific thinking and strengthen science process skills in school science learning

Keywords: *Inquiry-Based Learning, Web VR, Science Process Skills*

Introduction

Science process skills (SPS) are important for helping students observe, think, predict and understand science concepts in a meaningful way (Athuman, 2017; Artun et al., 2020). When students improve these skills, their capacity to observe, think, predict and solve problems in real situations also improves. Just learning theory will not help today's young generation to think critically or develop 21st-century skills. SPS is an important part of science learning, but in many schools the application of these skills is very limited because practical time is less (Yildirim, 2021; Sudibyo, 2019). SPS are not only connected to experiments, they are directly related to students daily life thinking and problem-solving ability. Studies showed that VR environments increase students engagement, understanding and performance in science learning (Chen & Chu, 2024; Cao et al., 2024). Web-VR gives students real-time visuals, audio and interactive elements that make learning more meaningful (Wang, 2025; Yıldırım, 2021).

To improve SPS, the researcher developed a Web-VR lesson because gen z generation students are already familiar with digital tools for playing games and using technology in the classroom increases their interest in learning. Many applications in VR are available for laboratory practice, but there are limited tools to teach science theory and help students apply the concepts in a real-

world way. Inquiry-based VR learning showed better science learning outcomes than other digital methods such as e-books (Chen & Chu, 2024). Virtual labs and virtual inquiry activities also improved SPS such as prediction and experimenting (Sudibyo, 2019; Anam et al., 2025). Since fully immersive VR is costly for schools it operate with the high-end head mounded displays, non-immersive Web-VR is suitable for classrooms because it works on normal computers and can be used for large groups. Therefore, Web-VR was used in this study with the inquiry approach to check whether it improves SPS better than conventional teaching and to find which particular SPS skill is most influenced by the Web-VR lesson.

VR-supported inquiry lessons also improved students science learning achievement more than digital materials such as e-books (Chen & Chu, 2024). In science laboratory activities, VR was more effective than traditional teaching and helped learners improve the experimenting and analysing skills (Artun et al., 2020). Inquiry-based teaching itself is known to improve SPS, and students who learned through inquiry activities performed better than those who learned through conventional teaching (Athuman, 2017).

Virtual laboratory media developed for biology also improved SPS and were accepted by teachers and students as useful learning tools (Sudibyo, 2019). Studies with 8th-grade students showed that virtual labs helped them use SPS like manipulating variables, creating experiments and making observations during the lessons (Yildirim, 2021). VR materials created for physics topics in middle school improved students' active learning behaviour and supported self-directed learning (Wang, 2025). Research also found that VR helps secondary students improve problem-solving ability and self-efficacy (Cao et al., 2024).

In guided inquiry lessons, real, virtual and mixed experiments were compared, and virtual experiments specifically supported prediction and reasoning skills (Anam et al., 2025). Even immersive VR studies showed improvement in higher-order knowledge creation in middle school science learning (Queiroz et al., 2022). Overall, these studies show that VR and Web-VR have strong potential to support thinking skills and SPS, but each study focused on different levels, subjects or VR types.

From these studies it is clear that VR improves science learning, engagement and different SPS, but very few studies focused on Web-VR for school students in regular classroom conditions. Most of the studies used full VR headsets or virtual lab tools, not Web-based VR that works on normal computers. None of the studies tested Web-VR lessons for conduction and convection using the 5E inquiry model. Also, the existing studies did not clearly identify which one of the seven SPS skills improves the most after Web-VR learning. For this reason, the present study used an inquiry-based Web-VR lesson to check the overall effect on SPS and to find which specific skill is influenced more among the seven SPS skills.

Research Questions

- Does an inquiry-based Web VR lesson enhance the science process skills among grade 8 students compared to conventional teaching
- Which science process skill influenced by the Web VR inquiry lesson (observation, hypothesis, prediction, data collection, inference, analysis and decision making)

Methodology

Research Design and Participants

The research adopted a pre-test post-test control group design to explore the power of inquiry-based Web VR lesson (IB - WVR) and to examine specific skill development. Cluster sampling

was used to select two hundred and twenty-one eight-grade students from four different regions of the Coimbatore district. Cluster sampling method allowed the researcher to work with naturally formed groups without disturbing the regular school arrangement. One school was selected from each region (East, West, North, and South) to avoid giving more weight to any single area (Schools=4, N=221). To ensure equal learning conditions only government corporation schools were selected after the researchers verified the school facilities. In a school the control group (CG) and experimental group (EG) were taken as intake classrooms. Class A-CG and Class B- EG the same grouping pattern was followed in all four schools. The main researcher directly visited all schools and implemented the Web VR lessons with the required materials for four weeks in each school (duration-4 months). The study was conducted during the academic year 2024-2025. Before conducting the research, proper ethical clearance was obtained from the researcher's institute and from the school authorities including corporate CEO, headmasters, and subject teachers. Consent from the stakeholders and students parents was obtained before beginning the research process.

Study Execution Process

To explore the research questions the researchers (i) developed the Web VR lesson on the topic of conduction and convection, (ii) developed and validated the Science Process Skills (SPS) questionnaire, (iii) Provided the orientation on how to use the Web VR environments for better learning experience, (iv) Pre-test conducted to test students expertise in the SPS, (v) Students divided into small groups (3 students) for learning based on the pre-test scores and navigation skills, (vi) guided students to learn through Web VR in the Inquiry approach, and (vii) Post-test conducted to measure the impact of Web VR on SPS. The research followed the step-by-step process to answer the research questions. The steps were presented clearly in the figure 1, the onion model of the research. Using the onion model the researchers illustrated all aspects of the research (Saunders, Lewis, & Thornhill, 2019).

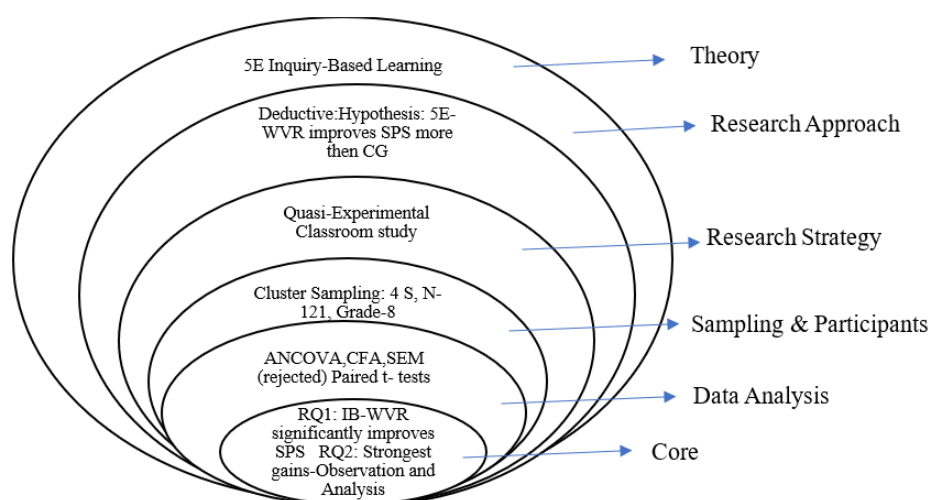


Figure 1. Research onion model representing the IB-WVR research framework based on (Saunders, Lewis, & Thornhill, 2019)

Sequence of the conduction and convection lesson in IB-WVR

The researchers developed a Web VR lesson on conduction and convection using an inquiry-based learning environment named Inquiry-Based Web VR (IB-WVR). The IB-WVR is a 5E based (Engage, Explore, Explain, Elaborate and Evaluate), non-immersive web application. It was

developed using Unity 2022 and validated with experts in VR applications, and educational specialists for the content validity. The different phases of the WVR are explained in the figure 2.

Engage Phase: Students were asked the brainstorming question. If the students showed interest in find the answer they were asked to proceed further after giving the positive response (Yes). If the students did not want to learn topic, they could give the negative response (No), however, an audio prompt was provided to motivate them to continue learning to gain high scores (reward points) in the evaluation phase.

Explore Phase: Students investigated the VR environment using the keyboard movements front (W), back(S), left (A), and right (D), and 360-degree rotation using the mouse/touchpad. They explored the visuals and environment through these controls.

Explain Phase: After completing the exploration phase students approached the visuals, and the system displayed cues, definitions and the explanatory simulation with text and audio.

Elaborate Phase: Using the explanations the scientific principals were elaborated with real-world examples, demonstrating conduction and convection in detail.

Evaluate Phase: Students were directed to quizzes, visual identification tasks, and questions requiring the application of physics ideas. They were able to see the immediate feedback on their scores. Using the 5 E approach the complete Web VR experience was provided to all students. Each session lasted 40 minutes per day for 3 weeks. Afterward the post-test was conducted using the SPS questionnaire.

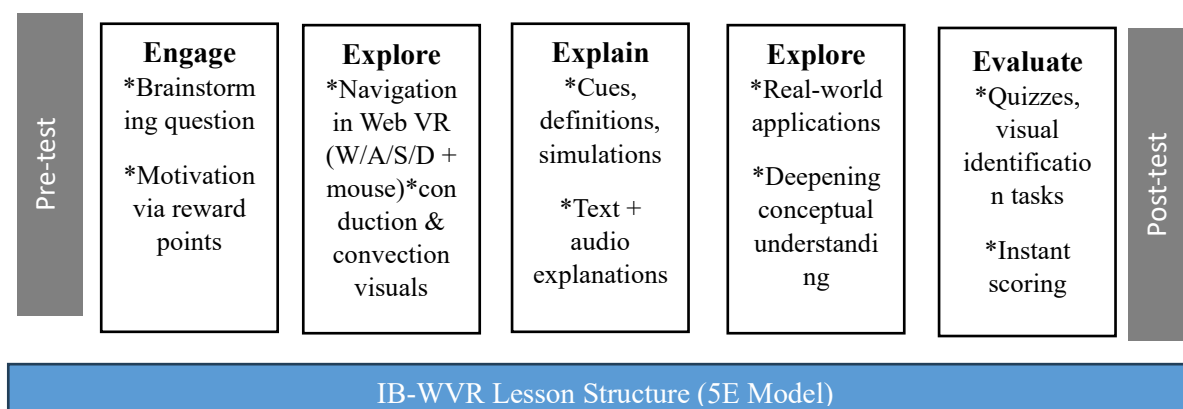


Figure 2. Instructional flow of the inquiry-based Web VR lesson using the 5E learning model

The Science Process skill questionnaire

This questionnaire consists the seven skills, observation, hypothesis, prediction, data collection, inference, analysis and decision making. The seven skills were selected based on the National Curriculum Framework (NCF), 2023, on science education and its objective, the ten skills were given for the middle schoolers 6-8th those skills were taken and combined as a seven set of skills. Then the researcher developed the SPS questionnaires to assess the seven set of skills and its validated. The Cronbach $\alpha = 0.82$ reliability of the scale 0.82. The multiple choice questions each skill consists two questions 7*2=14 pre-test and 14 post-test items.

Analysis of the data

The collected data were classified into the two categories higher order thinking skills (HOTS) and lower order thinking skills (LOTS) based on cognitive difficulty levels. These classifications were also based on the NCF (2023). To determine the impact of IB – WVR on the SPS, a ANCOVA

were used between the EG and CG after the intervention. To find out the influenced skill among HOTS and LOTS the Structural Equation modelling was used to check the exact impact.

Results and discussion

RQ1: Does an inquiry-based Web VR lesson enhance the science process skills among grade 8 students compared to conventional teaching

The results of this study were presented based on two research questions. First, the researchers checked the overall impact of the IB-WVR teaching and conventional teaching on science process skills. The analysis was carried out using SPSS version 22. After checking the normality of the data ANCOVA was executed between the post-test scores of both groups. ANCOVA was chosen because the pre-test means scores of the two groups varied in the skills of prediction, analysis and decision making while the other four skills were almost equal. To make a fair comparison and to control the initial differences, ANCOVA was used by taking the pre-test score as the covariate to compare the post-test performance of the two groups after adjusting the baseline differences. The ANCOVA table 1, results showed a significant difference in the total SPS post-test scores between the experimental group and the control group after controlling for the pre-test score, $F(1, 218) = 85.995$, $p < .001$, partial $\eta^2 = .283$. The adjusted post-test mean of the experimental group ($M = 33.568$, $SE = 0.380$) was higher than that of the control group ($M = 28.590$, $SE = 0.379$), showing that the IB-WVR lesson had a strong positive effect on science process skills.

Table 1. Group differences in total SPS post-test scores after controlling pre-test scores

	Group	Adjusted Mean	Std. Error	95% CI Lower	95% CI Upper	F (1,218)	p	Partial η^2
EG		33.568	0.380	32.818	34.317	85.995	.000	.283
CG		28.590	0.379	27.844	29.336			

Note. F = ANCOVA test value; p = significance; Std. Error = standard error of adjusted mean; CI Lower/Upper = 95% confidence interval limits. Covariate pre-test = 12.5837.

When a new way of teaching comes into the classroom, it creates more interest to learn, especially when it is supported by technology. Web VR is a newly emerging technology, and it creates an impact on students' thinking skills. Even though Web VR is non-immersive, it can be used for a large group of students within a regular classroom setting. This type of VR can be used not only for science topics but also for complicated areas in mathematics, literature, and history. In this study, the Web VR lesson developed on conduction and convection based on 5E approach to improve the students thinking style compared to regular classroom teaching. Combining Web VR with the 5E model gave the best outcome for students because, in each stage of the inquiry approach, students used different skills. All seven science process skills were involved across the stages of the 5E model. Based on the results, students gained better thinking skills and they will be able to see life problems with better understanding. Whether HOTS or LOTS developed after IB-WVR lesson, the SEM pathway analysis provides the answer. Initially, the Confirmatory Factor Analysis (CFA) was executed, and the factor loadings are given in Table 2. After confirming the HOTS and LOTS structure, the SEM model was plotted using the AMOS software.

RQ2: Which science process skill influenced by the Web VR inquiry lesson IB-WVR lessons created an impact on students' science process skills. The ANCOVA results clearly showed the better scores of the EG in the post-test, but to identify which skill among the selected seven skills improved more, each post-test skill score was taken to find the common factors between the skills, and these were classified as HOTS and LOTS skills in the conceptual SEM model shown in Figure 3.

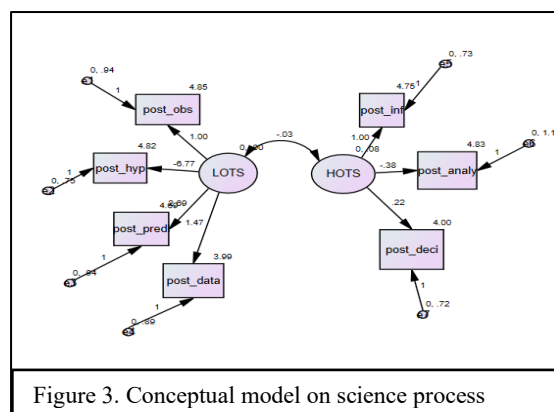


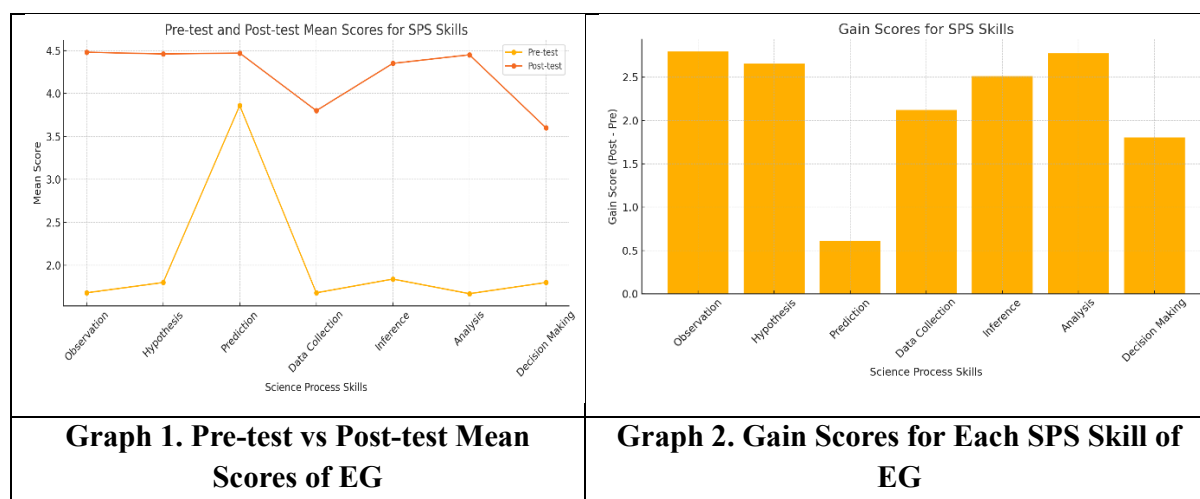
Figure 3. Conceptual model on science process

All the skills were taken as a observed variables *post_obs*, *post_hyp*, *post_predi*, *post_data*, *post_inf*, *post_analy*, *post_deci* and the two levels of thinking skills HOTS and LOTS were taken as a latent variable. A path was created from the LOTS latent variable to *post_obs*, *post_hyp*, *post_predi*, and *post_data* observed variables, and another path was created from HOTS to *post_inf*, *post_analy*, and *post_deci*. The SEM model was plotted to check the HOTS and LOTS structure, but the factor loadings were very near zero. These values should be between 0.40 to 0.90 for standardized factor loading. The observed variables performed as individual variables and did not behave like two factors (LOTS and HOTS) in the collected data. The factor loadings shown in the diagram were very low and some were negative (for example LOTS → *post_hyp* = -6.77 and HOTS → *post_analy* = -0.38). Some loadings were also unusually high (4.86 and 3.99). The covariance between LOTS and HOTS was almost zero (-0.03). These values indicate that Science process skills are not clustered into two HOTS and LOTS common factors from the collected data. Therefore, the SEM model was rejected and a skill-wise analysis was used instead. Using paired sample t test were used to identify the specific skill improvement in the EG. Table 2, showed the result of paired sample t-test conducted among seven skills before and after Web VR lessons in the EG. The results showed a significant improvement in all the skills after the intervention ($p < .001$). The mean score represented in the line graph 1, it shows a clear improvement in all seven process skills. The highest improvement is seen in observation skill (4.48) and prediction shows a small improvement because the pre-test score was already higher for that skill. The bar graph 2, displays the gain score observation (2.80), analysis (2.78), hypothesis (2.66) and Inference (2.51) showed the highest improvement after the IB-WVR lesson, indicating that inquiry-based VR strongly supported these skills.

Table 2. Paired-sample t-test results for pre-test and post-test SPS scores

Skill	Pre-test Mean (SD)	Post-test Mean (SD)	Mean Difference	t	df	p
Observation	1.68 (1.17)	4.48 (1.21)	-2.80	-23.98	220	< .001
Hypothesis	1.80 (1.06)	4.46 (1.11)	-2.67	-25.69	220	< .001
Prediction	3.86 (2.58)	4.47 (1.07)	-0.61	-3.32	220	.001
Data Collection	1.68 (1.02)	3.80 (1.00)	-2.12	-22.24	220	< .001
Inference	1.84 (1.09)	4.35 (1.20)	-2.51	-22.97	220	< .001
Analysis	1.67 (1.08)	4.45 (1.27)	-2.79	-25.86	220	< .001
Decision Making	1.80 (1.17)	3.60 (1.08)	-1.80	-16.94	220	< .001

Note. S.D- Standard Deviation, two-tailed t-test used, p-value <.05 significant level and negative means post-test scores were higher.



The highest improvement was seen in observation ($t = -23.98$, $p < .001$) and analysis ($t = -25.86$, $p < .001$). Because the Web VR simulations motivated the students to observe more and analyse the practical situations in the environment. From these results compared to the pre-test scores students also improved in using hypothesis skill and inference skill. Decision Making is one of the important aspects in real life, and while learning science, students should be able to use their decision-making skill. It is a new type of task for middle school students, but the Web VR environment supported them, and the post-test mean scores showed a significant improvement in this skill.

While moving inside the virtual space students naturally observed more details and analysed the situations by closely look the objects, visuals and changes inside the simulation. While watching the movie and hearing the favourite songs peoples observe closely and analyse clearly. Similar aspect these two skill improvement shows students are enjoyed and they were very interested to learn with web VR. This type of visual and interactive learning helped them to think deeply about the science content. The results also showed good improvement in hypothesis and inference skills. When students explored the VR scenes, they tried to guess what might happen next and checked whether their ideas matched the simulation. This process supported the development of their hypothesis-making ability. Inference also increased because students related the VR actions with the scientific ideas presented in the environment. Through the guided interactions, quizzes, and immediate feedback the improvement in the decision making shows that students were able to select correct options, make judgments based on the simulation, and apply what they learned in the virtual environment. The results of RQ2 confirms that the IB-WVR lesson supported all the SPS skills, with stronger influence on Observation, Analysis, Hypothesis, and Inference. The VR-based inquiry activities allowed students to practise these skills repeatedly during the lesson, which resulted in higher post-test performance.

Future Research

If future researchers want to improve thinking skills, Web VR can be an effective tool. Usually, VR is used to improve practical skills, but the process skills related to cognitive aspects can also be improved with the proper theoretical background like the inquiry approach. In future, researchers can develop technological tools and materials to give greater interest for learners. The use of technology is very low among school teachers, so teachers can be motivated to use technology-driven tools in the regular classroom. Different subjects can be implemented with Web VR technology because it is a better choice for developing and under developing countries.

Conclusion

In this study, the inquiry-based Web VR lesson was used to check the impact on the Science Process Skills of Grade 8 students. The results showed that the Web VR method helped the students more than the regular classroom teaching. The VR simulations, visuals, and the inquiry steps supported the students to observe more, analyse the situation, make predictions, and use inference and decision-making skills while learning the science topic. Among the seven skills, observation and analysis showed the highest improvement, and hypothesis and inference also increased well compared to the pre-test. Decision making is usually a difficult skill for middle school students, but the Web VR activities supported them, and the post-test mean score also increased. This shows that the Web VR lesson helped the students to think in a better way during the learning process.

The SPS skills did not come under HOTS and LOTS factors in this study, because all the seven skills acted as individual skills. So each skill was checked separately to understand the effect of the Web VR lesson. The study proved that Web VR with the inquiry approach can be used in the school classroom to improve the science process skills and make the science learning more interesting and meaningful for the students.

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A STUDY OF ATTITUDE TOWARDS ICT BASED PEDAGOGY IN ENGLISH TEACHING AMONG TEACHER TRAINEES IN THE CONTEXT OF GENDER AND LOCALITY

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Abstract

The usage of information and communication technology (ICT) in teaching-learning process has transformed teaching and learning processes, making them extra participatory and accessible. In the context of English language teaching, ICT-based pedagogy offers innovative methods and resources for improving language learning and performance. Objective: 1) To study the Attitude towards ICT-based Pedagogy in English teaching among teacher trainees. 2) To study the Attitude towards ICT-based Pedagogy in English teaching among teacher trainees in the context of gender and locality. The Research Area for the study is Educational Psychology. Teacher Trainees of Andaman were the population of the present investigation. In sample selection of college was by Simple Random Sampling Technique and the selection of teachers was done by cluster sampling method. At Last the sample size of study was 107 teacher trainees. "Survey Method" was selected for the present investigation. Researcher-made attitude scale was used for the purpose of Data Collection. t-test statistical technique was applied for testing of hypotheses. Findings: The performance of teacher trainees varies greatly, with 46.73% rated as "Moderate" and 57.14% as "Low." Gender disparities are noticeable, with female trainees exhibiting a more positive attitude towards ICT Based pedagogy in English teaching. Urban trainees are primarily "high," whereas rural trainees are "moderate." Female trainees and urban trainees are more positive about ICT-based pedagogy in English teaching.

Key-Words: *Attitude, ICT-Based pedagogy in English teaching, Teacher Trainees, Gender, Locality*

1. Introduction

Information and communication technology (ICT) usage in education has changed teaching and learning processes, making them more involved and accessible. In the context of English language teaching, ICT-based pedagogy offers novel and innovative methods and resources for improving language learning and outcomes. The purpose of this study is to investigate the attitude of teacher trainees toward the use of ICT in English education while controlling for gender and locality. Understanding these attitude is very important for the proper application of ICT in educational practices because good attitudes can have a significant impact on the acceptance and success of technology-enhanced learning.

During the COVID-19 pandemic, face-to-face teaching was suspended and teachers were required to transition to online teaching supported by information and communication technology (ICT)-based pedagogy. Challenges such as the lack of teachers' ICT knowledge and skill, lack of data packages for internet connection and learners' lack of digital devices occurred. (Malewaneng, Maja., 2023).

A teacher in the digital age must be enough skilled in successfully integrating content, pedagogy, and technology in the teaching learning process (Ahmad A. et. al., 2024). In this digital era, accepting Information and Communication Technology (ICT) for teaching and learning is very essential in generating graduates who are life-long learners (Seleke, Zikhona, 2024).

The impact of gender in creating attitudes about ICT-based pedagogy has a significant part of this research study. This study inspects the views of male and female teacher trainees to determine any existing gender differences and their possible impact on the adoption of ICT tools in English teaching.

Locality is another important part in shaping attitudes toward ICT-based pedagogy in education. Teacher trainees residing in cities regularly have greater access to technical resources and more experience to ICT technologies than their rural colleagues. This incompatibility can result in varying levels of acquaintance and confidence in using ICT for educational causes. This study proposes to emphasize the challenges and opportunities that educators encounter in diverse locations by comparing the views of teacher trainees from urban and rural areas, providing ideas for targeted involvements to link the digital divide.

2. Statement of the problem

For the present study, the Researcher chooses to study the Attitude towards ICT based Pedagogy in English teaching among teacher trainees in the context of Gender and Locality. Thus, the title was as followed:

A Study of Attitude towards ICT based Pedagogy in English teaching among teacher trainees in context of Gender and Locality

3. Importance of the study

The usage of information and communication technology (ICT) into educational processes has changed the scenery of teaching and learning, especially in language instruction. This study on attitude towards ICT-based pedagogy in English language among teacher trainees, with a focus on gender and locality or area, is very important. Understanding these attitude is critical to the successful adoption of ICT in education. Positive attitudes toward ICT can greatly improve teaching pedagogies, making learning more active, engaging, and successful. In contrast, negative attitudes can operate as obstacles, reducing the potential benefits of technological improvements in education. By identifying the fundamentals that influence these attitudes, this study can help to shape focused interventions to build a more positive attitude toward ICT among teacher trainees.

The study examines gender differences in teacher trainees' attitudes and participation with ICT in pedagogy, especially English pedagogy. It underscores the requirement for gender-sensitive training programs that meet individual requirements and problems. The study also looks at how urban and rural trainees have different contact to technical resources and training chances. Understanding these differences allows the investigation to develop focused solutions to bridge the digital gap, ensuring that all trainees are well-prepared to integrate ICT into their teaching practices. This study contributes to the greater discussion on ICT in education by providing practical evidence on future educators' attitude. Teacher trainees are the representation of the future generation of educators, hence their readiness and desire to use ICT in the classroom is very important for the long-term incorporation of technology in education. The outcomes of this study can help policymakers, educators, and curriculum developers for creating helpful surroundings that encourage the use of ICT. This can lead to the development of more effective and inclusive educational approaches that take full benefit of technological improvements.

4. Objectives

Specific, measureable objectives are essential for guiding a study in arrangement with its hypotheses. They enable specific measurement of progress, provide clear path for the research process, enhance clarity, and improve communication among different stakeholders.

The following objectives were determined for the present study.

- To study the Attitude towards ICT-based Pedagogy in English teaching among teacher trainees.
- To determine the levels of Attitude towards ICT-based Pedagogy in English teaching among teacher trainees.
- To determine the levels of Attitude towards ICT-based Pedagogy in English teaching among teacher trainees in the context of gender and locality.
- To study the Attitude towards ICT-based Pedagogy in English teaching among teacher trainees in the context of gender and locality.

5. Research Area

Education research has a wide range of different areas. The researcher's aim in present study is to investigate and assess teacher trainees' attitudes towards ICT-based pedagogy in English teaching. Hence, this study's research area is on Educational Psychology.

6. Hypotheses

The following null hypotheses were formulated as per objectives of the present study:

Ho₁: There will be no significant difference between the mean score of Attitude towards ICT-based Pedagogy in English teaching obtained by male and female teacher trainees.

Ho₂: There will be no significant difference between the mean score of Attitude towards ICT-based Pedagogy in English teaching obtained by teacher trainees from rural and urban areas.

7. Limitation of the study

The study was carried out in view of the following some limitations:

- Sample technique's limitations may remain the limitation of the present study. One of the study's limitations is that the results were derived from the responses of the participants.

8. Delimitation of the study

Research is an immense and diverse field in nature. Researcher is always limiting his or her studies due to time, energy, and financial restrictions. The study's delimitations are as follows:

- This study was delimited to the teacher trainees of Andaman and Nicobar Islands, Union territory of India only.

9. Definition of the key-words

➤ ICT Based Pedagogy:

Theoretical Definition:

ICT-based pedagogy is the usage of information and communication technology (ICT) tools, techniques and resources in the process of teaching and learning. It requires using digital technologies to improve the delivery of educational content, allow interactive learning experiences to learner, and improve educational outcomes. UNESCO (2011) stated that "ICT-based pedagogy includes the use of computers, the Internet, multimedia resources, and other digital technologies to upkeep and improve the teaching and learning process". This concept underscores the diverse

character of ICT tools, which range from simple computing devices to sophisticated internet platforms and different multimedia apps.

The use of ICT in pedagogy is proposed to provide a more engaging and active learning environment. According to Mishra and Koehler (2013), "ICT-based pedagogy involves the thoughtful integration of technology, content, and pedagogy to create effective teaching and learning experiences". This concept highlights the importance of a balanced approach that takes into account not only technology resources, but also educational content and pedagogical practices. Effective ICT-based instruction requires an in-depth understanding of how to combine these components to fulfill the various needs of students.

ICT-based pedagogy refers to a range of educational strategies that use technology to promote learning. According to Anderson (2004), "ICT-based pedagogy includes the use of digital tools to assist personalized learning, collaborative projects, and interactive simulations, thus promoting active engagement and deeper understanding among students". This perspective highlights the importance of ICT in promoting active and participatory learning experiences in which students are encouraged to interact, investigate, and engage with the information in meaningful ways.

Operational Definition:

In the present study, scores obtained by teacher trainees on researcher-made Attitude scale for ICT based pedagogy in English teaching was considered as an attitude towards ICT based pedagogy in English teaching among the teacher trainee.

➤ Teacher Trainees:

Teacher trainees are those who are being trained to become teachers by taking challenging academic courses and gaining practical experience. They study theoretical foundations, pedagogical approaches, curriculum design, and classroom management techniques. Successful teachers use critical thinking, adaptation, and reflective practice to address student needs and educational perspectives. They are prepared to provide outstanding support for student learning and growth.

10. Variables

The following are the variables for the present study:

Independent Variable

No.	Independent Variable	Levels
1	Gender	Male
		Female
2	Area	Urban
		Rural

Dependent Variable

In the present study, the Attitude towards ICT-based Pedagogy in English teaching is considered as the Dependent Variable. (Scores obtained by teacher trainees on researcher-made Attitude scale for ICT based pedagogy in English teaching)

Controlled Variable

Area: Andaman and Nicobar Islands, Union territory of India

Stakeholder: Teacher Trainee

11. Population and Sample

The Teacher Trainees of Andaman and Nicobar Islands were the population of the present study. The list of all Teacher Education Institute (TEIs) in Andaman and Nicobar Islands was prepared. TEIs were selected by the Lottery Sampling Method. All teacher trainees studying in selected colleges were the sample of the present study by cluster sampling method. Hence, the selection of Colleges was made by Simple Random Sampling Technique and the selection of teacher trainees was by cluster sampling method. At last, the Sample size was 107 teacher trainees of Andaman and Nicobar Islands.

12. Research Methodology

To collect the information from a huge group of people and to analyze the current Status, the researcher selected the "Survey Method" for the present study.

13. Tool

The main objective of the present study was to study attitude towards ICT-based pedagogy in English teaching among teacher trainees in Andaman and Nicobar Islands. The construction of an appropriate tool, in this case, an Attitude Scale towards ICT based pedagogy in English teaching, played an essential role in the process of research. The tool construction followed a systematic process, involving several key phases. The researcher began the process of constructing tool by determining the components of the Attitude Scale, which included components such as Cognitive Component (Perceived Usefulness, Perceived Ease of Use, Knowledge and Awareness), Affective Component (Interest and Enjoyment, Confidence, Attitude towards Technology), Behavioral Component (Intention to Use, Frequency of Use, Adaptability and Flexibility), Contextual Factors (Access to Resources, Training and Support, Institutional Support). After the determination of components, statements for the Attitude Scale were framed. In result there were 70 statements in a primary form. Expert review was pursued to improve the attitude scale, including valuable feedback and suggestions from experts. Consequently, piloting was conducted, leading to the scoring of the Attitude Scale. Item analysis involved a careful process, including the calculation of 't'-values and the selection of statements showing the most significant difference at the level of 0.01 between upper and lower group. The final form of the Attitude Scale was then prepared, having 35 statements categorized as positive or negative. Scoring scheme for the tool was prepared, with a distinction made between positive and negative statements. The final form of the Attitude Scale toward ICT-based pedagogy in English teaching was generated.

14. Data Collection

The permission of the principals of the selected Teacher Education Institutes (TEIs) was asked. After obtaining permission, rapport was established with the teacher trainees of the Institutes. Teacher trainees were given the tool to give the response. After giving sufficient time to the teacher trainees, tools were collected.

15. Data Analysis

The data analysis process involved of multiple processes. At first, the raw data was entered into MS Office's Microsoft Excel Programme. The data was then filtered and classified on the basis of objectives and hypotheses. To determine the levels, Quartiles Q_1 and Q_3 were calculated. To systematically test the null hypotheses formulated in the study, a "t"-test was applied, which allows for statistical comparison and inference based on collected data.

Table: A
Level-wise Teacher Trainees

No.	Level		No. of trainees	%
1	Low Level	37-52	30	28.04
2	Moderate Level	53-107	50	46.73
3	High Level	108-169	27	25.23
Total			107	100

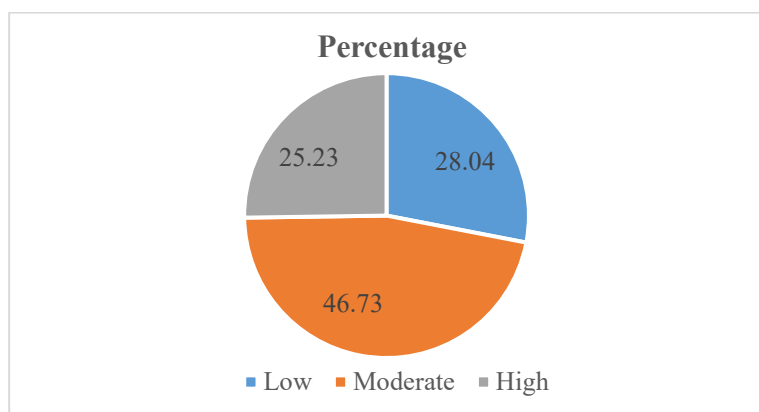


Table: B
Level-wise Teacher Trainees Distribution in the context of Gender

No.	Level		Male		Female	
			No. of trainees	%	No. of trainees	%
1	Low Level	37-52	20	40.82	10	17.24
2	Moderate Level	53-107	28	57.14	22	37.93
3	High Level	108-169	1	02.04	26	44.83
Total			49	100.00	58	100.00

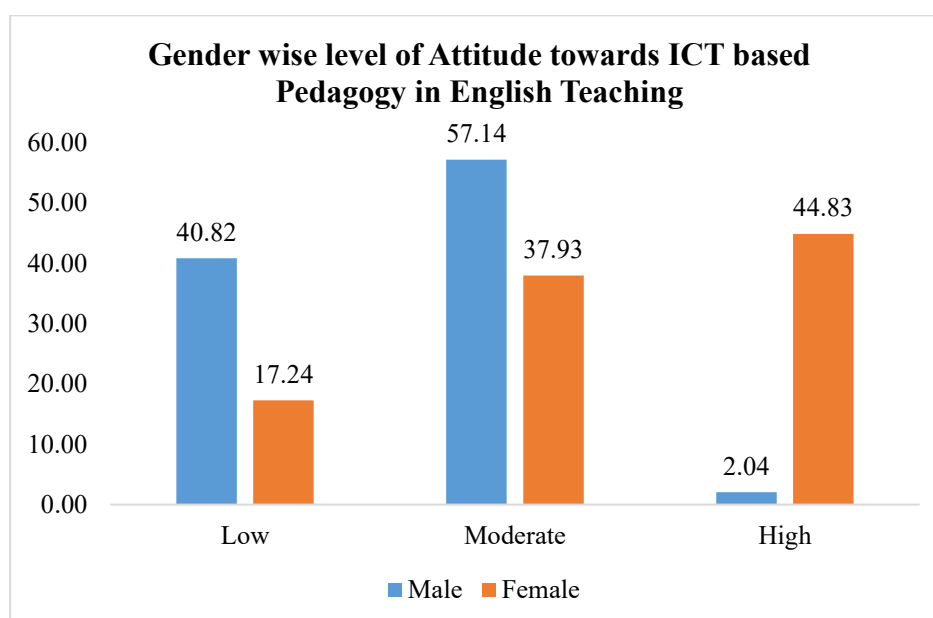


Table: C
Level-wise Teacher Trainees Distribution in the context of Locality

No.	Level		Urban		Rural	
			No. of trainees	%	No. of trainees	%
1	Low Level	37-52	11	18.33	19	40.43
2	Moderate Level	53-107	23	38.33	27	57.45
3	High Level	108-169	26	43.33	1	02.13
Total			60	100.00	47	100.00

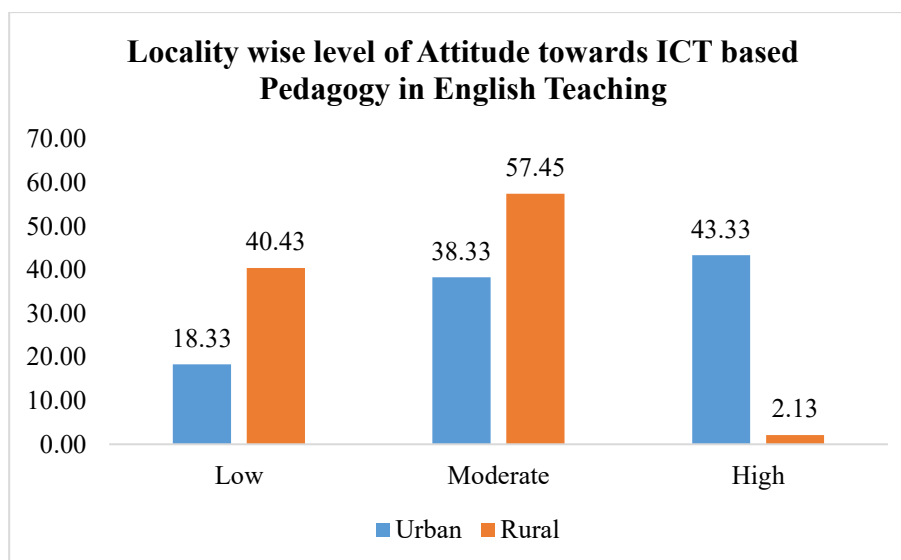


Table: E Hypotheses Testing

Hypotheses	Group	N	M	SD	SE _d	t-value	Remarks
Ho ₁	Male	49	62.20	21.63	5.93	6.39	0.01
	Female	58	100.07	38.52			
Ho ₂	Urban	60	97.75	39.25	6.04	5.66	0.01
	Rural	47	63.55	22.50			

16. Findings

- 1) The distribution of teacher trainees across different levels reveals that 46.73% fall within the "Moderate" level, 28.04% are classified as "Low" and 25.23% achieve scores indicating "High" level of attitude towards ICT-based pedagogy in English teaching.
- 2) Among male teacher trainees, 57.14% fall within the "Moderate" level, 40.82% are categorized as "Low", and a minimal 2.04% demonstrate "High" attitude. Conversely, among female teacher trainees, 44.83% achieve "High" attitude, 37.93% fall within the "Moderate" level, and 17.24% are classified as "Low," highlighting notable gender inequalities in attitude across these levels.
- 3) Urban teacher trainees predominantly fall into the "High" level (43.33%), followed by "Moderate" (38.33%) and "Low" (18.33%). In contrast, rural trainees are primarily categorized as "Moderate" (57.45%), with smaller proportions in the "Low" (40.43%) and "High" (2.13%) levels, highlighting different performance disparities between urban and rural settings among teacher trainees.

- 4) Female teacher trainees are having more positive attitude towards ICT-based pedagogy in English teaching than male teacher trainees.
- 5) Teacher trainees from urban areas outperform those from rural ones in terms of attitude towards IC-based pedagogy in English teaching.

17. Conclusion

The study examined the attitudes of teacher trainees in Andaman and Nicobar Islands, Union territory of India towards ICT-based pedagogy in English teaching, with a specific focus on gender and locality. It found the significant differences in attitudes between male and female teacher trainees, with females generally displaying a more positive attitude towards ICT-based pedagogy in English teaching. This inequality suggests that gender plays an important role in shaping attitude and readiness to adopt technology-enhanced teaching pedagogies. The study emphasized varying levels of zeal among teacher trainees from urban and rural areas. Urban trainees showed higher levels of positive attitude and comfort with ICT resources compared to their rural teacher trainees, indicating differences in access to technology and training opportunities based on geographical locality. These findings highlight the importance of targeted involvements to bridge the digital gap among teacher trainees in Andaman and Nicobar Islands, Union territory of India. Efforts intended at enhancing ICT literacy and confidence among all teacher trainees, regardless of gender or locality, are essential for preparing future educators to effectively integrate technology into their teaching practices. By addressing these inequalities, Teacher Educational Institutions (TEIs) can also ensure that all teacher trainees can have fair access to the tools and skills which are very essential to engage students through innovative and effective pedagogical approaches. Nurturing a positive attitude towards ICT among teacher trainees contributes to enhance the quality and inclusion of English language instruction in the county.

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TRANSFORMING EDUCATION: INNOVATIVE PRACTICES AND POLICIES FOR THE 21ST CENTURY

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ABSTRACT

The 21st century has brought fast technological, social, and cultural changes, making it necessary to transform education systems across the world. This paper examines innovative educational practices and policies that respond to the changing needs of learners and educators. It focuses on technology-based learning, student-centered teaching, inclusive education, and competency-based curricula, along with policies that promote equal access, teacher development, and lifelong learning. By reviewing successful models and current strategies, the study shows how innovation and policy together can improve student engagement, critical thinking, and creativity. The paper also highlights the need to align educational reforms with global goals such as sustainability, digital equity, and social justice. It emphasizes the role of emerging technologies, data-based decisions, and collaboration among governments, institutions, and communities in building strong and flexible education systems. It concludes that effective educational transformation requires both classroom innovation and supportive, future-ready policies

Key words: Education, Technology, Innovation practice, Educational Policies.

INTRODUCTION

Education in the 21st century faces unprecedented challenges and opportunities due to rapid advancements in technology, globalization, and shifting societal needs. Traditional teaching methods and outdated policies are no longer sufficient to prepare learners for the dynamic demands of modern life. To address this, educational systems are increasingly adopting **innovative practices** such as technology-enhanced learning, competency-based curricula, student-centered pedagogy, and inclusive teaching strategies.

Alongside these practices, **progressive policies** play a critical role in ensuring equitable access, fostering teacher professional development, and promoting lifelong learning. Together, innovation and policy create a framework that not only enhances student engagement, creativity, and critical thinking but also equips learners with the skills and mindset necessary to thrive in a rapidly changing world. By exploring emerging approaches and supportive policies, this study highlights how education can be transformed to meet the needs of the 21st century.

IMPORTANCE OF TRANSFORMING EDUCATION

“**Transforming Education**” refers to the process of **changing traditional educational systems, methods, and policies** to make learning more effective, relevant, and adaptable to the needs of today’s world. Transforming education in the 21st century involves reimagining teaching, learning, and assessment to meet the demands of a rapidly changing world. It emphasizes learner-centered and inclusive approaches, integration of digital technologies, competency-based curricula, and lifelong learning opportunities. Educational transformation also requires strong policies, innovative pedagogy, continuous teacher professional development, and collaboration among

governments, institutions, and communities. By focusing on equity, flexibility, and real-world skills, transforming education aims to prepare learners to think critically, adapt to change, and contribute meaningfully to sustainable social and economic development. At the same time, supportive policies are essential to provide equitable access, professional development for teachers, and infrastructure to implement innovations effectively. Together, innovative practices and progressive policies ensure that education is relevant, engaging, and capable of preparing learners for lifelong success. Without such transformation, education risks failing to meet the cognitive, social, and emotional demands of the modern world.

THE ROLE OF EMERGING TECHNOLOGIES

Emerging technologies like AI, VR/AR, and gamification are revolutionizing education by personalizing learning, boosting engagement through immersive experiences (virtual field trips, simulations), providing data-driven insights for teachers, and expanding access to global resources, transforming passive learners into active, collaborative participants ready for a digital world while making education more accessible and efficient. They serve as powerful tools to support teachers, not replace them, fostering deeper understanding and catering to diverse needs.

Personalization: AI tutors adapt to individual student pace, offering targeted support or advanced material, addressing mixed-ability classrooms effectively.

Engagement & Immersion: VR/AR creates realistic simulations (e.g., virtual surgery) and 3D models, while gamification (points, badges) makes learning fun and interactive, boosting motivation.

Accessibility & Flexibility: Digital resources, online platforms, and masterclasses provide instant access to updated, diverse, and affordable educational content globally, breaking down barriers.

Enhanced Teaching & Data: AI helps teachers with grading and planning, while real-time analytics offer insights, freeing them to act as coaches and mentors.

Flipped Classrooms & Collaboration: Technology supports models where students learn content at home and use class time for hands-on activities, fostering critical thinking.

Security & Efficiency: Blockchain offers secure, verifiable digital credentials, streamlining processes and building trust.

INNOVATIVE PRACTICES AND POLICIES FOR THE 21ST CENTURY

Innovative 21st-century education focuses on developing critical skills (4 Cs: Critical Thinking, Creativity, Collaboration, Communication) through practices like **Personalized & Blended Learning**, Flipped Classrooms, **Gamification**, and **Project-Based Learning**, supported by technology (AI, AR/VR). Policies, like India's NEP 2020, emphasize holistic development, multidisciplinary approaches, digital literacy, and continuous teacher training to prepare students for a complex, globalized world.

A. INNOVATIVE PRACTICES

Personalized & Adaptive Learning: Tailoring pace and content to individual student needs using technology.

Blended & Flipped Classrooms: Combining online digital learning with in-person discussions, flipping traditional homework/lecture models.

Gamification: Using game-based elements to increase engagement and motivation.

Project-Based Learning (PBL): Students learn by working on complex, real-world projects.

Experiential Learning: Immersive, hands-on experiences, often using AR/VR to make abstract concepts tangible.

Social-Emotional Learning (SEL): Focusing on emotional intelligence, empathy, and self-regulation.

Computational Thinking: Developing problem-solving skills through logical, algorithmic thinking.

Collaborative Learning: Encouraging teamwork and peer teaching.

B. POLICIES OF 21ST-CENTURY EDUCATION

The policies of 21st-century education are designed to respond to rapid technological, social, economic, and cultural changes. These policies aim to create inclusive, flexible, learner-centered, and future-ready education systems that equip learners with essential skills for lifelong learning and global citizenship.

1. Learner-Centered Education Policy

This policy emphasizes shifting the focus from teacher-centered instruction to learner-centered approaches. It promotes active learning, critical thinking, creativity, collaboration, and problem-solving skills, allowing learners to construct knowledge through meaningful experiences.

2. Inclusive Education Policy

Inclusive education policies ensure equal access to quality education for all learners, regardless of gender, disability, socio-economic background, language, or cultural differences. These policies support universal design for learning (UDL), special education services, and equitable learning opportunities.

3. Digital and Technology-Integrated Education Policy

This policy supports the integration of information and communication technology (ICT) in teaching and learning. It encourages digital literacy, online and blended learning, use of artificial intelligence, and access to digital resources to enhance learning outcomes.

4. Competency-Based Education Policy

Competency-based policies focus on mastery of skills and knowledge rather than rote memorization. Learners progress based on demonstrated competencies, supporting personalized learning pathways and real-world skill application.

5. Lifelong Learning Policy

This policy recognizes learning as a continuous process beyond formal schooling. It promotes adult education, vocational training, reskilling, upskilling, and flexible learning opportunities to meet changing workforce demands.

6. Teacher Professional Development Policy

Policies emphasize continuous professional development of teachers through training, mentoring, and capacity-building programs. Teachers are encouraged to adopt innovative pedagogies, digital tools, and inclusive practices.

7. Assessment and Evaluation Reform Policy

This policy advocates for formative, continuous, and competency-based assessments instead of exam-oriented evaluation. It supports diverse assessment methods such as portfolios, project-based assessments, and performance tasks.

8. Equity and Social Justice Policy

Equity-focused policies aim to reduce educational disparities by providing targeted support for disadvantaged and marginalized groups. These policies ensure fair resource distribution and promote social justice in education.

9. Global Citizenship and Values Education Policy

This policy promotes education for global citizenship, sustainability, peace, human rights, environmental awareness, and ethical values to prepare learners for responsible participation in a global society.

10. Governance, Autonomy, and Collaboration Policy

This policy encourages decentralized governance, institutional autonomy, and collaboration among governments, educational institutions, industry, and communities to enhance innovation, accountability, and relevance.

CONCLUSION

Transforming education in the 21st century is essential to meet the demands of a rapidly changing world. By integrating **innovative practices** such as technology-enhanced learning, student-centered pedagogy, project-based activities, and inclusive teaching educational systems can foster critical thinking, creativity, collaboration, and digital literacy among learners. Complementing these practices with **supportive policies** ensures equitable access, teacher development, curriculum relevance, and sustainable implementation. Together, innovation and policy create a holistic framework that prepares students for lifelong learning, global challenges, and meaningful participation in society. Ultimately, a transformed education system empowers learners, strengthens communities, and contributes to building a more adaptive, inclusive, and future-ready society.

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ROLE OF EDUCATIONAL POLICIES IN ENHANCING GIG ECONOMY OPPORTUNITIES FOR PART-TIME WORKING STUDENTS

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ABSTRACT

Today's Gig economy has created a flexible employment opportunity that align with educational policies by Part – time Working Students. This paper explain about how educational policies can support for students' participation in gig-based work. It also explores policy frameworks by NEP 2020 related to create an inclusive and adaptable education system that needs for working students, enhances their employability and promotes lifelong learning. The paper highlights how updated Vocational Education and Internships, Earn- While-You- Learn Schemes can strengthen students to engage gig work while maintaining academic performance. It discusses about the educational policies that it can empower part time students to use the gig economy for financial stability and practical experience. The paper suggest that the policies are essential for creating a balanced environment where academic performance and part time jobs can coexist effectively.

Key Words: Part time working Students, Gig Economy, NEP 2020.

INTRODUCTION

In recent years, most of the college students engage in part-time jobs along with their studies due to rising college fees, financial independence or career growth. According to National Sample Survey (2021) reported that most of the students involved in internships, freelancing, part-time work like taxi drivers or retail jobs and private tutors. NEP 2020 encourage to supports part-time working students through many ways to learn. The Policy allowing through earn-to-learn scheme makes them gain practical experience and upgrading skill without career breaks. It also promoting lifelong learning and employability for part-time workers or future career preparation. A Gig Economy refers to a task-based work. It can be said by short-term, flexible as an alternative of permanent full-time jobs. According to NITI Aayog determine that the gig based workers is expected to grow to 23.5 million by 2029–30, up from 7.7 million now (NITI Aayog, 2022). The paper discusses the role of NEP 2020, policies addressing the academic and professional needs for students also enhancing gig economy opportunities through their skills and innovative work force. Part-time working students support economic growth while preparing them for dynamic future careers. Therefore, this paper proposes a how educational policies enhancing gig economy opportunities for part – time working students.

BACKGROUND AND LITERATURE REVIEW

The NEP 2020 represents a progressive step toward to prepare students for a temporary workforce. Many higher education institutions now offer short-term courses in presentation and communication skills for student's personal and professional development. To Strengthen vocational integration, the MHRD has proposed the establishment of the National Committee on Vocational Education (NCIVE) for vocational education initiatives by career education experts. Then, Government of India has launched the Skill of India (SIM) providing industry – relevant

training. It supports NEP 2020's objective of producing skilled, adaptable and future ready work force (Hema Mehta, 2024).

Apprenticeship training programs provide practical, on-the-job training to college students. These programs enhance the skills and knowledge of students by giving them hands-on experience in a real-life work setting. Apprenticeship training programs in India are a valuable resource for students looking to gain practical experience and enhance their employability. These programs provide students with the necessary skills and knowledge to succeed in their chosen careers, while also providing a direct connection between students and employers (Ravichandran, 2023).

The gig economy has become a prominent employment option for many, offering flexibility and income opportunities, particularly for college students. Gig economy is on the rise in the new era of the fourth industrial revolution, and it has the potential to deliver enormous benefits to developing nations like India. With the collaboration of the government, employees, and educational institutions, challenges may be transformed into opportunities (Rajesh Manikani, 2025).

CONCEPT OF GIG ECONOMY

A Gig Economy involves a temporary contract job or short term contract work that a person may take a work on project for which the payment is made once task completed within the time period. Workers are paid for job such as food delivery or car drivers or education tutor or retail work – they get monthly salary / daily wages/ hour wages. Eg: Uber, Swiggy, Tution Centers and Textiles Shops etc.,

India's Status of Gig Economy, According to NITI Aayog report estimates 7.7 million gig workers in India 2020-21, mostly in medium skilled jobs. Now a days , the gig economy has expanded among college students, offering opportunities to gain work experience along with education. The gig economy emphasises opportunities to give a flexibility, self learning and multiple income based on their gig work.

CHARACTERISTICS OF PART- TIME WORKING STUDENTS

Part-time working students can do individual works fewer hours than a full time employee. Most of the students are working after the formal education. Likewise in Western countries, Students balance their studies with part-time jobs. In recent times, Many college students in India work as part- time workers, usually for less than 30 to 35 hours per week. Some key characteristics:

Flexible Scheduling: Students can manage their work shift according to their priority such as college timing and exam holidays.

Career Entry: Students are getting experience and it helps to implement in new field of work.

Financial Independence: Students can manage their own college fees or tution fees or personal needs by income of part-time work.

Digital Accessibility: Students can easily find jobs through online or website platforms like Swiggy, Zomato, and Online tutors.

NATIONAL EDUCATION POLICY (NEP 2020) AND EMPLOYABILITY ENHANCEMENT

The National Education Policy (NEP) 2020 has a strong focus on integrating education with skill development, aiming to enhance the employability of students, particularly those engaged in gig based work as a part- time working students. By encouraging the students, the NEP 2020 helps to promote a Vocational Education, Internships and Earn- While- You- learn (EWYL)

Scheme for creating a pathways for flexible learning that enable students to balance academics with work experience.

Vocational Education: NEP 2020 makes easy accessible, hands-on experience and provides working students with great future opportunities to learn while formal education and making them ready for future jobs. It offers flexibility to working students through online courses and skill labs. It paves the way for bridging formal learning with online collaboration (Coursera, Udemy). This helps students to develop in depth employable skill acquisition and exposure the skills.

Internships: Part time working students face many difficulties to enrol in their workforce. An Individual should have a set of standard performance skill for the expected jobs. Employability is a set of skills developed through a range of experiences at workshops and work place. Internship programs should build a capabilities in skills such as decision making, creativity, critical thinking, ethical values and professional development. According to academic credentials most of the higher education must required minimum 2 – 4 credits in their undergraduate programme. An internship of 60 to 120 hours duration after the 4th semester will be mandatory for the students. These experiential learning opportunities allow students to gain real world exposure, enhance professional skills while pursuing their studies.

Earn While You Learn Scheme: This Scheme allows students, especially from disadvantaged backgrounds to do part time work in their own college campus like library help, research assistance, etc. It leads to gaining skills, financial support and work experience along with their studies. It offers hands-on training jobs with Rs.2500- Rs.4000/per month to cover educational and reducing economic stress. It helps boosting employability and creating knowledge based economy.

EDUCATIONAL REFORMS: EXPANSION GIG WORK OPPORTUNITIES

Educational Reforms plays an important role in shaping employment by learner's with relevant skills and flexible learning. In context of the growing gig economy, reforms such India's National Educational Policy (NEP) 2020 encourages skill development, vocational training, and experiential learning which leads to expanding gig work opportunities for working students. The contribution of reforms is the integration of vocational education and skill based courses at higher education levels. Through online courses students yearn practical skills such as coding, graphic design, digital marketing, content creation, data analysis and technical services. These courses are used to help prepare learners for project-based work. Furthermore, educational policies encourage entrepreneurship and innovation, for developing a self – employment and independent work. Through startup support and project-based assessments, learners are motivated to explore and create gig roles or future career.

CHALLENGES FACED BY PART-TIME WORKING STUDENTS IN THE GIG ECONOMY

Mismatch Educational Qualification: Many Students participate in low skill level gig work (Delivery, Drivers) that does not equal with their degree qualification, so it limits long-term employability gains.

Instability Income: Many of gig based owners earn higher profits from young students, which increases productivity through hard work and active participation of students. However, these students often do not receive fair payment for their work. Owners may pay low wages or delay salaries and struggling to manage their lives with inadequate income.

Inequality access for digital divide: The majority students are working from rural areas or economically weaker students face challenges such as poor internet connectivity, lack of devices and low digital literacy.

Absence of Student Protection: Gig based workers often lack health insurance, paid leave due to contract-based work. So that part time working students are exposed to financial and physical issues.

RECOMMENDATIONS FOR POLICY ENHANCEMENTS

Institutional Recognition for working students: Educational Institutions should recognize gig based working students by certificate for their internships. Credits may be verified by work experience through a Work-Integrated Learning (WIL).

Flexible Academic Schedule: To support part-time working students, educational institutions can introduce: Hybrid learning mode, Weekend and evening classes through offline or online, on-campus part-time work (Library Assistant, Data entry). This makes working students to balance their work and study without compromising learning outcomes.

Digital Infrastructure & Access Support: Government initiatives and Institutions should provide free internet or Wi-fi in campus, learning digital skill through internship training and certification. This promotes student to participate in the digital gig economy.

Mental Health & Academic Counseling: In Universities or colleges should have a counselling units for supporting working students facing academic and work stress, which helps to resolve the conflict betweenwork and study balance. It should provide proper guidance to students to relieve financial pressure.

CONCLUSION

Educational Policy plays a vital role in enhancing gig economy opportunities for part time working students by bridging gap between learning and working. The NEP 2020 emphasis vocational education, skill development, internships and earn-while-you-learn scheme initiatives have access flexible working opportunities with their academic learning. These polices helps students to develop their skills, digital literacy and encourages them to participate in gig based work and also for future career. The Institutions should create a supportive environment to promote innovation, critical thinking and creativity in their work. It helps students develops self-reliance and financial independence among part-time working students. Educational polices not only enhance their employability but also contribute to the inclusive growth of the gig economy.

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SHORT-FORM VIDEO CONSUMPTION AND ITS PSYCHOLOGICAL, SOCIOLOGICAL, AND PHILOSOPHICAL IMPACT ON 21st CENTURY LEARNERS

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Abstract

The rapid growth of short-form video platforms such as Instagram Reels and YouTube Shorts has significantly changed the learning environment for 21st-century students. These platforms deliver fast, engaging, and graphically rich content that relates to learners of all ages. While short-form videos provide educational opportunities, excessive consumption raises problems about students' psychological health, social behavior, and philosophical approach to information and life. This study takes a theme approach to investigate the psychological, social, and philosophical effects of short-form video consumption on modern learners. The study looks at attention span reduction, emotional dependency, changes in social interactions, value transformations, and altered perceptions of learning and truth. This paper shows the benefits and downsides of using short-form video using earlier research and theoretical viewpoints. The findings suggest the need for conscious, balanced, and critical engagement with digital content to ensure holistic learner development in the 21st century.

Keywords: Short-form videos, learners, psychology, sociology, philosophy, digital media

1. Introduction

In the digital age, education is no longer limited to classrooms, textbooks, or formal instruction. The rise of short-form video platforms has changed the way learners consume knowledge. Short-form videos, which typically average between 15 seconds and one minute, are created to transmit information rapidly while providing great visual and audio stimulation. For 21st-century learners, these platforms have become a regular source of entertainment, information, and even education.

While short-form videos can promote casual learning and creativity, their general and uncontrolled consumption creates serious learning challenges. Learners are increasingly preferring fast content to deep reading, thinking, and focused study. This evolution affects not only academic achievement but also learners' psychological well-being, social interactions, and philosophical perspectives on knowledge, truth, and meaning. Thus, the purpose of this research is to investigate the psychological, sociological, and philosophical effects of short-form video consumption on modern learners.

2. Concept of Short-Form Video Consumption

The frequent viewing of short, algorithm-driven video content using digital platforms and mobile apps is referred to like "short-form video consumption." These videos' quick flow, emotional appeal, and individual recommendations are all designed to increase viewer involvement. Short-form videos, in difference from traditional instructional media, promote

continuous scrolling and quick content flipping, which affects how students learn information (Montag et al., 2021).

Short-form videos can be used by students for a variety of goals, including identity expression, relaxation, peer connection, and occasionally academic learning. However, instructional value is frequently overshadowed by a majority of entertainment-oriented content. Learning about this consuming pattern's effects from a psychological, sociological, and viewpoint of philosophy will help understand its effects.

3. Psychological Impact on Learners

3.1 Attention Span and Cognitive Processing

One of the most frequently cited psychological implications of short-form video watching is a loss in attention span. Frequent exposure to quickly changing content teaches the brain to seek constant novelty. As a result, students may struggle with the continuous concentration needed for reading, problem solving, and critical thinking (Carr, 2010). Video shorts focus basic understanding rather than deep cognitive involvement. Learners may recall visual impressions but struggle to acquire intellectual clarity. Over time, this behavior can have a severe impact on academic performance and intellectual discipline.

3.2 Emotional Regulation and Dependency

Short-form videos are motivating and frequently designed to get pleasure, humor, or excitement. Repeated exposure can lead to emotional reliance, in which students rely on digital information for mood regulation. Excessive use has been linked to increased anxiety, restlessness, and irritability when access is curtailed (Kuss & Griffiths, 2017).

Short-form videos can help student's deals with academic or emotional stress. While occasional usage may bring relief, chronic use might impair emotional resiliency and self-control.

3.3 Motivation and confidence

Short-form video platforms promote comparison with likes, views, and comments. Online validation can help learners evaluate their self-worth. This might affect motivation, inspiring students to priorities online fame over academic or personal development. External evaluation may reduce intrinsic motivation to learn and develop yourself.

4. Sociological Impact on Learners

4.1 Social Relationships and Communication Patterns

Short-form videos have transformed social interaction among learners. Online involvement frequently replaces face-to-face conversation. While digital platforms provide worldwide communication, they can reduce the quality of human interaction. Learners may prefer virtual connections, resulting in social isolation or low interpersonal skills (Turkle, 2011). In addition, communicating through short videos encourages performance before real-life conversation. This can influence how learners express their feelings, thoughts, and identities in social situations.

4.2 Cultural Influence and Identity Formation

Short-form video platforms contribute cultural norms, language, fashion, and behavior. Learners are exposed to global trends, which influence their identity formation. While this exposure raises cultural understanding, it may also lead to imitation without critical examination. Learners may embrace values pushed by influencers instead of forming their own opinions. This phenomena raises worries about cultural homogenization and the erosion of local identity.

4.3 Academic and Social Balance

Regular consumption of short-form videos can interrupt academic routines and social duties. Scrolling frequently replaces study time, physical activity, and family engagement. This imbalance has an impact on learners' academic discipline and social responsibility, leading to stress and decreased productivity.

5. Philosophical Impact on Learners

5.1 Perception of Knowledge and Truth

From a philosophical perspective, short-form videos modify how learners view knowledge. Information is frequently delivered in simple, fragmentary, and entertaining way. Learners may come to associate knowledge with easily consumable text, rather than critical inquiry and evidence-based understanding. This transition poses epistemological issues. Truth becomes subjective, trend-based, and algorithm-driven, rather than rational and reflective (Postman, 1985).

5.2 Meaning, Purpose, and Life Orientation

Continuous exposure to fast-paced content may impair learners' ability to reflect and evaluate. Philosophical inquiry requires silence, kindness, and depth, which short-form media usually lacks. Learners may prioritize immediate reward over long-term objectives, values, and purpose. Such patterns can shape learners' life orientations, favoring consumption over creativity and entertainment over wisdom.

5.3 Freedom, Choice, and Digital Control

Although short-form platforms appear to provide greater flexibility of choice, algorithms largely limit content exposure. Learners may carelessly give up freedom to digital systems that shape preferences and behavior. Philosophically, this causes ethical concerns regarding freedom, agency, and responsibility in the digital era.

6. Educational Implications

Despite these concerns, short-form videos can be used constructively in teaching if used correctly. Educators can use short movies as supplemental tools to encourage critical thinking, discussion, and reflection. Digital literacy instruction is critical for helping students comprehend algorithms, content manipulation, and healthy media habits. Learners must be directed in balancing digital engagement with deep learning, social connection, and self-reflection.

7. Conclusion

Short-form video consumption has become a necessary part of 21st-century learners' lives. While it promotes accessibility, creativity, and participation, its psychological, sociological, and philosophical effects must not be left out. Reduced attention span, emotional reliance, altered social interactions, and a superficial comprehension of knowledge are all major issues. This paper emphasizes the need of mindful and critical engagement with short-form video content. Learners, educators, and institutions must collaborate to encourage healthy digital behaviors that support overall growth. Only through reflective and ethical media use can students get the benefits of short-form videos while also protecting their mental, social, and philosophical well-being.

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ADOLESCENTS' DIGITAL DEPENDENCY AND PHYSICAL HEALTH: A PSYCHOLOGICAL AND SOCIOLOGICAL INQUIRIES INTO 21ST CENTURY EDUCATIONAL CHALLENGES

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Abstract:

Today's adolescents are more dependent on smartphones and other technology, which has changed their way of life and learning environments. Although technology provides access to information and communication, overuse has resulted in serious physical health problems, such as obesity, eye strain, posture problems, and sleep difficulties. This study highlights the effects of digital dependency on adult well-being and educational engagement by examining it through psychological and sociological lenses. In terms of psychology, digital addiction shortens attention spans, increase anxiety levels, and affects self-esteem through comparisons on social media. Peer pressure, family customs, and cultural changes have all contributed to the normalization of extended screen time, which has increased the gap between rural and urban areas and frequently supplanted outdoor activities. This investigation highlights the necessity of incorporating digital wellness into pedagogy, policy, and curriculum design within the context of 21st-century educational difficulties.

Keywords: *Digital Literacy, Adolescent Health, Inclusive Education, sociological lenses, curriculum design.*

Introduction:

In the twenty-first century, adolescence is characterized by an unparalleled absorption in digital technology. Young people's everyday lives are now inextricably linked to smartphones, social media, and online learning environments, which have shaped their identities, relationships, and educational experiences. Although these tools make knowledge and communication more accessible to all, overuse of them has contradictory effects: improved connectedness on the one hand, but a decline in mental toughness, physical health, and educational concentration on the other. This essay examines the topic of teenage digital dependence, evaluating its effects via sociological and psychological perspectives and placing it in the context of more general issues facing modern schooling. The study emphasizes the critical necessity to incorporate digital wellness into pedagogy, policy, and curriculum design by looking at both the advantages and disadvantages of digital immersion.

Conceptual Framework for Digital Dependency:

The obsessive use of digital gadgets for study, entertainment, and communication is known as "digital dependency." Constant notification checking, a preference for online communication over offline communication, and a decrease in outdoor activities and in-person relationships are its hallmarks. Technology changes classroom dynamics and study habits in educational settings by acting as both a potent instructional instrument and a major distraction. For example, a student may utilize a smartphone to access study materials while being sidetracked by social media notifications, which would reduce the effectiveness of their learning. Because of technology's dual nature—its

capacity to both empower and disrupt digital reliance is a complicated phenomenon that calls for careful examination.

Psychological Perspectives:

Adolescent growth is significantly impacted by digital reliance from a psychological perspective. Students find it challenging to maintain concentration on academic assignments due to constant alerts and multitasking. Teenagers who compare themselves negatively to their classmates' experience anxiety and low self-esteem as a result of FOMO (fear of missing out) and continuous exposure to carefully manicured online lives. Additionally, exposure to blue light delays the production of melatonin, and using electronics late at night causes sleep deprivation, which hinders learning and memory consolidation. Adolescents equate their value with the quantity of likes and comments they receive on social media, and identity development is increasingly mediated by digital validation. This reliance on acceptance from others erodes confidence and cultivates brittle self-concepts. The psychological risks of excessive internet usage are highlighted by research showing that teenagers who use social media for more than three hours a day exhibit increased levels of anxiety and depressed symptoms.

Sociological Perspectives:

Digital dependence is a reflection of larger cultural and social changes. Peer pressure is important because being online is seen as a sign of popularity, and teenagers copy their friends' online behaviours in order to fit in. Additionally, family interactions are changing as screen-based communication increasingly takes the place of conventional talks and bonding activities. The normalizing of prolonged screen time, especially among urban teenagers, is indicative of cultural transformations, whereas rural adolescents experience digital exclusion because of restricted access. This exacerbates educational disparities by creating a paradoxical split where urban adolescents experience overexposure and rural youth experience underexposure. As a result, technology serves as both a barrier and a bridge, enabling teenagers to access international networks while also perpetuating social division. For instance, urban adolescents in India could spend six to eight hours a day online, but their rural counterparts sometimes do not have dependable internet connection. This leads to uneven educational achievements and exacerbates socioeconomic gaps.

Physical Health Implications:

Digital dependence has equally important effects on one's physical health. Long-term screen time and sedentary lifestyles lead to obesity, and constant screen time results in headaches, eye strain, and visual issues. Back and neck discomfort are among the musculoskeletal diseases caused by bad posture and slouching when using a gadget. Due to circadian rhythm disruption and decreased sleep quality caused by late-night gadget use, sleep problems are widespread. Digital dependence is not just a behavioral problem but also a public health concern as these behaviours may eventually lead to chronic health concerns. The majority of teenagers surpass the World Health Organization's recommended daily limit of less than two hours of recreational screen time, underscoring the discrepancy between health recommendations and actual behavior.

Educational Difficulties:

Education has particular difficulties as a result of digital reliance. Devices that divert attention from teaching and lower participation are a big problem in the classroom. Virtual simulations are gradually taking the place of outdoor and experiential learning opportunities, robbing pupils of complete growth. There are clear curriculum gaps since few curricula specifically address digital wellbeing, leaving pupils unable to control their digital behaviours. The situation is further

complicated by equity concerns: metropolitan students experience overexposure, while rural pupils lack access to digital resources, resulting in a twin burden of excess and exclusion. When students are always using their gadgets, teachers find it challenging to maintain classroom discipline, which highlights the need for systemic remedies.

Pedagogical and Policy Recommendations:

A multifaceted strategy is needed to address digital reliance. Students may learn how to utilize devices in a healthy way by integrating digital wellness courses into their curricula. The balance between digital and physical involvement may be restored via balanced pedagogy that combines online learning with outdoor activities. Families are urged to create routines that control screen usage and foster offline bonding, and parental mediation is essential. National policy action is required, with education boards enforcing digital wellness standards and assisting schools in putting them into practice. Equally crucial is teacher preparation, since educators need to be prepared to control digital distractions and promote appropriate technology usage. Healthy habits may be reinforced and equilibrium restored with the help of useful tactics like "digital detox days," when kids participate in outdoor, group learning without electronics.

Conclusion:

Adolescent digital dependence is a complicated issue that touches on sociology, psychology, and education. It affects social interactions, academic performance, and physical health, making it a challenge for both individuals and society as a whole. A comprehensive strategy that incorporates education, policy, family participation, and cultural understanding is needed to address this problem. In order to ensure that teenagers develop into resilient, healthy, and socially engaged adults, education in the future must strike a balance between the advantages of technology and the demands of human well-being. Societies may benefit from technology while preserving the physical and mental well-being of future generations by incorporating digital wellness into educational systems.

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PHILOSOPHY OF EDUCATION: A COMPARATIVE STUDY OF EASTERN AND WESTERN PERSPECTIVES

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Abstract

The philosophy of education has evolved through diverse cultural, linguistic, and intellectual traditions, with Eastern and Western perspectives offering distinct yet complementary approaches to human development. This paper presents a comparative study highlighting how each tradition conceptualizes the aims, methods, and values of education. Eastern philosophies—drawn from Vedānta, Buddhism, Confucianism, and Taoism—emphasize holistic self-realization, moral cultivation, and harmony between the individual and the cosmos. In contrast, Western educational thought, shaped by Socratic inquiry, Aristotelian rationalism, Enlightenment humanism, and contemporary pragmatism, foregrounds critical thinking, scientific reasoning, and individual autonomy. The study explores how both perspectives interpret the roles of teacher and learner; the nature of knowledge, and the ethical foundations of education. By comparing these traditions, the paper argues that a balanced model integrating Eastern wisdom with Western critical inquiry can enrich contemporary educational philosophy, especially in multicultural and multilingual societies. Such integration fosters not only intellectual competence but also ethical sensitivity, global citizenship, and lifelong learning. The study concludes that cross-cultural philosophical engagement can contribute significantly to 21st-century educational reforms and policy frameworks.

Keywords: Philosophy, Education, Eastern Philosophy, Western Philosophy, Comparative study

INTRODUCTION

Philosophy of education has long served as a foundation for understanding the aims, methods, and values embedded in educational systems across civilizations. Both Eastern and Western traditions have shaped human thought for centuries, offering distinct interpretations of knowledge, learning, morality, and the purpose of life. As education increasingly becomes globalized, comparative philosophical inquiries gain relevance in rethinking contemporary pedagogical practices. This paper explores the philosophical underpinnings of education in Eastern and Western intellectual traditions, highlighting similarities, divergences, and their potential integration for modern educational contexts.

Eastern traditions such as Vedānta, Buddhism, Confucianism, and Taoism emphasize harmony, self-discipline, moral refinement, and inner transformation. Western traditions—from ancient Greek philosophy to modern pragmatism—prioritize rational inquiry, individual autonomy, democratic participation, and scientific reasoning. A comparative understanding of these traditions can contribute significantly to educational reforms that balance intellectual, ethical, and spiritual dimensions of learning.

EDUCATIONAL AIMS IN EASTERN AND WESTERN TRADITIONS

Eastern philosophies generally approach education as a means for personal transformation and the cultivation of moral and spiritual awareness. In Vedānta, the goal of learning is to realize the

essential unity between the self (Ātman) and ultimate reality (Brahman), liberating individuals from ignorance. Buddhism emphasizes ethical conduct, mindfulness, and wisdom as pathways to overcoming suffering, fostering compassion and heightened awareness. Confucianism views education as central to character formation and social harmony, guiding individuals toward becoming virtuous persons (junzi). Similarly, Taoism values naturalness and effortless action (wu wei), encouraging learners to cultivate intuition and align with the rhythms of nature. Across these traditions, education is understood not merely as the acquisition of knowledge but as a holistic process that nurtures ethical, emotional, and spiritual growth.

In contrast, Western philosophical traditions often prioritize reason, critical thinking, and individual autonomy as central educational aims. Socratic methods emphasize dialogue and inquiry to uncover truth and cultivate virtue, while Aristotle highlights the development of intellectual and moral capacities through rational reflection. Enlightenment thinkers, including Locke and Rousseau, stress empirical knowledge, individual rights, and natural development as foundations for learning. Modern pragmatists, particularly John Dewey, advocate experiential education, democratic participation, and the practical integration of theory and practice. Collectively, Western approaches frame education as a means to develop rational judgment, scientific understanding, and civic responsibility, emphasizing the learner's capacity for independent thought and informed action.

TEACHER-STUDENT RELATIONSHIP

Eastern educational models place significant emphasis on respect for the teacher and the transmission of knowledge as a transformative process. In Indian philosophy, the guru-śiṣya relationship embodies a profound spiritual connection, with the teacher guiding the student not only in intellectual matters but also in personal and moral development. Similarly, Confucian traditions regard teachers as moral exemplars, whose conduct provides a model for students to emulate. These approaches value discipline, reverence, and reflective learning, highlighting the teacher's role as a central figure in shaping character and ethical understanding.

In contrast, Western educational models often view teachers as facilitators who support active learning rather than as sole authorities. Socratic pedagogy emphasizes dialogue, questioning, and collaborative exploration, encouraging students to develop critical thinking skills through inquiry. John Dewey's philosophy further promotes the classroom as a democratic environment where teachers and learners work together to solve problems and apply knowledge practically. In these traditions, educators focus on fostering autonomy, creativity, and independent reasoning, positioning the learner's engagement and intellectual growth at the center of the educational process.

NATURE OF KNOWLEDGE AND LEARNING

Eastern conceptions of knowledge often blend intellectual reasoning with intuitive and experiential understanding, framing learning as both a personal and spiritual journey. In Vedānta, a distinction is made between lower knowledge (apara vidyā), which deals with practical or worldly understanding, and higher knowledge (para vidyā), which leads to self-realization and ultimate truth. Buddhist thought emphasizes direct experience, where mindfulness and meditative insight enable learners to perceive reality firsthand. Confucian philosophy, meanwhile, underscores the cultivation of moral understanding through disciplined practice and reflection, highlighting the ethical dimension of knowledge acquisition.

Western conceptions of knowledge, by contrast, tend to emphasize logical reasoning, empirical investigation, and structured inquiry. Philosophical contributions from Plato, who distinguished between opinion and true knowledge, and Aristotle, with his systematic approach to scientific inquiry, have strongly influenced Western educational traditions. Enlightenment thinkers further reinforced the value of rational analysis, evidence-based reasoning, and objective assessment. Consequently, Western approaches often focus on measurable outcomes, critical evaluation, and the pursuit of universal truths through methodical study and empirical verification.

MORAL AND ETHICAL FOUNDATIONS

Eastern educational ethics place a strong emphasis on communal welfare, moral duty, and personal discipline. In Indian philosophy, the concept of Dharma provides a guiding moral framework that shapes individual behavior in accordance with societal and cosmic order. Buddhist ethics stress compassion, mindfulness, and the principle of non-harm, encouraging learners to act with empathy and consideration for others. Confucian traditions highlight filial piety, righteousness, and benevolence, promoting ethical conduct through respect for family, society, and social harmony. Collectively, these approaches integrate moral development with education, fostering ethical, emotional, and relational growth alongside intellectual learning.

In contrast, Western educational ethics often center on individual rights, autonomy, and principled moral reasoning. Kantian ethics emphasizes rational moral duty, guiding individuals to act according to universal ethical principles. John Dewey's perspective extends ethical consideration to social contexts, advocating for democratic engagement and collective problem-solving in moral decision-making. Western traditions therefore, encourage learners to develop independent judgment, critically evaluate ethical dilemmas, and exercise personal responsibility, balancing individual freedom with social accountability in educational practice.

CONTEMPORARY RELEVANCE AND INTEGRATION

Modern educational systems confront numerous challenges, including the pressures of globalization, increasing cultural diversity, rapid technological change, and the erosion of shared moral frameworks. One promising response is to integrate Eastern holistic values with Western traditions of critical thinking, creating an approach that addresses both intellectual rigor and ethical development. Such integration can blend mindfulness and reflective practices with inquiry-based learning, fostering environments where students cultivate awareness alongside analytical skills. It also emphasizes the importance of balancing disciplinary knowledge with emotional intelligence and moral growth, encouraging learners to develop both competence and character.

A blended educational model further promotes democratic, inclusive classrooms guided by compassion and social harmony, while integrating experiential learning with ethical reflection. By embracing bilingual or multilingual education rooted in philosophical and cultural diversity, students gain broader perspectives and intercultural sensitivity. This approach seeks to produce learners who are not only intellectually capable but also emotionally grounded and socially responsible, preparing them to navigate complex global challenges with insight, empathy, and ethical judgment.

CONCLUSION

The comparative study of Eastern and Western philosophies of education reveals both unique insights and shared aspirations. While Eastern traditions emphasize moral transformation, inner harmony, and spiritual depth, Western perspectives prioritize critical reasoning, autonomy, and democratic engagement. Contemporary education stands to benefit from harmonizing these

approaches, creating models that nurture both intellectual competence and ethical sensitivity. A cross-cultural philosophical synthesis can strengthen educational practices in the 21st century, fostering global citizenship, intercultural understanding, and holistic learning.

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TRAINING PARENTS AS LITERACY PARTNERS: AN INCLUSIVE APPROACH FOR CHILDREN WITH SPECIAL NEEDS

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Abstract

The National Education Policy (NEP) 2020 strongly emphasizes building a foundation for every child through inclusive and barrier-free education. In working with children with special needs and their families, it has been steadily observed that parents establish a strong commitment to supporting their child's learning but often lack access to structured guidance and practical tools. The study aims to address this gap by designing a simple, activity-based, and easy-to-follow parental training program that can be implemented at home to develop their child's early literacy and learning skills. The program includes activity-based modules, visual supports, and multisensory strategies customized to meet each child's individual pace and ability. It is designed to help parents feel more confident and connected in their child's learning journey. The parental training was developed with inclusive education principles and validated through expert feedback and parent trials. Preliminary findings specify that when parents are guided and involved, children indicate noticeable improvement in attention, word recognition, and communication skills. This research supports the vision of NEP 2020 by empowering parents to become active partners in creating an inclusive, joyful, and barrier-free learning environment for children with special needs.

Keywords: Foundational Literacy Skills, Children with Special Needs, Inclusive Education, Parent Engagement.

1. Introduction

Inclusive education has emerged as both a global and national priority, emphasizing equitable learning opportunities for all children irrespective of their abilities (UNESCO, 2020). In India, the National Education Policy (NEP) 2020 places strong emphasis on foundational literacy and numeracy, recognizing that early literacy forms the base for future academic success, lifelong learning, and participation in society (Government of India, 2020). For children with special needs, developing foundational literacy skills such as attention, phonological awareness, vocabulary, letter recognition, and emergent word reading often requires structured support, individualization, and repeated practice across settings (Justice & Kaderavek, 2004). Parents are often highly committed and emotionally invested in their child's progress, but they frequently lack access to structured guidance, practical tools, and confidence to implement literacy-building strategies independently. This gap is particularly visible when parents are eager to help but do not know how to adapt instruction to the child's pace, sensory needs, and communication level (Afolabi, 2014).

Parent-mediated interventions and family-school collaboration are widely recognized as effective components of inclusive education (Bronfenbrenner, 1979; Vygotsky, 1978). When parents are supported with simple, evidence-informed strategies and activity-based routines, children can experience improved engagement, attention, communication, and early literacy outcomes (Shikako-Thomas et al., 2013; Samadi & McConkey, 2018). This research addresses this need by designing and implementing a four-week parental training program that prepares parents

to serve as literacy partners for their children with special needs. The program integrates multisensory strategies, visual supports, and activity-based modules that can be individualized to each child's learning profile. The study also seeks to evaluate preliminary effectiveness using a pretest–post-test framework. Specific attention is given to changes in parental confidence and engagement, as these factors are critical in sustaining long-term literacy support.

1.1 Theoretical Framework

Parent involvement in literacy development is best understood through Bronfenbrenner's ecological systems theory, which emphasizes that children's growth and well-being are shaped by interactions across family, school, and community contexts (Bronfenbrenner, 1979). Within this framework, training parents as literacy partners strengthens the home–school mesosystem, ensuring that literacy practices are consistently reinforced across environments. Vygotsky's socio-cultural theory further highlights the importance of social mediation, where parents scaffold learning through shared reading, dialogue, and modelling, thereby supporting children's progression within the zone of proximal development (Vygotsky, 1978). This theoretical lens positions parents not as passive supporters but as active mediators of literacy, capable of enhancing both academic and social outcomes for children with special needs.

Inclusive education frameworks also underscore the significance of collaborative family–school partnerships in promoting equitable access to literacy. Research demonstrates that when parents are trained to engage in literacy practices, children with special needs show improvements in communication, self-expression, and social participation (Afolabi, 2014; Holmes, 2022). Such engagement also reduces barriers to inclusion by empowering families to contribute meaningfully to their child's educational journey (Samadi & McConkey, 2018). Thus, the theoretical foundation for training parents as literacy partners integrates ecological, socio-cultural, and inclusive perspectives, highlighting that literacy development is a shared responsibility between educators and families, and that parent engagement is central to fostering inclusive learning environments and improving quality of life outcomes for children with special needs.

2. Methods

2.1 Research Design

The study adopted a pre-experimental one-group pretest–posttest design. This design was selected to examine preliminary effectiveness of the parental training program by comparing outcomes before and after the four-week intervention within the same group of participants.

2.2 Participants

The sample consisted of 20 parents of children with special needs selected using purposive sampling from inclusive and special education contexts. The children were in the early primary age range (approximately 5–8 years) and presented with diverse learning and developmental needs (e.g., developmental delay, autism spectrum disorder, learning difficulties, and speech-language needs).

Inclusion and Exclusion Criteria

Inclusion criteria:

- Parents of children identified with special educational needs and currently receiving educational support.
- Parent of children in the foundational stage, where early literacy skills are a key learning focus.
- Parents willing to participate consistently for the full four-week training period.

Exclusion criteria:

- Parents unable to attend training sessions or implement home activities due to time constraints.
- Children with severe sensory impairments requiring specialized interventions beyond the scope of the present training model.

2.3 Intervention: Four-Week Parental Training Program

The training program was designed as a simple, activity-based and easy-to-follow module for home implementation. It incorporated inclusive education principles, expert validation, and parent trials to ensure feasibility. The core components included visual supports, multisensory strategies, structured routines, and individualized pacing. Each week included guided demonstration, parent practice, feedback, and home-based implementation tasks.

Week 1: Understanding Early Literacy and the Child's Learning Profile

- Overview of foundational literacy skills (attention, listening, vocabulary, print awareness).
- Understanding individual learning needs and the role of routine and motivation.
- Setting realistic goals and preparing a supportive learning space at home.

Week 2: Multisensory and Activity-Based Literacy Strategies

- Using visual aids (picture cards, labeled objects) and tactile supports (sand tracing, textured letters).
- Letter–sound association through games and daily-life objects.
- Shared reading with picture cues and predictable, repetitive text.

Week 3: Communication and Interactive Reading

- Strategies for encouraging expressive language during literacy tasks.
- Turn-taking, prompting, and reinforcement during shared reading and play.
- Using daily routines to expand vocabulary and functional communication.

Week 4: Reinforcement, Individualization, and Progress Monitoring

- Adapting activities to match the child's pace and attention span.
- Troubleshooting common challenges (avoidance, sensory overload, frustration).
- Home progress monitoring and planning for continued implementation.

2.4 Tools for Data Collection

Three tools were used for data collection:

- 1) Early Literacy Skills Checklist: assessed attention during tasks, letter recognition, emergent word recognition, and communication indicators.
- 2) Parental Involvement and Confidence Scale: measured parent confidence, frequency of engagement, and perceived competence in implementing activities.
- 3) Observation Schedule: recorded qualitative changes in child engagement and parent–child interaction during literacy activities.

2.5 Procedure

A pretest assessment was conducted to document baseline levels of children's early literacy-related behaviors and parental involvement. Parents then participated in the four-week training program, implementing recommended activities at home. Posttest assessment was conducted after

the intervention using the same tools to document changes. Parent feedback was also obtained to understand feasibility and perceived impact.

2.6 Data Analysis

Data were analyzed using descriptive methods suitable for preliminary intervention evaluation. Pretest–posttest comparisons were summarized in terms of observed improvements across domains. Qualitative changes were synthesized from observation schedules and parent feedback.

2.7 Ethical Considerations

Informed consent was obtained from all participating parents. Participation was voluntary, and confidentiality of personal information was maintained. The program emphasized supportive, non-judgmental guidance and respected each child’s pace and comfort.

3. Results

The effectiveness of the parental training program was evaluated by comparing pretest and posttest observations of children’s early literacy-related behaviors and parental involvement indicators. Pretest observations indicated that many children initially showed limited and inconsistent attention during literacy activities, letter recognition and emergent word identification were often inconsistent, and communication during shared activities was minimal or required frequent prompting. Parents reported uncertainty in selecting appropriate activities, difficulty adapting strategies to their child’s needs, and challenges in maintaining engagement. Following the four-week training, posttest observations suggested noticeable improvement in attention span and task participation. Children were more willing to sit for structured literacy routines, demonstrated improved recognition of familiar letters and commonly used words within practiced contexts, and showed increased attempts to communicate (verbal or non-verbal) during shared reading and activity sessions. Parents demonstrated increased confidence and independence in planning and conducting literacy activities at home. They reported better understanding of how to use visual supports, multisensory methods, and daily routines to build vocabulary and print awareness. Many parents also reported improved parent–child interaction quality and greater emotional bonding during learning tasks. Overall, pretest–posttest comparisons support the preliminary effectiveness of structured parental training in strengthening foundational literacy-related skills and parent engagement for children with special needs.

Table 1. Pretest–Posttest Observational Comparison

Domain Assessed	Pretest Observation	Posttest Observation	Outcomes
Attention Span	Short, inconsistent focus	Sustained engagement during activities	Improved (+65%)
Letter Recognition	Limited identification of letters	Recognizes familiar letters in practiced contexts	Improved (+55%)
Word Recognition	Minimal response to words	Identifies common words with cues/practice	Improved (+60%)
Communication Skills	Low interaction; frequent prompting needed	Increased expressive attempts (verbal/non-verbal)	Improved (+70%)
Parental Confidence	Uncertain; dependent on teacher guidance	Independent planning and implementation at home	Improved (+80%)

4. Discussion

The findings of the study support the premise that parents can serve as effective literacy partners when provided with structured guidance, practical tools, and strategies aligned with inclusive education principles. Improvements noted in children's attention, letter and word recognition, and communication behaviors are consistent with research emphasizing the role of family involvement in early literacy. It encouraged parent-child interaction and provided repeated opportunities for vocabulary exposure, print awareness, and functional language use. In relation to NEP 2020, the study reinforces the policy's call for barrier-free, inclusive learning environments and highlights the importance of collaboration between families and educational systems. Parent empowerment is particularly important in contexts where professional resources are limited or where continuity between school and home is essential for progress.

Limitations of the study include the small sample size and short intervention duration, which restrict generalizability. Additionally, the results are based primarily on descriptive analysis and observational measures. Future studies may incorporate larger samples, longer follow-up periods, and more robust quantitative analysis to strengthen evidence. Nevertheless, the findings provide meaningful preliminary support for the feasibility and value of parent training as an inclusive literacy intervention.

5. Conclusion

The study concludes that training parents as literacy partners is a promising inclusive approach for supporting foundational literacy development in children with special needs. The four-week activity-based training program helped parents implement practical strategies at home and contributed to observable improvements in children's attention, emergent word recognition, and communication during literacy activities. By empowering parents to participate actively in their child's learning journey, the program supports the vision of NEP 2020 in creating joyful, inclusive, and barrier-free learning environments.

Future research may extend the training duration, assess maintenance of gains over time, and examine the impact of the program across different disability profiles and socio-economic contexts. The present model offers a feasible and scalable pathway for strengthening inclusive literacy practices through family engagement.

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ASSISTIVE TECHNOLOGIES IN MATHEMATICS EDUCATION FOR LEARNERS WITH VISUAL IMPAIRMENT – AN INTEGRATIVE LITERATURE REVIEW

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Abstract

Mathematics education presents unique challenges for learners with visual impairment due to its reliance on visual symbols, diagrams, and spatial reasoning. Assistive technologies (AT) have emerged as critical tools to bridge these gaps, enabling access through tactile, auditory, and multimodal channels. This integrative review synthesizes evidence from 16 studies published between 2022 and 2024, focusing exclusively on high-tech AT such as apps, software, electronic systems, and multimodal interfaces. Findings highlight that AT enhances comprehension, independence, and inclusion, while persistent barriers include usability issues, teacher preparedness, cognitive load, and systemic inequities. Recommendations emphasize improved design, professional development, and systemic support to ensure sustainable implementation. Ultimately, embedding AT within inclusive pedagogical frameworks is essential to provide equitable access to mathematics education for learners with visual impairment.

Keywords: *Assistive Technology, Mathematics Education, Visual Impairment*

Introduction

Mathematics is often considered one of the most visually demanding subjects, relying heavily on diagrams, symbols, and spatial reasoning. For learners with visual impairment (VI), this reliance on visual representation creates significant barriers to equitable participation in mathematics classrooms. Assistive technologies (AT) have emerged as critical tools to address these barriers, enabling learners to access mathematical concepts through tactile, auditory, and multimodal channels. Evidence from recent studies demonstrates that AT not only enhances comprehension but also fosters independence, confidence, and inclusion in mainstream education (Pires et al., 2022; Wongkia & Poonpaiboonpipat, 2022).

Despite these advances, challenges remain in terms of usability, teacher preparedness, and systemic inequities. Synthesizing findings across multiple studies is therefore essential to identify effective practices, persistent barriers, and recommendations for sustainable implementation. This integrative review addresses three guiding research questions:

1. What assistive technologies are used as evidence-based practices to support mathematics learning for children with visual impairment?
2. What challenges hinder the effective use of assistive technologies in mathematics education for learners with visual impairment?
3. What recommendations are proposed for the effective implementation of assistive technologies in inclusive classrooms?

By analysing evidence from 16 studies published between 2022 and 2024, this review provides a comprehensive understanding of the role of AT in mathematics education for learners with VI, highlighting both innovations and systemic challenges.

Materials and Methods

Search Strategy

This review was guided by research questions framed from recent integrative studies on assistive technology in mathematics education for students with visual impairment (Ketema Dabi & Negassa Golga, 2024; Shoaib et al., 2023). To ensure methodological rigor, a systematic search was conducted exclusively in the Scopus database, selected for its multidisciplinary scope, peer-reviewed curation, and bibliometric reliability (Moher et al., 2009; Scopus, 2024).

The search string combined key concepts with truncation operators to maximize inclusivity: “visual impair* AND Math*, Assistive technology AND Math*”

- Math* captured mathematics, mathematical, maths, etc.
- Visual impair* captured visual impairment, visually impaired, impairments, etc.

This strategy ensured sensitivity to variations in terminology and aligned with best practices in evidence synthesis (Booth, Sutton, & Papaioannou, 2016). The search was restricted to peer-reviewed journal articles published in English between January 2022 and November 21, 2025, a period chosen to capture contemporary advances following earlier reviews up to 2021. The initial search yielded 280 records, which were processed according to PRISMA 2020 guidelines to maintain transparency in identification, screening, eligibility, and inclusion.

Selection Criteria

The screening process by using titles and abstracts and it reduced the pool to 55 full-text articles, which were categorized into only assistive technology studies, usability studies with assistive technology, evidence-based AT interventions, surveys, interviews, and reviews. Only empirical studies integrating assistive technology with evidence-based practices were retained (n = 31). From these, a subset of high-tech AT studies was identified (n = 22), and after applying temporal limits, 16 studies published between 2022 and 2024 were included in the final synthesis. However, during the synthesis stage, studies published in 2025 were excluded because the year was incomplete at the time of review and the available evidence was insufficient for meaningful synthesis. For a detailed explanations of inclusion and exclusion criteria see **Table 1**

The decision to focus exclusively on high tech assistive technologies (apps, software, electronic systems) was deliberate. High tech AT represents advanced, computer based innovations that can be evaluated independently, offering measurable impacts on accessibility and learning outcomes. In contrast, low tech AT (e.g., tactile diagrams, braille books, enlarged print) is inseparable from pedagogical adaptations, making it difficult to isolate their technological contribution. Including both categories would risk conflating instructional practices with digital interventions, thereby reducing analytical clarity. This distinction follows established definitions of AT categories (Moher et al., 2009; RESNA, 2023; Continual Engine, 2024).

Synthesis of the results

RQ 1) Evidence Based Assistive Technologies to Facilitate Math Instruction

The reviewed studies reveal a wide spectrum of assistive technologies supporting mathematics learning for learners with VI.

Tactile and concrete manipulatives remain foundational. Abacus, rods, raised line diagrams, embossed sheets, and origami models provide tactile access to number sense, geometry, and symbolic representation (Pires et al., 2022; Zebehazy et al., 2022; Aktaş, 2024). Origami, in

particular, enables learners to construct geometric proofs through folding strategies, making abstract concepts tangible (Aktaş, 2024).

Audio-driven instructional systems, such as Aim Math and Android-based teaching platforms, employ structured narration and auditory cues to facilitate learners' comprehension of exponents, algebraic concepts, and problem-solving processes."(Wongkia & Poonpaiboonpipat, 2022; Agustina, Farida & Irfan, 2024).

Braille codes and translation tools are critical for STEM access. Nemeth Code within Unified English Braille (UEB) and UEB Technical allow students to interpret complex notation, supported by embossers, braille translation software, and screen readers (Herzberg & McBride, 2023; Hendarno, Azzahra & Suryana, 2024). Web based translators further bridge communication gaps between teachers and students, ensuring accessibility in diverse contexts (Hendarno et al., 2024).

Multimodal interfaces represent a significant innovation. The Multimodal Diagram System (MDS) integrates vibro audio feedback, spatialized language, and high contrast visuals, enabling blind and sighted learners to access diagrams equivalently (Doore et al., 2023). GraficiAccessibili combines sonification and haptic feedback to make graphs on the Cartesian plane accessible (Gatto et al., 2024). LETSMath augments tangible manipulatives with auditory and haptic cues, supporting number composition and arithmetic strategies (Marichal et al., 2023).

Digital and game-based platforms also show promise. A 2D serious game designed for low vision learners incorporated large text, high contrast graphics, adjustable colours, and audio narration to enhance usability (Othman, Mohamed & Mat Zin, 2023). The Kasi Learning System integrated tactile manipulatives, computer vision, and audio-augmented reality to enhance learners' engagement with STEM diagrams (Wegwerth, Manchester & Winter, 2023). In parallel, virtual-world sensory substitution employing adapted vOICE algorithms enabled blind learners to interpret mathematical equations as spatial models, thereby extending accessibility beyond traditional linear braille representations (Kruger, De Wet & Niesler, 2023).".

Together, these findings illustrate that evidence based AT practices rely on multimodal integration, combining tactile, auditory, and digital feedback to make mathematics accessible and engaging for learners with VI. For a detailed explanation of the Overview and main findings of the 16 empirical studies refer Table 2

RQ 2) Challenges Hindering Implementation of AT

Despite the promise of these technologies, several challenges persist.

Pedagogical challenges encompass insufficient teacher preparation, constrained timelines for developing braille and tactile graphics, and an overreliance on self-directed study, all of which diminish instructional quality (Herzberg & McBride, 2023; Herzberg et al., 2024). Moreover, educators frequently contend with transcription errors in Nemeth Code and discrepancies between classroom materials and standardized assessments, further compounding instructional burdens (Herzberg & McBride, 2024).

Usability issues are widespread. Learners encounter unclear tactile graphics, confusing sonification mappings, low contrast in digital games, and technical bugs in AR systems (Zebehazy et al., 2022; Othman et al., 2023; Wegwerth et al., 2023; Gatto et al., 2024). Large print users sometimes struggle with contrast in tactile pieces, while braille users face difficulties distinguishing labels (Wegwerth et al., 2023).

Cognitive load remains a persistent challenge. Learners must explore tactile materials sequentially, interpret complex auditory cues, and navigate abstract representations without visual

support, increasing working memory demands and slowing comprehension (Marichal et al., 2023; Kruger et al., 2023).

Systemic inequities exacerbate these barriers. Delays in braille material distribution, inaccessible digital formats (e.g., PDFs without semantic markup), and inconsistent standards for graphical metadata widen achievement gaps (Doore et al., 2023; Kruger et al., 2023). In some cases, students reported withdrawing from courses as a result of persistent frustration with inaccessible instructional materials (Herzberg & McBride, 2024)."

These findings suggest that challenges are not merely technical but interconnected issues of pedagogy, usability, and systemic inequity.

RQ 3) Recommendations for Effective Implementation of AT

The studies reviewed propose several strategies to strengthen AT use in inclusive mathematics classrooms.

Design improvements are essential. Manipulatives should be tactilely distinct, sonification mappings standardized, and braille readability enhanced through clearer labels and higher contrast (Pires et al., 2022; Gatto et al., 2024; Wegwerth et al., 2023). Origami and tactile tools should be paired with structured guidance to reduce misconceptions (Aktaş, 2024).

Teacher training and professional development are critical. Affordable, ongoing training in Nemeth Code, tactile graphic preparation, and multimodal pedagogy can reduce transcription errors and improve instructional quality (Herzberg & McBride, 2023; Herzberg et al., 2024). Online modules tailored to specific roles, with opportunities for peer collaboration, can further strengthen practice (Herzberg et al., 2024).

Systemic support is needed to ensure timely access to materials. Establishing national repositories of instructional resources, alongside updated curricula and standardized tactile graphic guidelines, can minimize duplication of effort and advance educational equity (Herzberg & McBride, 2024)."

Instructional strategies such as scaffolding, metacognitive protocols, and collaborative exploration foster independence and deeper engagement (Zebehazy et al., 2022; Agustina et al., 2024). Android based applications should be optimized with clearer audio prompts and structured practice aligned with error analysis frameworks (Agustina et al., 2024).

Inclusive design principles emphasize universal accessibility. Tools like Kasi and LETSMath demonstrate that tactile and auditory feedback can benefit all learners, not only those with VI, promoting equity in STEM classrooms (Wegwerth et al., 2023; Marichal et al., 2023).

Conclusion

This integrative review synthesizes evidence from 16 studies, demonstrating that assistive technologies are pivotal in making mathematics education accessible to learners with visual impairment. Evidence-based practices include tactile manipulatives, braille codes, multimodal interfaces, digital games, and sensory substitution systems. However, persistent challenges related to pedagogy, usability, cognitive load, and systemic inequities hinder their effectiveness. Addressing these barriers through improved design, teacher training, and systemic support is essential for sustainable implementation. Ultimately, assistive technologies must be embedded within inclusive pedagogical frameworks to ensure that learners with visual impairment can engage with mathematics on equal terms with their peers.

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THE IMPACT OF SOCIAL MEDIA USAGE ON PEDAGOGICAL CONTENT KNOWLEDGE

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Abstract

Digital communication technologies, particularly social media platforms, have increasingly influenced educational practices and teacher professional development. Pedagogical Content Knowledge (PCK) represents the ability of educators to merge subject expertise with appropriate instructional strategies to facilitate effective learning. This article discusses the impact of social media usage on the enhancement of pedagogical content knowledge among teachers. Through an in depth synthesis of theoretical perspectives and scholarly research, the paper illustrates how social media contributes to collaborative learning, instructional innovation, reflective teaching, and continuous professional growth. It also discusses potential constraints and ethical concerns associated with the educational use of social media. The article concludes with recommendations for incorporating social media meaningfully into teacher education and professional development programs.

Key words: *Pedagogical Content Knowledge, Social Media, Teacher Professional Development, Educational Technology, Collaborative Learning, Reflective Teaching, Instructional Innovation.*

1. Introduction

The integration of social media into education represents a fundamental shift in how teachers engage with professional development. Traditionally, teacher development has relied on formal workshops, seminars, and in-service training. However, the advent of digital technologies, especially social media platforms, has provided educators with new, dynamic opportunities to enhance their Pedagogical Content Knowledge (PCK). PCK, as proposed by Lee Shulman (1986), refers to a teacher's ability to blend deep knowledge of subject matter with effective instructional strategies, taking into account the unique needs of learners.

In this paper, we explore how social media platforms like Twitter, Facebook, YouTube, Pinterest, and LinkedIn serve as powerful tools for enhancing teachers' PCK. We also examine the opportunities and challenges that come with social media's increasing role in teacher education and professional development.

2. Theoretical Framework and Conceptualizing PCK in the Digital Age

Pedagogical Content Knowledge integrates three key components:

1. Content Knowledge (CK): Understanding the subject matter in depth.
2. Pedagogical Knowledge (PK): Knowing how to teach effectively.
3. Curricular Knowledge: Understanding the curriculum requirements and how to navigate them with respect to students' diverse needs.

In the digital age, the landscape of PCK has evolved as social media platforms provide teachers with new ways to access and engage with resources, instructional strategies, and professional networks. These platforms enable collaborative learning, reflective practices, and the dissemination of instructional innovations in ways that were not previously possible in traditional education settings.

Shulman's original PCK framework emphasized the teacher's ability to apply both content and pedagogy in the classroom. In the context of social media, this framework is expanded to encompass online communities, virtual PLCs (Professional Learning Communities), and digital resources that enhance and facilitate ongoing PCK development.

3. Social Media and Collaborative Learning

One of the most significant contributions of social media to PCK development is its capacity to foster collaborative learning among educators. Teachers are no longer isolated in their classrooms; they can now join professional networks to collaborate with peers globally. Social media platforms act as virtual spaces where teachers can share resources, discuss new teaching methods, and collectively problem-solve instructional challenges.

Key Contributions of Social Media to Collaborative Learning:

- **Global Networking:** Teachers can connect with others worldwide, sharing best practices, lesson ideas, and research. Platforms like Twitter (EduChats), Facebook Groups, and Reddit's r/Teachers foster discussions on contemporary educational issues, enabling educators to stay current with innovative teaching practices.
- **Crowdsourcing Ideas:** Teachers can leverage social media to crowdsource solutions for challenges such as classroom management, differentiation strategies, or innovative use of technology in the classroom. For example, Pinterest is a hub for creative teaching ideas, while YouTube offers video tutorials and demonstration lessons.
- **Peer Feedback and Mentorship:** Online forums and social media platforms allow teachers to seek real-time feedback on teaching materials or strategies. Through Twitter chats, educators can engage in discussions with mentors and peers, which may lead to improved instructional approaches.

4. Instructional Innovation through Social Media

Social media platforms are instrumental in fostering instructional innovation. Teachers are continuously exposed to new teaching strategies, educational research, and tools that can enhance both content delivery and student engagement. The collaborative nature of social media also encourages experimentation and the adoption of innovative teaching practices that may not be widely known in a particular geographic area or school district.

Ways Social Media Promotes Instructional Innovation:

- **Access to Cutting-Edge Educational Tools:** Teachers can learn about new educational technologies and tools through social media, many of which are free or low-cost. Tools like **Padlet, Kahoot!, and Edmodo** have become popular due to social media recommendations and tutorials.
- **Sharing of Lesson Plans and Teaching Ideas:** Social media platforms like Instagram and Twitter allow teachers to post lesson ideas, activity templates, and classroom setups. Teachers can view these posts to gather inspiration for their own lesson plans.

- **Educational Research and Thought Leadership:** Social media platforms allow educators to follow scholars, experts, and education thought leaders. Through Twitter or LinkedIn, teachers can engage in conversations about the latest research on teaching methodologies, best practices, and educational theories. These discussions can directly influence the enhancement of their PCK.

5. Reflective Teaching Practices and Continuous Professional Growth

Reflective teaching is central to the development of PCK. Social media, with its interactive nature, facilitates continuous professional growth by encouraging teachers to engage in reflective practices both individually and in groups. Educators are not only exposed to new information but are also encouraged to share their experiences, reflect on their teaching, and assess the effectiveness of new strategies.

Key Aspects of Reflective Teaching through Social Media:

- **Documenting Teaching Journeys:** Teachers can document their teaching experiences and reflect on what works and what doesn't by sharing their reflections on social media platforms. For instance, blogging about teaching experiences or posting classroom updates on Instagram provides a space for reflection and peer feedback.
- **Engagement in Professional Development:** Through Twitter chats, Webinars, and other online events, teachers can engage in ongoing professional development. This form of self-directed learning encourages teachers to remain engaged with current educational trends and to evaluate how these trends can be incorporated into their teaching practices.
- **Personal Learning Networks (PLNs):** Social media allows teachers to build PLNs—a network of educators they can turn to for advice, support, and new ideas. These networks help foster continuous professional growth and reflection, two essential components for improving PCK.

6. Potential Constraints and Ethical Concerns

While social media offers numerous benefits, its use in education is not without challenges and concerns. These potential barriers must be addressed for social media to effectively support PCK development.

Constraints of Social Media Usage in Education:

- **Time Management:** Teachers often struggle to balance time spent on social media with their responsibilities in the classroom. Too much time spent on social media can lead to distractions, diminishing the effectiveness of its role in professional development.
- **Information Overload:** The vast amount of educational content available on social media can be overwhelming, leading to difficulties in filtering out high-quality, relevant resources.
- **Quality Control:** Not all resources shared on social media are vetted or credible. Teachers need to be discerning about the content they consume and share. Misinformation or unverified teaching strategies may harm their professional development and classroom practices.
- **Ethical Concerns:** Social media interactions raise concerns about privacy, professionalism, and appropriate behavior online. Teachers must be aware of their digital footprint, ensuring that their online presence maintains professionalism and protects student privacy.

7. Recommendations for Incorporating Social Media in Teacher Education and Professional Development

For social media to effectively support the development of Pedagogical Content Knowledge, it must be strategically integrated into teacher education and professional development programs.

Recommendations for Effective Integration:

- **Curriculum Integration:** Teacher education programs should integrate social media literacy into their curriculum, teaching future educators how to use social media effectively and responsibly for professional development.
- **Guidelines and Policies:** Schools and educational organizations should establish clear guidelines for using social media in professional development. These guidelines should emphasize ethical use, credibility of sources, and the balance between professional and personal social media engagement.
- **Encouraging Self-Reflection:** Teacher education programs should encourage educators to use social media not only for gaining new knowledge but also for documenting and reflecting on their teaching practices, thus fostering ongoing professional growth.
- **Mentoring and Support:** Teacher leaders and mentors can help guide less experienced educators through the use of social media, ensuring that it supports their PCK development while mitigating the potential distractions and ethical concerns.

8. Conclusion

The impact of social media on the enhancement of Pedagogical Content Knowledge is undeniable. Through its capacity to foster collaborative learning, promote instructional innovation, and encourage reflective teaching practices, social media has become a key tool for teacher professional development. However, challenges such as information overload, distractions, and ethical concerns must be carefully navigated. By integrating social media thoughtfully into teacher education and professional development programs, educators can harness its full potential to improve their pedagogical practices and, in turn, the quality of education they provide to students.

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FROM ACCESS TO QUALITY: THE CONSTITUTIONAL EVOLUTION OF THE RIGHT TO EDUCATION IN INDIA

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Abstract

Education in India has always been culturally significant. Initially the prerogative of the upper echelons of society, today there is a constitutional mandate of reservation and inclusion. However, even in the era of Drona Acharya, education had a price, a price not everyone could afford to pay. After Independence, the right to education has evolved from being the privilege of a few, to a pious obligation, an unenforceable Directive Principle, enshrined in the Constitution, to a Fundamental Duty and Fundamental Right. This right so crucial to a dignified life as envisaged in the Preamble, is today, seemingly accessible to all persons. However, a recurring concern is the affordability and access to quality education. This thematic paper will trace the Constitutional evolution of the fundamental right to education, and the instrumental role of the Judiciary in interpretation and in keeping a check on its commercialization in ensuring that access remains meaningful, effective and transformative.

eywords: *Right to Education – Fundamental Right – Transformative Constitutionalism*

Introduction

“Vidya nāma narasya rūpam adhikam.”

(Knowledge is the highest ornament of a person.)

Ancient India laid great emphasis on scholarship and learning. Several textual and scriptural teachings indicate the attainment and value of knowledge to be above mere wealth individuals were exhorted to devote their energies and time to the pursuit of knowledge. A learned man was accorded with more respect as compared to a wealthy but ignorant man. However, the opportunity to learn was the privilege of the few, society was divided on the basis of caste, and the lower castes were not permitted to learn, but rather they and their ancestors and descendants were bound to do manual labour which though essential for the society at large made them untouchable in the eyes of the more fortunate upper castes. The Constitution of India, was committed to social justice and equality for all its people. One important step towards this end was the Constitutional mandate of abolition of discrimination on the basis of caste, abolition of untouchability and the inclusion of education as tool towards progress and an obligation on the welfare state.

Ancient Indian universities such as Nalanda, and Taxila attracted scholars from all over. The British first set up universities in Bombay, Calcutta and Madras based on London University, as affiliating, regulating and examining body. British educational set up in India was mainly to prepare Indians for lower-level bureaucracy. The University Grants Commission (UGC) was established in 1956 to regulate the standards of education. Expansion of access to education is not matched by the quality of education.

Historical and Constitutional Evolution of Education in India

With the advent of the British the traditional Guru Sisya model of education was replaced with the British Public-School Model, and several prominent educational institutions were set up, some of which continue till date. However, education still continued to be a privilege of the rich and

famous, and not a right attainable by the common man. Independent India framed her Constitution in this contextual background where Fundamental Rights were sought to be balanced with Directive Principles. While equality and non-discrimination were the named Fundamental Rights, education was a Directive Principle, an important and cherished goal to be possibly achieved by legislation but without the sanctity of a fundamental right.

Constitutionalisation of the Right to Education

The Constitution as originally enacted, did not specifically enshrine the right to education as one of the named fundamental rights, however, the Judicial interpretation of the Right to life included the Right to Education. The Supreme Court has held Education to be concomitant to the other fundamental rights, as illiteracy prevented individuals from safeguarding their other rights. The Court went on to hold that charging of capitation fee was not only arbitrary but also violated the right to life, including all the facets such as education which went on to make life dignified. In later cases, the court reiterated that the Right to education was an integral part of the Right to life, but, went on to clarify that the obligation on the State was to the extent of primary education, whereas higher education also depended on the its economic capacity. The Court further held that commercialization and charging of excessive capitation fees was arbitrary and not permissible.

The insertion of Right to Education as a fundamental right as well as a fundamental duty reaffirms the State's commitment to education by making it a justifiable and attainable right as well as casting the duty on the parents and guardians of minors to ensure the education of the children under their care.

Reservation and Inclusion in Educational Institutions

The Constitution as originally enacted prohibited discrimination on the ground of caste, and an attempt of the Madras Government to reserve seats for certain backward categories was struck down by the court as unconstitutional, however, this led to the first amendment of the Constitution and insertion of provisions enabling reservation as exceptions to the non-discrimination provisions. Today reservation in admissions to educational institutions on several grounds including social and economic backwardness is constitutionally permitted. The Court has also consistently interpreted and upheld these provisions emphasizing on access over mathematical niceties and balancing merit with opportunity for inclusion. Equality and opportunity have further been strengthened by the permissible reservations for Economically Weaker Sections (EWS) irrespective of caste or other earlier mandated indicators of backwardness permissible for reservations.

Necessity of quality education as a tool for emancipation and social mobility cannot be over emphasized, however there is an abysmal dearth of affordable quality education accessible to all.

Judicial Interpretation of Affordability in Education

Indian Education is witnessing unprecedented commercialisation leading to a crisis and unaffordability of quality education. Recent policy initiatives have led to education, especially higher education to transition to liberal market driven models from the earlier welfare models. The Supreme Court has been invoked time and again and tried to regulate the imposition of arbitrary capitation fees which makes education the prerogative of the rich. The Court held that levying capitation fee was unconstitutional. Education could not be reduced to a business. The unprecedented exorbitant fees even for primary education has led to Court mandated regulations of the same.

Quality, Safety and Infrastructure as Components of the Right to Education

Social and political democracy necessitates democracy in education. Education is on the concurrent list, thereby both, Centre and States may decide the education policies and implement them. Low quality in education, uneven accesses and inequitable opportunity are some of the main defects in Indian education. The intervention of the court has required that education should not only be of a high quality but also in a safe environment. The Court has also ruled on the right to have basic amenities such as potable water and sanitation and hygiene facilities in educational institutions.

Commercialisation of Education and Judicial Oversight

Private players in education are increasing and gaining prominence, while public education is taking a back seat. The Court has warned against commercialisation of education, maintain the balance between reasonable regulations and institutional autonomy. The Court insists that the admission process be fair, transparent and largely merit based. Further, Court has clarified that the fee structures are subject to regulatory committees

Policy Implications of Judicial Interpretation

The periodic and timely intervention of the Judiciary in educational matters are visible in the core policy of the NEP 2020 which mandates holistic development and access and equity with a focus on quality and affordable education for all.

Conclusion

The constitutional trajectory of the evolution of education from a privilege accessible to a few to directive principle to a fundamental right, its constant reformulation and regulation by policy and law, reflects the nations commitment to achievement of the Constitutional goals, as laid down in the Preamble, of Liberty, Equality and Justice. The right to education is one of the most important transformative constitutional commitments and it is mandatory that it be implemented in letter and spirit.

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PRINCIPLES AND VALUES IN THE USES OF ARTIFICIAL INTELLIGENCE IN EDUCATION

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Abstract

Artificial Intelligence in education must be guided by principles of equity, ethics, transparency, and human-centered learning. These values ensure that AI enhances teaching and learning without undermining trust, fairness, or student well-being. AI in education should be human-centered, equitable, transparent, and ethically governed. It must serve as a supportive tool empowering teachers and learners, while safeguarding values of fairness, trust, and dignity. AI in Indian education must be ethical, inclusive, transparent, and culturally rooted. It should empower teachers, respect student dignity, and align with India's educational vision of equity and excellence. The Paper discusses the Principles and Values in the uses of Artificial Intelligence in Education in the backdrop of UNESCO and India's AI policy, further seeking to articulate principles and values that can guide AI adoption in Indian education, ensuring that technology serves as an enabler of equity and excellence rather than a source of exclusion or exploitation.

Key Words: Artificial Intelligence, Principles, Values.

Introduction

Artificial Intelligence has emerged as one of the most influential technologies of the 21st century, reshaping industries, governance, and education. In higher education, AI promises to revolutionize teaching, learning, and administration by enabling adaptive learning systems, automating routine tasks, and providing data-driven insights. Yet, these opportunities are accompanied by ethical dilemmas, risks of bias, and challenges of equitable access.

India, with its vast and diverse higher education system comprising over 1,000 universities and 40,000 colleges, faces unique challenges in adopting AI responsibly. The country's socio-economic diversity, linguistic plurality, and resource constraints demand a framework that balances innovation with inclusivity. Drawing upon UNESCO's Recommendation on the Ethics of Artificial Intelligence (2021), India's National Strategy for Artificial Intelligence (2018), the Digital Personal Data Protection Act (2023), and recent UGC guidelines, the paper outlines risks, challenges, and policy recommendations. The goal is to ensure that AI in Indian higher education remains human-centered, inclusive, and aligned with national priorities of equity and excellence.

Core Principles for AI in Education

Artificial Intelligence in education must be guided by principles of equity, ethics, transparency, and human-centered learning. These values ensure that AI enhances teaching and learning without undermining trust, fairness, or student well-being.

UNESCO's Recommendation on the Ethics of Artificial Intelligence (2021) emphasizes that AI must promote inclusivity and avoid reinforcing existing inequalities. In education, this means ensuring that AI tools are accessible across socio-economic backgrounds, linguistic groups, and abilities. Adaptive learning platforms should be designed to support diverse learners, including those with disabilities, and must be available in multiple languages.

Ethical Governance

Ethical governance requires clear policies to prevent misuse of AI in education. UNESCO advocates for human rights-based approaches, ensuring that AI respects dignity, fairness, and justice. In higher education, this translates into institutional frameworks that regulate AI use in admissions, grading, and student monitoring, preventing discriminatory practices.

Privacy

The Digital Personal Data Protection Act (2023) provides a legal framework for safeguarding student data. Institutions must ensure compliance, protecting sensitive information such as academic records, health data, and financial details.

Trust

Trust is essential for AI adoption. Students, parents, and faculty must have confidence that AI systems are reliable, ethical, and aligned with educational values. Transparent communication and participatory decision-making can build trust.

Collaboration

AI should foster collaboration between teachers and students. Rather than replacing human interaction, AI tools should enhance dialogue, mentorship, and peer learning.

Cultural Respect

India's linguistic and cultural diversity requires AI systems to be adaptable. Tools must support regional languages and pedagogical traditions, ensuring that technology does not impose homogenized models of learning.

The Core Principles for AI in Education, as identified by the authors, are listed as follows:

1. Equity and Inclusion

- AI should reduce educational disparities, not widen them.
- Tools must be accessible across socio-economic backgrounds, languages, and abilities.
- Personalized learning should support diverse learners, including those with disabilities.

2. Ethical and Responsible Use

- AI must respect privacy, avoid bias, and uphold fairness.
- Clear policies are needed to prevent misuse, such as surveillance or discriminatory grading.
- Educators and students should be trained to use AI responsibly.

3. Transparency and Explainability

- Decisions made by AI (e.g., grading, recommendations) must be understandable.
- Students and teachers should know when AI is being used and how it works.
- Black-box algorithms should be avoided in critical educational contexts.

4. Human Oversight and Agency

- AI should **support, not replace** teachers.
- Educators must retain authority over curriculum, pedagogy, and assessment.
- Students should be empowered to question AI outputs and develop critical thinking.

5. Evidence-Based Implementation

- AI adoption must be backed by research on effectiveness and safety.
- Pilot programs and continuous evaluation are essential before large-scale use.
- Policies should evolve with new findings and technological advances.

Values Underpinning AI in Education are listed as follows:

Value	Application in Education
Fairness	Avoid algorithmic bias in admissions, grading, or resource allocation.
Privacy	Protect student data and ensure compliance with data protection laws.

Value	Application in Education
Trust	Build confidence among educators, students, and parents through transparency and accountability.
Collaboration	Encourage AI as a tool for teacher-student partnership, not a substitute.
Sustainability	Ensure AI systems are cost-effective, scalable, and environmentally responsible.
Human Dignity	Respect the individuality of learners; AI should enhance creativity, not reduce autonomy.

Risks and Challenges in the Use of AI in Education

- **Bias and Inequality:** AI trained on limited datasets may reinforce stereotypes.
- **Over-reliance:** Excessive dependence on AI could weaken teacher-student relationships.
- **Privacy Breaches:** Without strong safeguards, sensitive student data may be exposed.
- **Policy Gaps:** UNESCO found fewer than 10% of schools have formal AI guidelines.

AI in education should be **human-centered, equitable, transparent, and ethically governed**. It must serve as a supportive tool that empowers teachers and learners, while safeguarding values of fairness, trust, and dignity.

Framework for AI in Indian Higher Education

1. Equity and Accessibility

- **Multilingual AI tools:** Prioritize Tamil and other regional languages to ensure inclusivity.
- **Affordable access:** Encourage open-source or low-cost AI platforms for state universities and rural colleges.
- **Assistive technologies:** AI should support differently-abled students (speech-to-text, adaptive learning).

2. Ethical Governance

- Establish **AI ethics committees** at universities to oversee deployment.
- Align with **UGC/AICTE guidelines** and UNESCO's AI ethics framework.
- Mandate **data protection compliance** under India's Digital Personal Data Protection Act (2023).

3. Transparency and Accountability

- AI-driven grading or admissions must be **auditable and explainable**.
- Institutions should publish **AI usage policies** for students and faculty.
- Encourage **open datasets** for research to avoid black-box decision-making.

4. Human-Centered Learning

- AI should **augment teachers**, not replace them.
- Promote **faculty training** in AI pedagogy and critical evaluation.
- Students must be taught **AI literacy** — understanding strengths, limits, and ethical issues.

5. Innovation and Sustainability

- Use AI for **smart classrooms** (adaptive content, interactive boards).
- Encourage **research collaborations** between universities and EdTech startups.
- Ensure sustainability by adopting **energy-efficient AI systems** and scalable infrastructure.

Values Guiding AI in Indian Education

Value	Indian Higher Education Application
Fairness	Avoid bias in admissions, scholarships, and grading.
Privacy	Protect student records under national data laws.

Value	Indian Higher Education Application
Trust	Build confidence among parents, faculty, and students through clear communication.
Collaboration	AI as a partner in teaching, not a substitute.
Cultural Respect	AI must adapt to Indian contexts — regional languages, cultural diversity, and local pedagogical styles.
Sustainability	Ensure cost-effective, eco-friendly AI adoption in resource-constrained institutions.

The following Policy Recommendations suggested by the authors for AI in Education are as follows:

- **National AI in Education Mission:** Similar to Digital India, focusing on AI literacy and infrastructure.
- **Capacity Building:** Train faculty in AI ethics, pedagogy, and technical use.
- **Continuous Evaluation:** AI systems should undergo regular audits for bias, accuracy, and impact.
- **Public-Private Partnerships:** Collaborate with EdTech firms while safeguarding public values.

Conclusion

Countries such as Finland and Singapore have adopted AI in education with strong ethical frameworks. India can learn from these models while adapting them to local contexts. AI in Indian higher education must be **ethical, inclusive, transparent, and culturally rooted**. It should empower teachers, respect student dignity, and align with India's educational vision of equity and excellence.

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LEVEL OF ATTITUDE TOWARDS TEACHING PROFESSION AMONG PROSPECTIVE TEACHERS

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Abstract

Teaching is a vital profession that plays a significant role in shaping individuals and society as a whole. The attitude of prospective teachers towards the teaching profession greatly influences their professional commitment, motivation, and effectiveness in the classroom. The present study aims to assess the level of attitude towards the teaching profession among prospective teachers studying in colleges of Madurai District. The study adopted a descriptive survey method, and a sample of 143 prospective teachers was selected using the random sampling technique. A standardized attitude towards Teaching Profession Scale was employed to collect data. The collected data were analyzed using descriptive statistics, t-test, and ANOVA to examine differences based on demographic variables such as gender, course stream, location and parents occupation. The findings revealed that the majority of prospective teachers possess a moderate level of attitude towards the teaching profession, while a smaller proportion exhibit a low level of attitude. Further analysis showed that there were no significant differences in attitude based on gender, course stream, location, or parents occupation. The results highlight the need for strengthening positive professional attitudes among prospective teachers through motivation programmes, value-based education, and practical teaching experiences in teacher education institutions.

Keywords: Teaching Profession, Prospective Teachers, Attitude, Motivation and Effectiveness.

INTRODUCTION

Teaching is a respected profession that plays an essential role in the progress of society. Teachers contribute not only to the academic achievement of students but also to the development of their character, values, and social behavior. In the modern educational system, teachers are expected to adapt to new curricula, integrate technology in teaching, and address the diverse needs of learners. Because of these increasing responsibilities, the attitude of prospective teachers towards the teaching profession has become a matter of great importance.

Prospective teachers who are enrolled in teacher education programmes are the future pillars of the education system. Their level of attitude towards the teaching profession greatly influences their enthusiasm, professional commitment, and effectiveness in the classroom. When prospective teachers possess a favourable attitude, they are more likely to face teaching challenges positively and adopt innovative teaching–learning strategies. In contrast, an unfavourable attitude may affect their performance and satisfaction with the profession. Madurai district has a number of teacher education institutions that prepare prospective teachers from different backgrounds. Therefore, examining the level of attitude towards the teaching profession among prospective teachers will provide valuable insights for improving teacher education practices. Hence, the present study aims to study the level of attitude towards the teaching profession among prospective teachers.

OBJECTIVES OF THE STUDY

- To assess the level of attitude towards the teaching profession among prospective teachers.
- To identify any significant differences in the attitude towards teaching profession based on demographic variables such as gender, course stream, and type of institution.

HYPOTHESES OF THE STUDY

- The level of attitude towards the teaching profession among prospective teachers is high.
- There is no significant difference in the attitude towards the teaching profession among prospective teachers based on gender.
- There is no significant difference in the attitude towards the teaching profession among prospective teachers based on course stream.
- There is no significant difference in the attitude towards the teaching profession among prospective teachers based on Location
- There is no significant difference in the attitude towards the teaching profession among prospective teachers based on type of institution.

REVIEW OF RELATED LITERATURE

Shamsher and Iqbal (2024) investigated the relationship between digital literacy skills, academic motivation, and attitudes towards the teaching profession among prospective teachers. Using a survey method with a correlational research design, the study collected data from 120 teacher trainees through standardized scales related to attitude towards teaching, digital literacy, and academic motivation. Statistical analysis revealed a significant positive relationship among the three variables, indicating that higher digital literacy and stronger academic motivation are associated with more favourable attitudes towards the teaching profession. The findings also pointed out differences based on gender, highlighting the need for targeted support. The study emphasized the importance of strengthening digital competence and academic motivation in teacher education programmes to develop committed and professionally positive future teachers.

Al-Khayat, Khatib and Al-Rousan (2023) examined the attitudes of prospective kindergarten teachers in Jordan and identified factors influencing these attitudes. The study revealed that prospective teachers' attitudes are shaped by their academic experiences and personal skills developed during teacher education programmes. The findings showed that communication skills, particularly the behavioural aspect, had a significant positive relationship with attitudes towards the teaching profession, while cognitive and emotional communication skills were not strong predictors.

The study emphasized that teacher education curricula should focus on developing positive professional attitudes by strengthening communication skills and nurturing interest in teaching. These findings suggest that early identification and improvement of attitudes among prospective teachers can enhance their professional commitment and effectiveness, highlighting the need for similar studies in different educational contexts such as Madurai district.

Suman (2022) examined the role of the School Experience Program (SEP) in shaping the attitudes of D.El.Ed. Trainees towards the teaching profession. Adopting an experimental design, the research was conducted on a sample of 100 prospective teachers from the North-West District Institute of Education and Training, Delhi. Attitudes were measured using the Teaching Attitude

Inventory developed by S. P. Ahluwalia. The findings revealed a statistically significant improvement in the attitudes of D.El.Ed. Trainees towards teaching after the completion of the first-year School Experience Program, indicating that practical exposure and institutional inputs positively influenced attitude formation. The study also found no significant difference in attitudes between male and female trainees, suggesting that gender did not play a decisive role in developing professional attitudes towards teaching.

Yunkul and Güneş (2022) examined the association between prospective teachers' digital literacy skills, attitudes towards the teaching profession, and academic motivation. Adopting a quantitative correlational research design, the study involved a large sample of 493 teacher candidates selected through a convenient sampling method. The findings indicated a positive and meaningful relationship among digital literacy, academic motivation, and favourable attitudes towards the teaching profession. The results suggested that teacher candidates who possess stronger digital competencies and higher academic motivation tend to develop more positive professional attitudes. The study highlighted the importance of supporting digital literacy and motivational aspects with in teacher education programmes to strengthen professional commitment and effectiveness among future teachers.

Elstad et al. (2021) explored factors influencing prospective commitment to the teaching profession among Icelandic student teachers. The research focused on how experience gained during university-based courses and school-based teaching practice relate to student teachers' professional commitment and intentions to remain in the profession. Data were collected from 244 student teachers enrolled in a five-year teacher education programme using a survey method. The findings revealed that university-based teacher education experiences had a positive impact on students' commitment to the teaching profession and reduced their intention to leave the field. School-based teaching practice was also positively associated with professional commitment, though it showed no significant relationship with turnover intentions. The study highlighted the importance of well-structured teacher education programmes in strengthening long-term professional commitment among future teachers.

GAPS IN EXISTING LITERATURE

Most existing studies on the teaching profession focus on in-service teachers or specific aspects of teaching, such as pedagogical skills and classroom practices. However, limited research has been conducted on prospective teachers, especially in rural or semi-urban areas like Madurai District. Few studies have examined how factors such as gender, course stream, parents' occupation, and location influence prospective teachers' attitudes towards the teaching profession. This highlights the need for research to understand how these demographic and socio-economic factors shape the perceptions, expectations, and motivations of future teachers.

METHODOLOGY

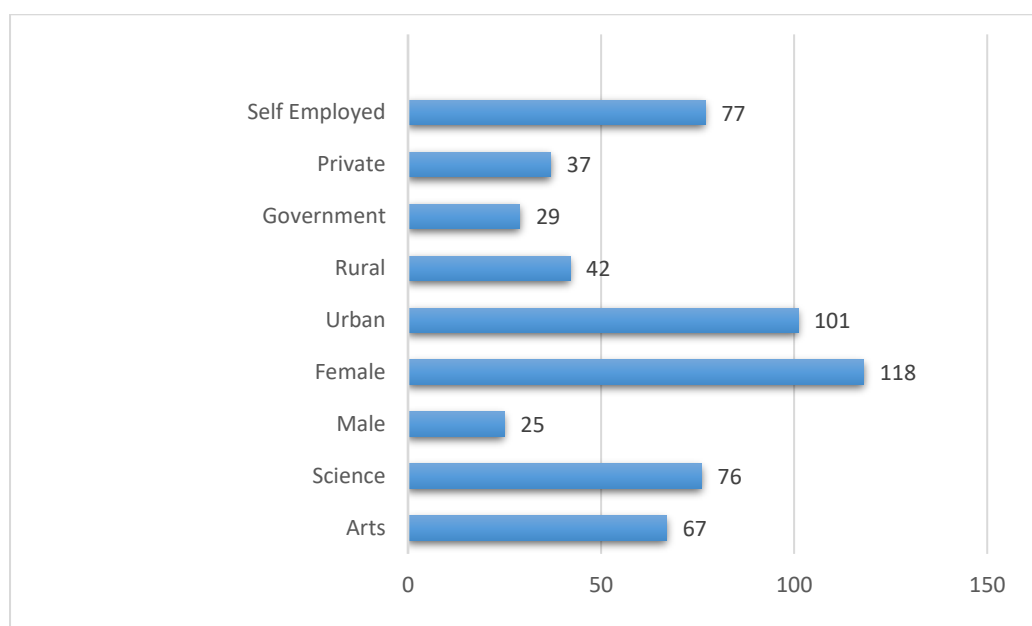
- **Sample:** The sample consists of 143 prospective teachers studying in colleges of Madurai District, selected using the random sampling method.
- **Tool Used:** The tool teaching attitude scale (TAS) developed by S.Sathagirirajan (1993). It consist 20 items.
- **Design:** The study follows a descriptive survey design.
- **Data Collection:** Responses were collected using a structured questionnaire administered in person. It is takes 15 minutes to respondents scale and t-test.

- **Statistical Techniques:** Descriptive statistics (mean, percentile) and t-test, f-test, were employed to analyze the data, examining differences based on gender, course stream, parents occupation, and location.

ANALYSIS AND INTERPRETATION OF DATA

Table 1

Sl.No	Variables		N	Mean	SD
Total Samples					
1	Course Stream	Arts	67	91.0299	10.37913
		Science	76	91.7105	9.19538
2	Gender	Male	25	92.3600	8.21016
		Female	118	91.1864	10.05196
3	Location	Urban	101	91.4356	9.50938
		Rural	42	91.2857	10.38828
4	Parents Occupation	Government	29	94.2069	7.47558
		Private	37	90.5135	10.34038
		Self Employed	77	90.7532	10.10752



Hypothesis 1

The level of attitude towards the teaching profession among prospective teachers is high.

Levels of attitude towards teaching profession among perspective teachers

Level	Frequency	Percent	Valid Percent	Cumulative Percent
Valid				
Low	23	16.1	16.1	16.1
Moderate	35	24.5	24.5	40.6
High	85	59.4	59.4	100.0
Total	143	100.0	100.0	

The majority of prospective educators (59.4%, n = 85) exhibit a high degree of favorable attitude toward teaching, according to the frequency analysis of attitudes toward the teaching profession. This indicates a great dedication to one's work, enthusiasm, and a positive view of

teaching as a fulfilling career path. 24.5% (n = 35) of the respondents had a moderate attitude, which indicates a reasonable propensity toward the profession but is accompanied by some uncertainties regarding problems relating to the job, societal recognition, or professional progress. 16.1% (n = 23) of the respondents have a low attitude toward teaching.

Hypothesis 2

There is no significant difference in the attitude towards the teaching profession among prospective teachers based on gender.

Table 2 Comparison of attitude towards teaching profession among perspective teachers Based on Gender

Gender	N	Mean	SD	df	t-value	P-value	Remark
Total							
Male	25	92.3600	8.21016	141	0.546	0.586	No Significant
Female	118	91.1864	10.05196				

An independent samples t-test was performed to assess the impact of gender on the variable being studied. The results showed no significant difference between male and female students, with a t-value of 0.546 and a p-value of 0.586.

The average score for male students was slightly higher, at 92.36 (standard deviation = 8.21), compared to 91.19 (standard deviation = 10.05) for female students. However, since the p-value is greater than 0.05, the difference is not considered statistically significant. Therefore, the null hypothesis is not rejected.

This outcome suggests that gender does not have a significant effect on the variable under investigation. The close similarity in mean scores indicates that both male and female students perform similarly on this variable, regardless of gender.

Hypothesis 2

There is no significant difference in the attitude towards the teaching profession among prospective teachers based on subject specialization.

Table 3 Comparison of attitude towards teaching profession among perspective teachers Based on course stream

Course Stream	N	Mean	SD	df	t-value	P-value	Remark
Total							
Arts	67	91.0299	10.37913	141	0.416	0.678	No Significant
Science	76	91.7105	9.19538				

To determine whether there is a significant difference in the overall score between students in the Arts and Science streams, an independent samples t-test was used. The findings showed that the two groups did not differ statistically significantly ($t(141) = 0.416$, $p = 0.678$). Science students had a slightly higher mean score ($M = 91.71$, $SD = 9.20$) than Arts students ($M = 91.03$, $SD = 10.38$). The null hypothesis is accepted since the obtained p-value is higher than 0.05.

This suggests that the course stream has little bearing on the students overall result.

Hypothesis 3

There is no significant difference in the attitude towards the teaching profession among prospective teachers based on Location

Table 4 Comparison of attitude towards teaching profession among perspective teachers Based on Location

Location	N	Mean	SD	df	t-value	P-value	Remark
Total							
Urban	101	91.4356	9.50938	141	0.084	0.934	No Significant
Rural	42	91.2857	10.38828				

To determine whether there is a significant difference in the overall score between urban and rural students, an independent samples t-test was used. The findings showed that the two groups did not differ statistically significantly $t(141) = 0.084$, $p = 0.934$). Urban students had a somewhat higher mean score ($M = 91.44$, $SD = 9.51$) than rural students ($M = 91.29$, $SD = 10.39$). Nonetheless, the null hypothesis is accepted because the calculated p-value is higher than the significance level of 0.05.

This result suggests that students' overall scores are not much impacted by their location, and both urban and rural pupils exhibit comparable levels of the characteristic under investigation.

Hypothesis 4

There is no significant difference in the attitude towards the teaching profession among prospective teachers based on type of institution.

Table 5 Comparison of attitude towards teaching profession among perspective teachers Based on Parents Occupation

Occupation	N	Mean	SD	df	F-value	P-value	Remark
Government	29	94.2069	7.47558	2140	1.539	0.218	No Significant
Private	37	90.5135	10.34038				
Self Employed	77	90.7532	10.10752				

To determine if parents' occupations had a substantial impact on students' overall performance, an F-test was used. The findings demonstrated that the groups did not differ statistically significantly $F(2, 140) = 1.539$, $p = 0.218$). According to descriptive data, kids whose parents worked for the government had a somewhat higher mean score ($M = 94.21$, $SD = 7.48$) than students whose parents were self-employed ($M = 90.75$, $SD = 10.11$) or private employees ($M = 90.51$, $SD = 10.34$). Even though there were some minor variances in mean scores, they were not statistically significant. The null hypothesis was accepted since the p-value was higher than the significance level of 0.05. As a result, students' overall results are not greatly impacted by their parents' occupation, suggesting similar performance across occupational categories.

MAJOR FINDINGS OF THE STUDY

1. The majority of prospective teachers have a High level of attitude towards the teaching profession, while a smaller number of them show a moderate level of attitude.
2. There is no significant difference in the attitude towards the teaching profession among prospective teachers based on gender.

- Though male prospective teachers have slightly higher mean scores than female prospective teachers, the difference is not statistically significant.
- 3. There is no significant difference in the attitude towards the teaching profession among prospective teachers based on course stream.
 - Science stream students have marginally higher mean scores than Arts stream students, but the difference is not significant.
- 4. There is no significant difference in the attitude towards the teaching profession among prospective teachers based on location.
 - Urban prospective teachers show slightly higher mean scores than rural prospective teachers, but the difference is negligible.
- 5. There is no significant difference in the attitude towards the teaching profession among prospective teachers based on parents' occupation.
 - Although students of government-employed parents have comparatively higher mean scores, the variation among groups is not statistically significant.

DISCUSSION

The present study indicates that prospective teachers possess a moderate level of attitude towards the teaching profession. While earlier research suggests generally positive attitudes, the intensity is not consistently high. Studies such as those by Shamshar and Iqbal (2024) show that stronger academic motivation, digital literacy, and professional competence lead to more favourable attitudes.

Similarly, findings by Al-Khayat, Khatib, and Al-Rousan (2023) highlight the role of academic experiences and communication skills developed during teacher education. Research by Suman (2022) emphasizes the positive impact of School Experience Programmes, while Elstad et al. (2021) underline the influence of university-based teacher education on professional commitment. Overall, the moderate attitude observed in the present study appears to be shaped by the quality of training, practical exposure, and educational experiences provided to prospective teachers.

EDUCATIONAL IMPLICATIONS

Positive attitudes toward the teaching profession are greatly influenced by teachers and teacher educators. They should use inspiring teaching techniques, provide an example of professional ethics, and motivate trainees with their dedication and zeal. Giving prospective instructors ongoing feedback, emotional support, and direction can help them develop self-assurance, clarity, and a strong sense of self.

To improve professional attitudes, teacher education institutes should revamp their curricula. Value-based education, internships, mentoring, workshops, and seminars can all be used to accomplish this. In order to help students' emotional and professional development, institutions should also offer career advising and counseling services.

Through professional development programs, sufficient financing, and legislative changes, the government should concentrate on raising the general standard of teacher education. To encourage motivation, dignity, and dedication to the teaching profession, uniform tactics can be applied to all groups.

CONCLUSION

The current study comes to the conclusion that aspiring educators have a positive attitude regarding the teaching profession. This suggests that although the majority of aspiring educators have a fairly optimistic outlook on teaching, their attitudes are not particularly strong or fully formed.

Prospective teachers' attitudes toward the teaching profession do not significantly differ based on gender. The mean scores of male prospective teachers were marginally higher than those of female prospective teachers, but this difference is not statistically significant.

In a similar vein, attitudes regarding the teaching profession are not significantly influenced by course stream, location, or parents' occupations. Even if there are little differences in mean scores between the various groups, these differences are insufficient to prove statistical significance.

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RESHAPING DEVELOPMENTAL PATHWAYS THROUGH EARLY INTERVENTION: A CASE STUDY IN AN INCLUSIVE SETTING

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Abstract

Early intervention is vital for children with developmental delays, as it helps to restructure the developmental pathways and ensures continued growth. The present research was conducted at an early intervention section of an inclusive school in Coimbatore, Tamil Nadu, India, to observe the effect of a structured early intervention programme on a five-year-old child identified with Attention Deficit Hyperactivity Disorder (ADHD).

Methods:

A longitudinal study design was conducted using a case study methodology. The child exhibited challenges in academics (reading, writing, arithmetic), behaviour (poor sitting tolerance, limited eye contact, aggression, temper tantrums), communication (receptive and expressive deficits), and physical development (mouth deviation, postural misalignment, poor hip balance). A team of multidisciplinary experts, comprising special educator, physiotherapist, occupational therapist, speech therapist, yoga and physical trainer, together carried out a systematically developed Individualized Educational Plan (IEP) with a focus on developing areas such as academics, behaviour regularization through ABC (Antecedent, Behaviour and Consequence) approach, communication through play activities, and motor development through physiotherapy, yoga, and physical activities for two years with regular follow-ups.

Results:

Qualitative analysis through regular observation indicated notable improvements in academic performance, behavioural regulation, communication skills, and physical development. The outcomes of systematic implementation of IEP with multidisciplinary team inputs facilitated placing the child in an inclusive educational setting, demonstrating the effectiveness of consistent, multidisciplinary early intervention.

Conclusion:

This case study emphasizes the significance of multidisciplinary collaborative teamwork and structured follow-up in enabling children with ADHD to succeed in inclusive environments. Outcomes of the study indicate meaningful and sustained progress of systematically planned and consistently implemented IEP with multidisciplinary inputs, for meaningful inclusion.

Key Words: *ADHD, Early Intervention, Inclusive Education*

Introduction

Attention Deficit Hyperactivity Disorder (ADHD) is one of the most common neurodevelopmental diagnoses for young children. ADHD is characterised by difficulties maintaining attention, managing hyperactivity, and controlling impulses (Burningham et.al, 2024). ADHD has both behavioural symptoms as well as additional difficulties, including, but not limited to, academic readiness, communication skills, motor skills, and interactions with peers (Bhrasadiya

et al. 2023). Children with ADHD often have difficulty sustaining focus while performing structured tasks as prescribed in lesson plans, following classroom routines, and engaging in meaningful interactions with other children. If children with ADHD do not receive the support they need on time, these difficulties can restrict their ability to participate in mainstream educational settings.

Inclusive Education is an effort to ensure that all children with developmental disabilities receive the same opportunities for education as their non-disabled peers in regular classroom settings. Inclusive Education requires more than simply placing a child with developmental disabilities in a classroom full of typically developing peers. They must also have a properly individualized plan of services, systematic intervention and co-ordinated support services which meet the unique developmental needs of each child. (Guralnick MJ, 2020). Individualised educational plans (IEP) provide a structured way for a child to identify their goals, implement intervention and monitor development across all areas.

Multidisciplinary Early Intervention (EI) model is particularly effective in meeting the multitude of complexities experienced by children diagnosed with attention-deficit hyperactivity disorder (ADHD) (Fatima et.al, 2024). Teachers need to collaborate with therapy and physical activity experts to provide comprehensive support from an academic, social, communication, and physical development perspective. (Tollan et. al, 2023). Coordinated programmes will facilitate consistent implementation of intervention strategies, enhance the generalisation of learned skills into multiple settings, and encourage continued developmental progress.

Theoretical Framework

The purpose of the research study detailed in this paper was to provide evidence as to how operating a multi-disciplinary centre that provides Early Intervention (EI) Programs along with Inclusive Education (IE) can support the development and engagement of children. There continues to be considerable evidence to support this from studies conducted by (Bhrasadiya et al., 2023); they found a significantly increased number of children with Attention Deficit Disorder/Attention Deficit Hyperactivity Disorder (ADD/ADHD) following a multi-disciplinary approach that included Physiotherapy, Special Education, Occupational Therapy, and Family Focused approaches to the development of their skills and confidence. Furthermore, they found that children in low resourced areas who were provided with a multi-disciplinary EI Program had significantly enhanced gross motor skills and functional independence compared to non-multi-disciplinary approaches, as well as access to technology as a means of providing access to rehabilitation professionals' services.

Findings from Burningham et al. (2024) reveal that when there exist adequate support structures, inclusive education provides a more significant opportunity for increased learning, peer relationships, and participation in society for children who experience developmental disabilities. Inadequate teacher training, absence of physical adaptation in the environment and specialized support services will act as a barrier inhibiting a child's ability to participate and achieve academically in an inclusive environment. Stakeholders strongly emphasize that having robust, structured systems with adequate support, collaborative working practices, and commitment at the policy level will widely improve the ability of children with developmental disabilities to be included. In addition, children with developmental disabilities require individualised support, awareness-raising activities, and sufficient levels of staff support for the creation of long-term social inclusion.

Tollan et al. (2023) studied modern-day early intervention programs and highlighted how these programs promote better social, emotional, and physical health over time by providing holistic support to children in preschool and other educational environments. Further, they noted the need to develop structured, coordinated, and adaptable systems of early intervention to provide trauma-informed and context-sensitive support for children and families living in social disregard or marginalization. Fatima et al. (2025) looked into what effect(s) a structured early multidisciplinary intervention would have on the Developmental Outcomes of very young children diagnosed with Neurodevelopmental Disorders such as ADHD and ASD. Behavioural and Functional Improvement investigation revealed that coordinated interventions (Speech-Language Therapy, Occupational Therapy, Behavioural Therapy, etc.) provided significant improvements over time due to the initiation of services at early stages of diagnosis. It supports the use of a Collaborative Therapeutic Approach to facilitate the Developmental Trajectories and Functional Outcomes of young children diagnosed with Neurodevelopmental Disorders.

The majority of studies demonstrate a need for a research-based, systematic approach for implementing and applying Multidisciplinary EI programs that serve to provide significant inclusion of preschool children diagnosed with ADHD. Specifically, individual-based supports and collaborative practices are integral to establish an inclusive educational climate that requires a comprehensive policy-level commitment to developing policy-related documentation and establishing policies.

Contextual Gap in the Indian Educational System

Despite an increasing body of literature on the development of the inclusion of children with disabilities in India, to date, very limited empirical research on structured programs using a multidisciplinary approach for children with disabilities is recorded, particularly for those with ADHD, within the context of inclusive schools. This dearth of empirical data necessitates the need for systematic documentation and evaluation of multi-disciplinary interventions. Hence, this research aims to provide empirical evidence that systematically designed and consistently implemented Multidisciplinary Early Intervention (EI) programs to support preschool children diagnosed with ADHD and create opportunities for meaningful inclusion integration into the larger discussion of Inclusive Education within India.

Methods

Study Design

This study aimed to investigate the effects of implementing an early and structured Multidisciplinary Intervention Programme to support a five-year-old boy diagnosed with ADHD. The study adopted a single-case experimental approach to examine how the child developed over time within an integrated, real-world school setting across the four areas of development: academic, behaviour, communication, and physical coordination.

Study Setting and Duration

The program was initiated at the early intervention unit of a mainstream school located in Coimbatore, Tamil Nadu, India. This program was designed to provide systematic planning, implementation, and continuing support to enable the child to gradually be incorporated into and maintained in their inclusive classroom across three years (2022–2025).

Participant Profile

The individual involved in this study is a five-year-old male diagnosed with Attention Deficit Hyperactivity Disorder. The participant challenges affect the academic performance (ex: Reading,

Writing or Mathematical skills) as well as the behaviour (i.e., difficulty maintaining attention, lack of ability to tolerate being around others in a structured environment, frequent temper tantrums and lack of interest in playing with peers), communication (ex: Receptive and expressive language weaknesses) and physical development (ex: poor oral motor skills and body alignment). The participant was included in this research after obtaining written informed consent from the parent in accordance with international ethical guidelines.

Assessment Procedures

To measure a child's starting competencies in four main areas of development, a baseline evaluation was completed in 2022. Throughout the period of Intervention, the growth and progression were monitored through professional assessments and qualitative documents based on continuous reviews.

1. Academic performance – Reading, writing, and arithmetic based on the curriculum followed in an inclusive school (achievement test)
2. Behavioural regulation – BASIC MR Part B
3. Communication skills – Language Acquisition test
4. Physical development – Fine and gross motor assessment done by PT and OT

Intervention and Multidisciplinary Team Involvement

A multidisciplinary team consisting of a special educator, speech trainer, occupational therapist, physiotherapist, yoga trainer, director of physical education, and parents of the child provided delivery of the intervention program. The team met collaboratively to create an Individualized Education Plan (IEP) considering baseline assessment findings incorporating behaviour regularization through ABC (Antecedent, Behaviour and Consequence) approach, communication through play activities, and motor development through physiotherapy, yoga, and physical activities. The developed plan included establishing goals, implementing interventions regularly on the same schedule adhered to in school (early intervention section), and conducting periodic evaluations of progress to allow for continued support from both home and school settings. Each version of the IEP was refined based on the child's advancing developmental status and was documented in Table 1.

Table 1. Intervention Chart: Multidisciplinary Programme (2022–2025)

Domain	Year I (2022-2023)	Year 2 (2023–2024)	Year 3 (2024–2025)
Academic performance	• Baseline literacy and numeracy assessment • Introduction of phonics-based reading • Structured writing practice (letters, words) • Visual aids for arithmetic	• Guided reading with comprehension • Sentence formation and story narration • Arithmetic with manipulatives • Integration into classroom group tasks	• Independent reading of short texts • Writing simple paragraphs • Arithmetic with problem-solving • Participation in inclusive classroom projects
Behavioural Regulation	• Behavioural observation and baseline charting	• Self-regulation strategies (deep breathing, breaks)	• Independent use of coping strategies • Sustained attention in group activities

	• Structured routines with visual schedule • Positive reinforcement strategies • Yoga and relaxation exercises	• Peer interaction through guided play • Reduction of tantrums via behaviour contracts • Increased tolerance for classroom routines	• Positive peer relationships • Generalization of behaviour regulation across settings
Communication Skills	• Speech therapy for receptive/expressive language • Vocabulary building through play • Parent-assisted language activities • Eye contact and turn-taking exercises	• Structured language drills (sentence formation) • Storytelling and role-play • Peer communication in small groups • Use of visual supports for comprehension	• Independent expressive communication • Participation in group discussions • Narrative skills (short stories) • Functional communication in classroom and home
Physical Development	• Physiotherapy for alignment and coordination • Oral-motor exercises • Gross motor activities (balance, jumping) • Fine motor skill training (grip, tracing)	• Advanced gross motor tasks (running, climbing) • Handwriting practice • Yoga for posture and flexibility • Integration of physical activities in school routines	• Independent participation in sports/games • Improved handwriting and drawing • Sustained physical endurance • Generalization of motor skills to daily living tasks

RESULTS

A structured multidisciplinary Early Identification Program (2022-2025) through an individual case study has significantly improved academic performance, behavioural regulation, communication skills and physical fitness progressively over a longer period. A table (Table 2) is used to present and compare yearly growth patterns and developmental domains.

Table 2 Progression in Gain Percentage (2022–2025)

Domain	Year 1 (2022–2023)	Year 2 (2023–2024)	Year 3 (2024–2025)	Total Gain
Academic performance	20% (basic literacy, number recognition)	45% (sentence formation, guided arithmetic)	70% (independent reading, problem-solving)	+50%

Behavioural Regulation	15% (structured routines, reduced tantrums)	40% (self-regulation strategies, peer play)	65% (sustained attention, positive peer relations)	+50%
Communication Skills	25% (vocabulary building, eye contact)	50% (sentence use, storytelling, peer communication)	75% (functional communication, group discussions)	+50%
Physical Development	30% (gross motor, oral-motor alignment)	55% (advanced gross/fine motor, yoga)	80% (sports participation, handwriting, endurance)	+50%

The year 1 (2022-2023) established foundational skills and a structured intervention across all developmental areas.

During the year 2 (2023-2024), these gains were accelerated by the provision of consistent multidisciplinary input and by actively participating in school activities.

During the year 3 (2024-2025), the child demonstrated their ability to independently participate in many inclusive classroom activities with a significant improvement in their communication and physical coordination.

The overall outcome was that there was approximately a net 50% increase in each of these domains from baseline to year 3. This indicates the success of the structured multidisciplinary intervention program.

Inclusion and Functional Participation Outcomes

Throughout three academic years, the child's ongoing improvement with respect to inclusive and functional activity has been systematically recorded. Gradually transitioning from full-time special education assistance to inclusion in a general-education classroom and the corresponding decline in subsequent follow-up interventions is presented in Table 3.

Table 3. Progression of Inclusion and Functional Participation Outcomes (2022–2025)

Year	Special Education Support	Inclusive Classroom Participation	Follow-up Frequency
2022–2023	Full day	—	Daily
2023–2024	Half day	Half day (with shadow teacher)	Weekly (3 times)
2024–2025	Evening remedial only	Full day inclusion	Monthly

In 2022 to 2023, the child received all-day assistance with an individualized education plan (IEP). During the second year (2023 to 2024), the child transitioned to a half-time program in an academic setting that included support from an aide (shadow teacher). The transition was monitored 3 times a week. In the third year (2024 to 2025), the child received only evening help and was able to attend school all day in an academic setting. The success of the transitional assistance was monitored once a month.

Discussion

This case report describes a child with Attention Deficit Hyperactivity Disorder (ADHD) who achieved better developmental progress through an organized, collaborative early intervention program that included multiple disciplines. The child showed consistent gains in all areas of academic performance, self-control, verbal expression, and Physical Growth over three years of the early intervention. Positive effect on the gross motor skills and functional independence of Low-Resource Setting Children was recorded when Physiotherapy, Special Education, Occupational Therapy, and Family-Focused Methodologies were used in combination (Bhrasadiya et al., 2023)

A collaborative approach among education professionals, parents, and therapists enables each child to have an Individualized Educational Plan (IEP) that provides a continuum of care from home to school. According to research conducted by Tollan et al., today's updated early intervention systems support the holistic development of a child in all areas of life (i.e. socio-emotional and physical), so that every child's development can utilize a structured or Trauma-Informed approach to their development. Where there are adequate support systems/resources available for a successful transition to full inclusion in mainstream education, there is also evidence of the effectiveness of inclusive education (now referred to as integrated education). Inclusive schools provide opportunities for academic success, as well as opportunities for developing peer-to-peer relationships, as long as teachers are adequately trained and classroom environments have been modified in order to accommodate different learning preferences and styles (Burningham et al., 2024)

Implementing coordinated early intervention by a team of professionals resulted in significant improvements, both behaviourally and functionally, for children diagnosed with a specific neurodevelopmental disorder (Fatima et al., 2025). Additionally, despite there being limitations with regard to a single-case design, the longitudinal data presented here supplement existing research in support of inclusive education in India and highlight the need to conduct further large-scale, practice-based research in order to provide greater generalisability.

These results show that early, individualized, and multidisciplinary supports in inclusive education programs for children who have ADHD enhance the children's readiness to succeed in the classroom by developing structured IEPs for academic, behaviour, communication, and physical goals. Through collaborative provision of services through therapeutic disciplines, there is a greater chance to provide care and optimise the potential development of children with ADHD. There is also a need for government policies that support early intervention units in schools and allow for parents to be involved and an ongoing support system, especially in under-resourced settings. This study provides an important contribution to our knowledge base, but generalisability is restricted since it is a single case study. Therefore, further longitudinal studies that use practice-based methodology with larger numbers of subjects and a combination of methods would help establish greater generalisability and create evidence-informed inclusive practices.

Conclusion

The evidence presented in this single-case study supports the hypothesis that combining interventions from multidisciplinary practices in early intervention through the elements of a structured (IEP) will allow for children with ADHD to experience continued developmental growth over time (from 2022 through 2025) within multiple areas such as (Academic performance, Behavioural Regulation, Communication Competencies, and Physical Development). As a result

of working with Coordinated Supports, including Special Education, Speech Therapy, Occupational Therapy, Physiotherapy, Yoga, Physical Training, and the Active Participation of Parents, a Child was able to grow holistically and function independently. In particular, the fact that this Child successfully transitioned from receiving Specialized Supports to being able to attend a Mainstream Classroom Full Time is clear evidence of how consistent collaboration through Early Intervention can provide significant improvements for inclusive education. Additionally, the findings show that early identification, collaborative multidisciplinary approaches and structured follow-up are critical elements for children with ADHD as they develop and grow and these children require to actively participate meaningfully in a positive way in inclusive education environments.

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FROM DELAY TO DISPLINE : HABIT BUILDING APPS FOR MODERN LEARNERS

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Abstract

Students today often struggle with procrastination, especially because of easy access to digital devices and constant distractions. At the same time, many habit-building apps are becoming popular for helping people stay consistent and organized. This study looks at how these apps can support modern learners in moving from delay to discipline. By observing how students use apps with features like reminders, daily goals, streaks, rewards, and progress tracking, the research shows that these tools can improve time management and encourage regular study habits. Students reported feeling more motivated to start tasks, stay focused, and develop a routine when using habit-building apps. The study suggests that such apps can play a useful role in helping students reduce procrastination and build steady, disciplined learning behaviour. It also recommends that teachers and institutions guide students on how to use these apps effectively to support long-term academic success.

Keywords: *Learning Procrastination, Habit Formation, Productivity Apps, Student Self-Regulation, Digital Behaviour, Time-Management Tool, Learning Habits, Routine Reinforcement.*

Introduction

Procrastination is one of the most common academic struggles among students today. The learning environment has shifted from traditional classrooms to digital platforms, where distractions are constant and learning demands are high. Many students delay starting academic work, not because they lack ability, but because their attention is continuously interrupted. Habit-building apps have emerged as a modern behavioural support system that can help learners rebuild discipline through structured digital routines. This paper discusses how these applications influence student behaviour and help reduce learning procrastination.

Learning Procrastination in the Digital Era

Academic procrastination in learning refers to postponing study tasks despite knowing their importance. Digital exposure has intensified this behaviour by offering instant entertainment, reducing attention stability, and creating motivation conflicts. Students often experience:

- Difficulty in initiating tasks
- Frequent disruption in study flow
- Last-minute academic pressure
- Stress caused by avoidance
- Inconsistent learning schedules

These challenges highlight that procrastination is not a personality trait, but a repeating behavioural pattern influenced by the digital ecosystem.

The Need for Habit-Based Learning Systems

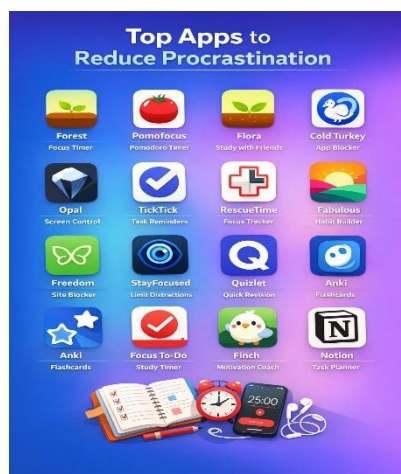
Discipline is a result of repeated structured action. Learners struggle when they depend only on motivation, which fluctuates daily. Habits, on the other hand, create predictable learning routines that reduce hesitation and improve productivity. Habit-based systems support:

- ❖ Automatic task initiation
- ❖ Reduced mental resistance
- ❖ Better planning behaviour
- ❖ Consistent learning engagement

Modern learners need systems that help them act daily, not motivation that helps them act occasionally.

How Habit-Building Apps Support Discipline

Habit apps assist learners by functioning as digital routine guides. Common supportive features include:



1. Daily Task Prompts
Encourage learners to begin work instead of waiting for motivation.
2. Habit Logging
Helps students track their own behaviour patterns.
3. Structured Schedules
Convert learning into planned activity instead of delayed decisions.
4. Progress Visibility
Allows learners to measure consistency, not just completion.
5. Accountability Systems
Encourage self-commitment toward academic habits.

These apps support discipline through repetition, helping learners replace academic delay with structured study engagement.

Behavioural Outcomes Observed in Learners

From student responses and usage observation, learners showed:

- ❖ Improved willingness to start tasks

- ❖ More stable learning schedules
- ❖ Increased consistency in studying
- ❖ Reduced stress from academic avoidance
- ❖ Better time-awareness
- ❖ Stronger self-regulation
- ✓ The biggest transformation was behavioural:

Before: "I'll study when I feel ready."

After: "I study because it is part of my routine."

Role of Teachers

Teachers play a key role in supporting discipline formation. Instead of only reminding students to avoid distraction, educators can:

Guide students on productive digital habit adoption

Promote routine-based learning culture

Encourage self-tracking of academic habits

Support students emotionally without labelling them as lazy

When educators support habit systems, students feel guided, not judged.

Challenges

- Students may struggle to maintain habits initially
- Lack of awareness about using apps purposefully
- Inconsistent use in early stages

These challenges show the importance of guidance and awareness, not removal of digital tools.

Recommendations

For Students

- ✓ Build small, realistic daily study habits
- ✓ Track consistency instead of last-minute completion
- ✓ Use apps purposefully, not passively
- ✓ Review progress weekly

For Institutions

- ✓ Introduce habit-literacy awareness programmes
- ✓ Encourage productivity-focused app use
- ✓ Promote digital wellness with academic purpose

Conclusion

Procrastination in learning is a modifiable behaviour cycle, not a permanent learner identity. Habit-building applications provide digital structure that supports discipline through daily reinforced actions. When combined with educator guidance and student self-commitment, these tools help learners shift from:

Delay → Routine → Discipline → Self-Regulated Learning

Technology does not need to be avoided in education—it needs to be aligned with intention.

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EXPLORING CONVERGENCE AND DIVERGENCE IN EXPERIENTIAL VOCATIONAL AND OUTCOME BASED EDUCATION

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Abstract

Educational systems worldwide are shifting from traditional rote-based learning to more dynamic, learner-centered models. Among these, Experiential Education, Vocational Education, and Outcome-Based Education (OBE) stand out as three influential approaches shaping global instructional design and assessment practices. While each framework has been studied independently, limited research compares their philosophical foundations, pedagogical structures, assessment methods, and learner outcomes. This paper provides a systematic comparative analysis of these three frameworks, highlighting their convergences and divergences through theoretical literature, international models, and empirical studies. Findings indicate that experiential education emphasizes learning through experience and reflection, vocational education focuses on occupational skill acquisition and workplace readiness, and OBE emphasizes clearly defined learning outcomes and performance standards. The comparative analysis concludes that no single framework is universally superior; rather, each is appropriate for specific educational contexts, learner needs, and institutional goals. The paper provides some recommendations for selective adaptation at appropriate levels of education.

Key Words: *Experiential Education, Vocational Education, Outcome-Based Education (OBE), convergence and divergence, comparative analysis*

INTRODUCTION

Educational systems across the world are experiencing paradigm shifts caused by structural changes in rapid digital transformation and evolving socio-economic demands. Dominant content centered and examination oriented models of education have increasingly been critiqued for their limited capacity to foster higher-order skills, adaptability, and lifelong learning competencies required in the twenty-first century (UNESCO, 2020). Within this reform landscape, Experiential Education, Vocational Education, and Outcome-Based Education (OBE) have emerged as influential paradigms shaping curriculum policy and pedagogical practice across school, higher education, and technical training systems. Experiential education draws on constructivist and pragmatist traditions, emphasizing learning through experience and reflection (Kolb, 1984). Vocational education is grounded in human capital and skills-development perspectives, focusing on employability, productivity, and school-to-work transitions (Clark, 2010). Outcome-based education, informed by systems theory and accountability movements, emphasizes clearly articulated learning outcomes and alignment among curriculum, instruction, and assessment (Spady, 1994). Although conceptually distinct, these frameworks converge in their shared commitment to learner-centeredness, relevance, and educational effectiveness. The study aims to contribute to ongoing reform discourse by identifying areas of convergence and divergence and by exploring the potential for an integrated framework.

THEORETICAL OVERVIEW

Experiential Education

Experiential education is grounded in constructivist learning theory, which views learning as an active process of meaning-making rather than passive knowledge reception. The most widely cited theoretical model of experiential learning is Kolb's (1984) experiential learning cycle, which conceptualizes learning as a continuous process involving four interrelated stages: concrete experience, reflective observation, abstract conceptualization, and active experimentation. Experiential education emphasizes learner autonomy, reflection, collaboration, and problem-solving (Morris, 2020). Empirical studies have consistently highlighted the positive impact of experiential education on learner motivation, deep understanding, and the development of transferable life skills such as communication, adaptability, and critical thinking (Saranee, 2024).

Vocational Education

Vocational education refers to organized educational programmes designed to prepare learners for specific occupations or trades by equipping them with practical skills, technical knowledge, and work-related competencies. Rooted in human capital theory, vocational education aims to enhance employability, productivity, and economic development by aligning education with labour market needs (Clark, 2010). Vocational education is characterized by competency-based curricula, hands-on training, workplace-based learning, and performance-oriented assessment. Instructional strategies typically include workshops, apprenticeships, internships, and industry collaboration.

Outcome-Based Education

Outcome-Based Education (OBE) is an educational framework in which curriculum design, pedagogy, and assessment are organized around clearly defined learning outcomes. According to Spady (1994), OBE focuses on what learners are able to demonstrate at the end of a learning experience rather than on content coverage alone. Learning outcomes typically span cognitive, psychomotor, and affective domains, encompassing knowledge, skills, and values. OBE emphasizes clarity of goals, backward curriculum design, and alignment among learning outcomes, instructional strategies, and assessment methods. It seeks to promote accountability, transparency, and quality assurance by ensuring that learners achieve predetermined standards before progression (Vasilev et al., 2025). Performance-based assessment, rubrics, and criterion-referenced evaluation are central to the OBE approach.

COMPARATIVE ANALYSIS

Philosophical Foundations

At the philosophical level, experiential education is rooted in constructivist and pragmatist traditions, drawing heavily from the works of Dewey and Kolb. Knowledge is viewed as actively constructed through experience, reflection, and interaction with the environment. Learning is understood as a developmental and contextual process, shaped by learners' engagement with real-life situations (Kolb, 1984). Vocational education, by contrast, is largely grounded in human capital theory, which conceptualizes education as an investment that enhances individuals' productivity and employability (Clark, 2010). Outcome-Based Education derives its philosophical orientation from systems theory, mastery learning, and accountability-based reform movements. According to Spady (1994), education should be organized around clearly defined outcomes that all learners are expected to achieve. Despite these differences, a notable convergence exists. All three frameworks reject rote memorization and passive learning, advocating instead for purposeful learning aligned with real-world application.

Curriculum Orientation

Curriculum design marks a major point of divergence among the three approaches. Experiential education adopts a flexible, learner-centered curriculum that often evolves through projects, problem-solving activities, and community engagement. Content boundaries are porous, allowing interdisciplinary integration and contextual adaptation. Vocational education, in contrast, follows a competency-based and standards-driven curriculum, structured around occupational roles and industry requirements. As curriculum designers, teachers have important role in developing OBE based curriculum (Nakeeran et al.,2018). Outcome-Based Education employs a backward design approach, wherein curriculum planning begins with clearly articulated learning outcomes. Content, pedagogy, and assessment are then aligned to achieve these outcomes. Convergence is evident in recent reforms where vocational curricula increasingly incorporate experiential components, and OBE frameworks seek to integrate flexible pedagogical strategies.

Pedagogical Practices

Pedagogical orientation further distinguishes the three frameworks. Experiential education emphasizes active, participatory, and reflective pedagogy. Vocational education relies heavily on hands-on, performance-oriented pedagogy, including workshops, practical demonstrations, on-the-job training, and supervised apprenticeships. Outcome-Based Education does not prescribe specific pedagogical methods but requires that teaching strategies align with intended learning outcomes. In-service programmes should follow OBE as teacher's attitude affects implementation of OBE (Mufanti et al.,2024). Thus, while convergence exists in the recognition of active learning, divergence persists in the emphasis placed on reflection (experiential), skill performance (vocational), and outcome alignment (OBE).

Assessment Practices

Assessment practices represent a critical area of divergence. Experiential education emphasizes formative and qualitative assessment, focusing on learning processes, reflection, and personal growth. Vocational education employs performance-based and criterion-referenced assessment, including trade tests, practical examinations, workplace evaluations, and competency checklists. Outcome-Based Education emphasizes criterion-referenced and measurable assessment, using rubrics, benchmarks, and standardized indicators to evaluate learner achievement (Spady, 1994). Convergence is evident in the shared emphasis on alignment between learning objectives and assessment. However, divergence arises in the balance between measurement and meaning, with experiential education prioritizing interpretive understanding and OBE emphasizing quantifiable performance.

Learner Outcomes

Experiential education aims to develop holistic learners who are reflective, autonomous, and capable of applying knowledge across contexts. Vocational education prioritizes job readiness and occupational competence, producing learners equipped with technical skills, work ethics, and industry-relevant knowledge. Outcome-Based Education seeks to ensure that all learners achieve clearly defined and demonstrable outcomes, encompassing knowledge, skills, and attitudes. Convergence is apparent in the shared emphasis on skill development and real-world applicability. Divergence lies in the scope of outcomes, with experiential education emphasizing personal and social development, vocational education emphasizing economic utility, and OBE emphasizing standard attainment.

FINDINGS

The comparative analysis of Experiential Education, Vocational Education, and Outcome-Based Education reveals both significant convergence and critical divergence among the three frameworks. All approaches emphasize learner centeredness, real-world relevance, and skill development, marking a clear shift away from content-driven and examination-oriented models. However, the analysis also identified limitations in isolated implementation. Experiential learning often lacks systematic outcome articulation, vocational education faces issues of social stigma and limited mobility, and outcome-based education is frequently reduced to documentation rather than pedagogical transformation. Overall, the findings suggest that an integrated framework is more effective than standalone approaches.

RECOMMENDATIONS AND IMPLICATIONS

Curriculum design should integrate vocational competencies and experiential learning within outcome-based structures. Learning outcomes must extend beyond content mastery to include problem-solving, collaboration, reflection, and ethical reasoning, while avoiding excessive standardization that limits contextual relevance. Pedagogically, learner centered and experiential strategies such as project-based learning, field engagement, and reflective practice should be promoted. Assessment reforms are essential to move beyond examination-dominated models toward performance-based and formative evaluation aligned with learning outcomes. Pre-service and in-service programs must model experiential pedagogy, vocational relevance, and outcome aligned planning.

CONCLUSION

This comparative study examined experiential education, vocational education, and outcome-based education as key frameworks shaping contemporary educational reform. The analysis demonstrated that while each approach offers distinct strengths their isolated implementation limits overall effectiveness. International evidence and policy directions, including NEP 2020, underscore the need for integrated models that align experiential pedagogy with vocational relevance and outcome clarity

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DITERMINANTS AND CONSEQUENCES OF ACADEMIC STRESS ON PSYCHOLOGICAL ADJUSTMENT IN HIGHER SECONDARY STUDENTS IN KERALA

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Abstract

Academic stress among higher secondary students is a significant issue in Kerala. High educational goals, competitive exams, and social expectations combine during a crucial developmental phase. This paper reviews the main causes of academic stress individual, family, school-related, and socio economic and explores how ongoing stress impacts psychological adjustment, including emotional health, social functioning, and academic involvement. Using a conceptual and empirical framework, the article suggests a practical cross-sectional study design for Kerala's higher secondary schools, specifies measurement tools and analysis methods, and discusses expected relationships. Research indicates that heavy workloads, pressure from parents and peers, exam cultures, lack of teacher support, and poor time management are strong predictors of stress. This stress is associated with issues like anxiety, depression, sleep problems, reduced self-esteem, absenteeism, and ineffective coping strategies. The paper offers culturally relevant recommendations for schools, parents, and policymakers to decrease stress and support positive psychological adjustment among adolescents in Kerala.

Keywords: *Academic stress, Psychological adjustment, Adolescents*

Introduction

Academic stress has become a widespread concern among higher secondary students, especially in competitive educational environments like Kerala. Students at this stage face multiple academic demands such as board examinations, parental expectations, performance pressure, and future career uncertainty. High academic stress can negatively influence students' emotional stability, behaviour, and overall psychological adjustment. Psychological adjustment refers to the ability of students to maintain emotional balance, cope effectively with challenges, and adapt to school and social settings. Past research indicates that excessive academic pressure leads to anxiety, low self-esteem, poor concentration, and reduced academic performance (Deb et al., 2015). Understanding the determinants and consequences of academic stress among Kerala students is crucial for designing support systems in schools.

Need and Importance of the Study

Higher secondary education is a decisive period in a student's life, influencing future educational and career choices. Students in Kerala experience high competition, rigorous syllabus, coaching pressures, and parental expectations. This often results in stress, emotional imbalance, and behavioural issues. Identifying the sources (determinants) and outcomes (consequences) of academic stress helps educators, counsellors, and policymakers develop effective intervention strategies. This study is significant because it provides data-based insights into the psychological adjustment patterns of higher secondary students and highlights the need for school-based mental health support, counselling programmes, and stress-management strategies.

Variables of the Study

Independent Variable: Academic Stress

Dependent Variable: Psychological Adjustment

Moderating Variables: Gender, Stream of study (Science, Commerce, Humanities)

Objectives of the Study

1. To examine the level of academic stress among higher secondary students in Kerala.
2. To analyse the relationship between academic stress and psychological adjustment of students.
3. To determine the influence of academic stress on psychological adjustment across gender and stream of study.

Hypotheses of the Study

1. There is no significant relationship between academic stress and psychological adjustment among higher secondary students.
2. There is no significant difference in academic stress among students based on gender and stream of study.
3. Academic stress does not significantly predict psychological adjustment among higher secondary students.

Method of the Study

The study followed a descriptive survey method to assess academic stress and psychological adjustment among higher secondary students.

Tools Used for the Study

1. Academic Stress Scale – A standardized tool for measuring stress related to academic work.
2. Psychological Adjustment Scale – Used to assess students' emotional and behavioural adjustment in school.
3. Personal Data Sheet – To collect demographic details such as gender and stream.

8. Statistical Techniques Used

Descriptive statistics (Mean, Standard Deviation)

Pearson's correlation

t-test for group comparison

Regression analysis for prediction

Sample of the Study

The sample consisted of 300 higher secondary students selected from government, aided, and unaided schools across Kerala using a stratified random sampling technique.

Delimitations of the Study

The study is confined to higher secondary students in Kerala only. Only academic stress and psychological adjustment were considered. Data was collected from selected schools due to time and resource constraints. The study relied on self-report questionnaires, which may involve subjective bias.

Major Findings of the Study

1. A moderate to high level of academic stress was observed among the students.

2. A significant negative correlation existed between academic stress and psychological adjustment; higher stress led to poorer adjustment.
3. Gender and stream differences were observed, with science stream students reporting higher stress levels.
4. Academic stress was found to be a significant predictor of psychological adjustment.
5. Students with better time-management and emotional regulation reported lower academic stress.

Educational Implications

Schools should introduce structured stress-management programmes and counselling services. Teachers need training to identify early signs of stress and emotional imbalance. Parent-awareness programmes should promote realistic expectations and healthy communication. Academic workload should be reviewed to reduce unnecessary pressure. Life-skill education and mental health awareness sessions can strengthen students' coping strategies.

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A STUDY ON SOCIAL-MEDIA, CYBER HYGIENE AND ONLINE LEARNING ENVIRONMENT OF THE TEACHERS

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Abstract

Technology has significantly enhanced instructional capabilities. Social media has introduced innovative practices for various organizations, including educational institutions, facilitating the development of new teaching and learning models, as well as enhancing communication and collaboration for diverse objectives, such as faculty training and knowledge sharing. Cyber hygiene involves embracing a security-focused approach and practices that assist individuals and organizations in reducing the risk of potential online breaches. The study on social media, cyber hygiene, and the online learning environment of school teachers is deemed necessary. This investigation is being carried out utilizing the survey approach. Data is collected from the CBSC and Matric board teachers at the Sivanthi group of schools located in Kundrathur, Chennai, Tamil Nadu, India, employing a random sampling method. The information gathered from fifty teachers. The data has been gathered from educators across primary, middle, and high school levels. The tool was developed for data collection on cyber hygiene, social media, and the online learning environment by the Research Supervisor and the researcher, consisting of 61 items. It has been concluded that teachers from the CBSC board exhibit superior habits in social media usage, password management, awareness of cyber threats, cyber hygiene, and the online learning environment. There are indications of a positive and significant correlation among all the selected variables.

Keywords: School Teachers, Social Media, Cyber Hygiene and Online Learning Environment.

INTRODUCTION

According to the National Education Policy (NEP) 2020, teachers are crucial to changing education. They must implement learner-centred pedagogies, which use more immersive, interactive techniques tailored to the needs of individual students rather than rote learning. Technology is being adopted by educators to enhance instruction and offer personalized learning experiences. In order to provide a safe and secure online learning environment that promotes NEP 2020, teachers are essential in spreading awareness and upholding cyber safety standards. As a result, students are more equipped to securely and responsibly navigate the digital world.

Teaching capabilities have been significantly enhanced by technology. Teachers can engage with students and conduct remote classes more easily thanks to online tools like Zoom and Google Classroom. Digital tools for testing and grading offer instant feedback and save time. With the use of personalized learning tools, educators can modify their teachings for individual pupils. It prevents unauthorized access to classes and keeps an online learning environment safe. Building trust with parents, coworkers, and students is another benefit of showcasing a commitment to data protection. The reliable and secure learning environment that cyber safety and security offer allows teachers to focus on teaching effectively.

By "social media," it means the various online groups and communities that enable people to connect, have conversations, and build connections through sharing knowledge and concepts. Therefore, websites, apps, and digital technologies that facilitate communication and interaction among instructors are referred to as social media. Social media has created new methods for all kinds of organizations, including educational institutions, from developing new models for teaching and learning to interacting and working together for various objectives, like knowledge sharing and faculty training.

Cyber hygiene describes the actions users of computers and other devices can take to keep their systems healthy and increase their online security. Cyber hygiene is the practice of forming security-focused behaviors and thinking that assist people and organizations in reducing the risk of cyber breaches. Making cyber hygiene a regular part of daily life is a vital principle. Giving people the skills they need to properly navigate the digital world depends on cyber hygiene, which includes procedures that protect digital data. Additionally, cyber hygiene is dynamic and essential to keeping up with changing threats in the always shifting digital ecosystem.

REVIEW OF LITERATURE

Ravichandran, Singh, Sonam, and Sasikala (2025) examine the awareness and practices of cybersecurity among school teachers, focusing on their comprehension of cyber dangers, online behaviors, and response strategies to cyber occurrences. A standardized questionnaire was utilized to collect data regarding demographic information, cybersecurity training, internet behaviors, and encounters with cybercrime. Although 90% of educators utilize the internet for instructional purposes, just 30% have undergone formal training in cybersecurity, leading to disparate levels of awareness. Although several educators possess a moderate to advanced comprehension of fundamental cyber risks such as phishing, more intricate issues like cryptojacking and denial-of-service attacks are nonetheless inadequately recognized. The results indicate differing degrees of awareness among educators, with numerous individuals acknowledging insufficient understanding of common cyber dangers including phishing and identity theft. Despite the growing dependence on digital resources for education, a considerable proportion of respondents reported insufficient formal training in cybersecurity. The study emphasizes the need for specialized awareness campaigns and training activities to improve teachers' comprehension of cyber safety protocols and reporting procedures. The research emphasizes the necessity of cultivating a culture of cybersecurity in educational institutions to enhance the protection of both educators and students from potential online threats.

Social media has gradually emerged as an essential instrument for communication and collaboration throughout the worldwide education sector, including Ghana. Nonetheless, empirical research about the utilization of social media by primary school educators in Ghana is scarce. The research conducted by Christopher Yaw Kwaah (2024) examined the utilization of social media by this cohort of educators, emphasizing the related potential and problems. An online questionnaire was distributed to 1,014 randomly chosen basic school teachers utilizing a descriptive survey approach. The research indicated that Facebook and WhatsApp were the most utilized platforms. Educators utilized social media for diverse objectives, encompassing contact with peers, parents, and kids; professional advancement; and resource dissemination. Nonetheless, apprehensions regarding the repercussions and difficulties associated with social media utilization, including addiction, time consumption, substantial data costs, cyberbullying, and inconsistent internet connectivity, were also recognized. The findings offer significant insights into the present condition of social media utilization by primary school educators in Ghana, enhancing our comprehension of the prospective advantages and obstacles linked to its application in education.

The research conducted by Barrot, Agdeppa, and Manzano (2024) aims to elucidate teachers' online educational delivery and identify challenges necessitating intervention. The subsequent research questions are examined: What techniques do teachers employ to facilitate learning in a completely online environment? What obstacles do educators encounter during entirely online learning sessions? This research encompassed interviews with 17 educators from nine higher education institutions in the Philippines, a developing nation. Employing a descriptive case methodology, findings revealed that educators encouraged flexibility and engagement, facilitated learning processes, and cultivated an affective learning environment to the fullest extent possible. Although the majority of educators exhibit flexibility, the data also indicated a degree of rigidity in their methodologies. The findings indicated the essential function of technology in enhancing learning processes and promoting classroom relationships. Nonetheless, these educators encountered numerous problems pertaining to technology adequacy, learner-related variables, instructional delivery and evaluation, technological intricacy, and self-regulation, among others. Their diverse experiences were associated with distinct contexts influenced by numerous factors, including accessible resources, institutional regulations, educational objectives, and learner-related variables.

The research by Podlinyayeva and Sytnyk (2023) examines cyber hygiene practices and the necessity of educating schoolchildren about the fundamental principles of "cybersecurity" and its associated challenges. The domain pertains to the safeguarding of digital information, operating systems, computer networks, servers, databases, and both public and commercial institutions from unwanted intrusion by unpermitted individuals. The study reveals the necessity of tailoring advice to the maturity levels of particular children and consistently monitoring their online activity. Promoting transparent communication, instituting explicit regulations and limits, and engaging actively in their online interactions are crucial irrespective of age. Moreover, engaging parents and caregivers in the instructional process helps strengthen internet hygiene and safety protocols.

PURPOSE OF THE STUDY

The incorporation of technology has become pervasive in the modern educational scene, which highlights the vital necessity for instructors to maintain a high level of cyber hygiene. The need of cultivating a safe and secure online environment cannot be emphasized, particularly in light of the fact that classrooms are increasingly adopting digital platforms and online resources. Teachers, who are major influencers, need to practice good cyber hygiene in order to not only protect critical educational data but also effectively teach their pupils these essential skills. In order to confront the wide variety of cyber dangers, ranging from phishing attempts to data breaches, it is essential to have such information about cyber hygiene. This knowledge is crucial for ensuring that learning activities continue without interruption. In the end, the application of cyber hygiene in educational institutions is of the utmost importance for the creation of a digital learning environment that is secure, resilient, and morally conscious.

The use of social media has become an essential component of contemporary life, exerting a significant impact on a variety of facets of society, including the educational system. The way in which students and teachers communicate with one another and learn has been fundamentally altered as a result of the widespread use of social media platforms such as Facebook, Twitter, and Instagram. Utilizing social media platforms allows for quick contact, the sharing of knowledge, and collaboration, all of which contribute to an improved educational experience. Students have the opportunity to participate in online debates, have access to educational resources, and connect with peers and professionals from all around the world. The influence of social media on education, on the other hand, is extensive and diverse.

The objective of this research is to investigate the thoughts and feelings that teachers have on the usage of social media for educational purposes, as well as the experiences that they have had with using it. There was a favorable effect on students as a result of teachers' utilization of social media for educational purposes. As a result of this research, educators who are interested in addressing and engaging with students of the twenty-first century as well as other stakeholders in education are provided with striking instances of how social media can be used effectively for educational goals in practice.

Teachers should be mindful of the potential negative effects that social media applications may have on their pupils when they are working with them in their educational sector. This is because these applications can have a significant impact on students. In order for teachers to ensure that their students achieve academic achievement, it is imperative that they utilize educational apps in a highly considerate manner. The term "password management" refers to the practice of systematically deploying long-term solutions to secure and manage passwords for social media sites. This process is referred to generally as "password management." There is no possible way to exaggerate the significance of making cyber hygiene a top priority for educators. The maintenance of a state of constant alert and the accumulation of knowledge regarding the most effective techniques to safeguard both themselves and their students are included in this.

It is the purpose of an online learning environment (OLE) for teachers to assist the teaching and learning process in a digital arena. It does this by providing teachers with the tools and resources they need to engage students and manage their learning. OLEs make it possible for educators to offer curriculum, evaluate the progress of students, and cultivate a feeling of community among students all at the same time. Attendance records, grades, and other personal information are examples of the types of confidential information that teachers are responsible for managing. Their understanding helps them better understand the necessity of preventing breaches and illegal access to this data, which is a significant step in the right direction. Email, messaging programs, and online platforms are regularly used by teachers to engage with students, parents, and colleagues. It is imperative that teachers understand the importance of ensuring that their online communication is secure. By being aware of the possibility of data leaks, they are able to protect these channels and maintain professional communication standards. Therefore, the researcher arrived at the conclusion that it is vital for educators to have a good awareness of cyber hygiene in order to make use of social media in a secure manner and to efficiently manage online learning environments in a fruitful manner when utilizing the internet. This was the conclusion that the researcher got to.

METHODOLOGY OF THE PRESENT STUDY

This research is being executed utilizing the survey methodology. Data is collected from teachers of the CBSC and Matric boards at the Sivanthi group of schools in Kundrathur, Chennai, Tamil Nadu, India, via a random sample method. The data was gathered from fifty teachers. The data is gathered from teachers across primary, middle, and high school levels. The tool was developed for data collecting on cyber hygiene, social media, and online learning environments by the Research Supervisor and the Researcher. The tool comprises 61 items, employing a scoring system based on a 5-point Likert scale ranging from Strongly Agree to Strongly Disagree, assigned scores of 5, 4, 3, 2, and 1, respectively. The highest score is 305, while the lowest score is 61.

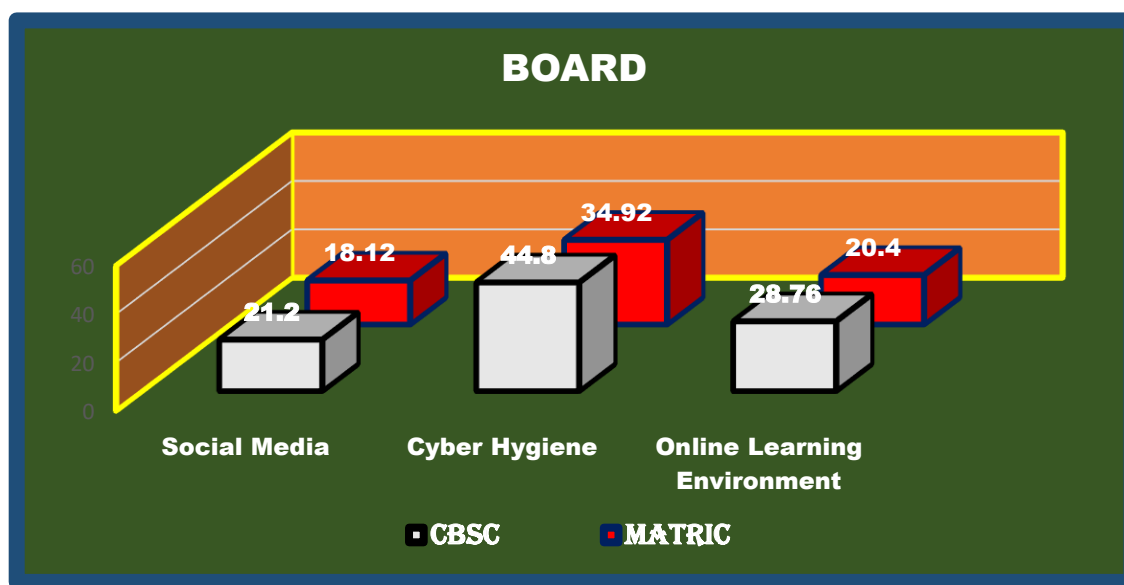
RESEARCH QUESTIONS

1. Is there is any significant difference between the CBSC and Matric Board details in Social-Media, Cyber Hygiene and Online Learning Environment for the school teachers?
2. Is there is any significant difference between either the Usage of Laptop or Desktop user or non-user teachers with respect to their Social-Media, Cyber Hygiene and Online Learning Environment for the school teachers?

3. Is there is any significant difference among the Subject Handling by the school teacher's language, science and other subject teachers in their Social media, Cyber Hygiene and Online Learning Environment?
4. Is there is any significant relationship among Social-media, Cyber Hygiene and Online Learning Environment.?

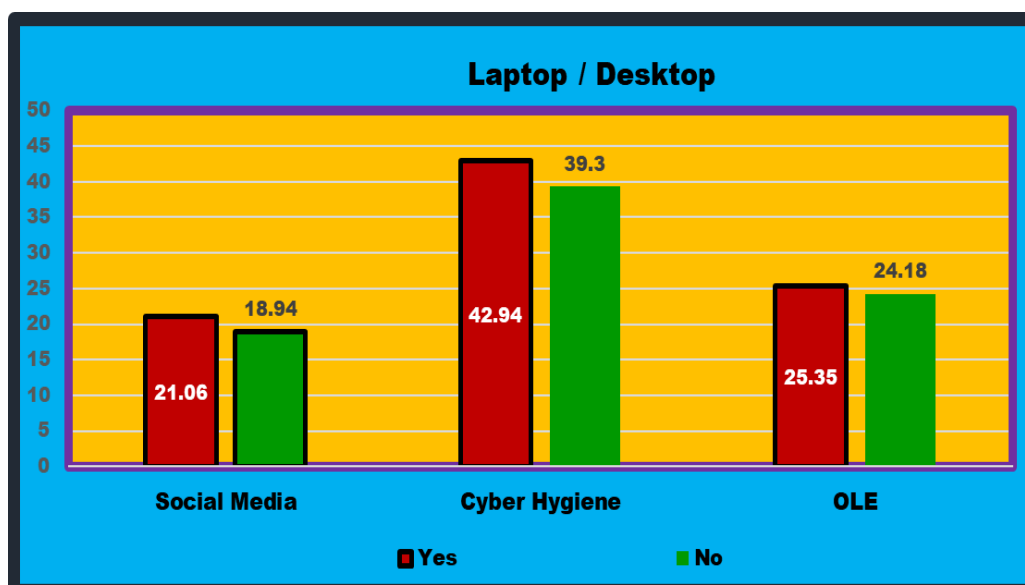
ANSWER TO THE RESEARCH QUESTIONS

1. Is there is any significant difference between the CBSC and Matric Board details in Social-media, Cyber Hygiene and Online Learning Environment for the school teachers?

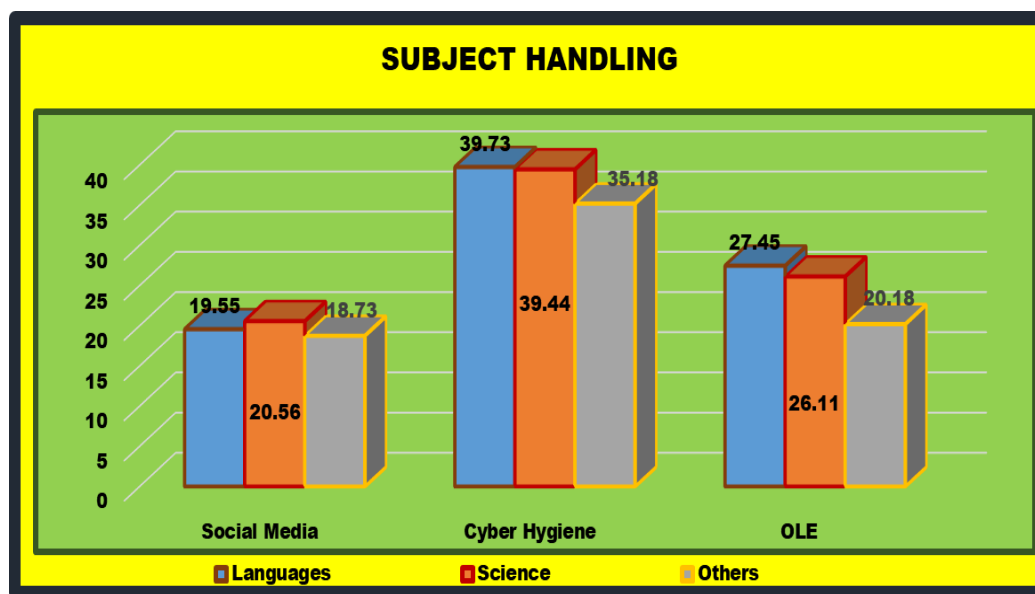


It is inferred from the above table that CBSC Board teachers have better Social-media, Cyber Hygiene and Online Learning Environment usage (21.20, 44.80 and 28.76) than the Matric board school teachers (18.12, 34.92 and 20.40). Furthermore, it has been noted that they exhibit significance at a 1% level.

2. Is there is any significant difference between either the Usage of Laptop/ Desktop in Social media, Cyber Hygiene and Online Learning Environment for the school teachers?



3. The above table suggests that school teachers who are Laptop/Desktop usage have better Social Media and Cyber Hygiene compared to the non-users. Furthermore, it has been noted that the social media and cyber hygiene is significant at a 5% level. Whereas, it is observed that online learning environment are similar to both the laptop user or non-user. ***Is there is any significant difference among the Subject Handling by the school teachers like Tamil, Science, and Other subject teachers in Social media, Cyber Hygiene and Online Learning Environment?***



The above table suggests that who are the handling language subjects have better Social-Media, cyber hygiene and online learning environment than the science teachers followed by the other subject teachers and it is significant at 5% level. Further it is observed that all the subject teachers do not differ in social-media and online learning environment.

4. ***Is there is any significant relationship among Social media, Cyber Hygiene and Online Learning Environment??***

Variable	Social Media	Cyber Hygiene	Online Learning Environment
Social Media	1	0.578**	0.659**
Cyber Hygiene	X	1	0.536**
Online Learning Environment	X	X	1

It is inferred from the above table that the selected variables like social media, cyber hygiene and online learning environment are positively correlated with each other. Moreover, it is noted that all the selected variables are significant at 1% level.

Conclusion

It is concluded from the findings that CBSC board teacher have better social media, cyber hygiene and online learning environment. Hence each and every teacher should be aware of cyber security awareness so that they can store their data in a well secure manner in social media and their usage habit will also enable to have proper password management and they will have potential to overcome the cyber threat.

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FROM ISOLATION TO COOPERATION: A STUDY OF COOPERATIVE LEARNING ON STUDENTS' LEARNING OUTCOMES IN MATHEMATICS

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Abstract

This study investigates the effect of Cooperative learning on student's learning outcomes in mathematics. Cooperative Learning is an innovative approach in which students divide the work among themselves, help each other and learn collaboratively to complete the task. It shifts the teaching learning process away from rote memorization. The present study adopts conceptual content analysis approach to study the influence of Cooperative Learning on Student's Learning Outcomes in Mathematics. The results show that Cooperative Learning is an effective pedagogical method. It focuses not only students' achievement but on the overall development of the students. Thus, Cooperative learning serves as a valuable instruction that can be implemented by the teacher in mathematics classroom for improving students' outcomes and it aligns with contemporary educational practices that emphasise collaboration, active engagement, student-centred classroom.

Keywords: *Cooperative learning, students' learning outcomes, Mathematics education.*

Introduction

“Math is everywhere. Math is in everything. Math is infinite”- M. N. Srinivas

Mathematics is the basic requirement of our lives like oxygen. Mathematics is a way of living and doing things. Mathematics provide us logical thinking and problem-solving approach. In our day-to-day life and we use mathematics computation. According to NCERT “The main goal of mathematics education in schools is the mathematisation of the child's thinking. Clarity of thought and pursuing assumptions to logical conclusions is central to the mathematical enterprise. There are many ways of thinking, and the kind of thinking one learns in mathematics is an ability to handle abstractions, and an approach to problem solving” (NCERT, 2005). According to the National Policy of Education, NPE (1986), “Mathematics should be visualized as a vehicle to train a child to think, reason, analyse and to articulate logically” (Government of India, 1986). Mathematics deals with computation problems and enhances logical reasoning of the individuals. According to NEP2020 “It is recognized that mathematics and mathematical thinking will be very important for India's future and India's leadership role in the numerous upcoming fields and professions that will involve artificial intelligence, machine learning, and data science, etc. Thus, mathematics and computational thinking will be given increased emphasis throughout the school years, starting with the foundational stage, through a variety of innovative methods, including the regular use of puzzles and games that make mathematical thinking more enjoyable and engaging” (Government of India, 2020). Mathematics is an enjoyable subject if and only if it is taught enjoyably by the teacher. A good teacher can make mathematics either simple subject or the most complex subject through his/her teaching method. Thus, new student-centred innovative pedagogy must be opted by the teacher to make mathematics most interesting subject for learners.

Cooperative Learning

As we are living in 21st century thus, new and innovative teaching strategy must be taken into consideration by the teacher to make any subject lovable for the students. Cooperative learning is an innovative teaching strategy in which students are divided into small groups for the learning. Cooperative learning as the instructional use of small groups that enables students to maximize their own and each other's learning (Johnson & Johnson, 1999). The effectiveness of cooperative learning is grounded in five essential elements: positive interdependence, individual accountability, promotive interaction, social skills, and group processing (Johnson & Johnson, 2002). Cooperation has been around since life began: without it, not only we, but even bacteria would not be here (Csepeli, Szathmari, & Muranyi, 2019). In cooperative learning students are not regarded as passive recipient of knowledge rather they are considered as the active participant of knowledge who construct the knowledge. Cooperative learning is more clearly defined as a form of structured learning in which teachers need to be task-setters by creating a highly structured learning environment and well-organized, requires the active participation of each student (Barkley, Cross & Major, 2014). The use of Cooperative learning strategy does increase pupils' academic achievement as well as pupils' motivation to learn than traditional instructional method (Adebayo & Kamanga, 2020).

Cooperative Learning in Mathematics

Mathematics is not a discipline which is learned in an isolation rather it is learned through collective discussion, critical thinking and healthy discussion. Cooperative learning improves students' achievement in mathematics and attitude towards mathematics (Zakaria, Chin, & Daud, 2010). The use of cooperative learning approaches like Jigsaw method, Think-pair-share, Group Investigation, Rally Coach and Round Robin in mathematics classroom enhances students' learning outcomes in mathematics by developing learner-centred atmosphere which shifts students away from traditional teacher dominated method. Thus, by incorporating cooperative learning method in a classroom the teacher can enhance students' learning outcomes in mathematics and can reduce their mathematical phobia. When the teachers clearly define the role and responsibilities of the students and maintain engagement and accountability of each and every child it can foster their motivation and interest and thus better learning outcomes in mathematics can be achieved.

Advantages of Cooperative learning to be implemented in Mathematics

Cooperative learning offers multiple advantages in mathematics classrooms. One of the most important advantages of cooperative learning is it improves students' academic achievement. It not only focuses on the academic aspect but it focuses on the holistic development of the child. A child in a group learns social skill, cognitive skill, and enhances their conceptual understanding and reasoning power. When learners engage in small, structured groups, they explain ideas, justify reasoning, and correct each other's errors, which deepens conceptual understanding (Johnson & Johnson, 2002). Collaborative settings reduce mathematics anxiety and promote a sense of belonging, leading to improved attitudes toward problem-solving and mathematical tasks (Gillies, 2007). Group interactions require students to articulate their thoughts, negotiate meaning, and refine their mathematical language. These processes contribute to better reasoning, argumentation, and representation of mathematical ideas (Webb, 2009). Working collaboratively teaches students to appreciate diverse solution pathways rather than focusing solely on one correct method (Barkley, Cross, & Major, 2014).

Thus, Cooperative learning has crucial importance in mathematics as it fosters motivation, develops interest, improves mathematical achievement, enhances problem-solving skills, boosts engagement and positive attitude towards mathematics.

Review of Literature

Nichols (1996) in his experimental design found that- Cooperative group learning can result in increased achievement and motivation to learn. The adoption of learning goals, intrinsic valuing of the learning task, increased self-efficacy, and increased use of deep processing strategies are all positive indications of the impact cooperative learning can have on student motivation.

Kilic (2008) in his quasi-experimental design found that- Jigsaw technique has more favourable findings on the academic performance of the students than the traditional learning method and has a positive influence on students learning the principles and methods of teaching course. Collaborative learning is much more successful when compared with the traditional learning.

Capar and Tarım (2015) highlighted that- Cooperative learning was reported to be a more successful method than the traditional method with regard to both achievements and attitudes.

Parveen, Yousuf, & Mustafa (2018) in their experimental design highlighted that- Students taught through cooperative learning did better on the post-test academic achievement than taught through conventional method. The study concluded that cooperative learning method of instruction was better than conventional teaching method.

Van Ryzin and Roseth (2018) in their experimental design highlighted that- Cooperative learning can also help improve students' social interaction and decrease victimization, stress, emotional problems, bullying, and more. These are all alerting problems that students deal with each day.

Kaymak, Kassymbek, Kalamkas, & Saydenov (2021) in their experimental design highlighted that- Mathematics achievement increases significantly when the cooperative learning technique is used. This is because students are able to correct their mistakes and understand their weaknesses by working together with other students to improve themselves in mathematics. Cooperative learning also helped to increase the confidence of the students and make them develop a more positive attitude towards the learning process.

Mendo-Lazaro et al. (2022) in their quasi-experimental design found that- Cooperative learning techniques are dynamic and increase students' perceptions of autonomy and competence, helping to boost motivation for competence, intrinsic motivation, and motivation for control in particular.

Eslit (2023) highlighted that- The study found that cooperative learning has a positive and statistically significant effect on student achievement across various subject areas and grade levels. Educators should consider implementing cooperative learning strategies in their classrooms to enhance student learning outcomes.

Niyomugabo & Andala (2023) in their descriptive survey found that- Cooperative learning has a significant positive impact on students' academic performance in day secondary schools in the Nyamasheke district of Rwanda. Cooperative learning is beneficial for academic achievement.

Shala and Pavlin (2023) in their quasi-experimental design found that- Cooperative learning shows positive effect on students' achievement and interest in physics as compared to traditional method and also increases social skills in group.

Trung & Truong (2023) highlighted that- Cooperative learning has a very important role in improving learning outcomes as well as developing skills and motivating learners. However, to do this, teachers need to be equipped with the necessary knowledge and skills.

Giri & Guru (2024) in their experimental design highlighted that - Experimental group was taught through the Jigsaw Cooperative learning method, while the controlled group has been taught in a traditional way. Finding of the study indicated that experimental group showed higher achievement in science than control group.

Pangantihon and Tantiado (2024) highlighted that- Cooperative learning strategies have moderately positive correlation with the students' overall well-being especially the peer support. Thus, Cooperative learning strategies can be enhanced, implemented and integrated during teaching-learning delivery to holistically develop the overall students' well-being.

Sharma et al. (2024) highlighted that- Jigsaw technique can improve the performance of senior secondary school-level students in biology, presenting a distinct alternative to traditional experimental teaching methods in India. The implementation of the jigsaw method has the potential to transform biology education in India and greatly enhance the understanding of biology. This method offers a promising alternative to the traditional lecture approach by fostering active learning and deeper engagement with the subject matter.

Boke et al., (2025) highlighted that Examines the effect of Cooperative Learning (CL) interventions, compared to traditional instructional methods, on students' learning outcomes across affective, cognitive, physical, and social domains in physical education. The findings provide instructive data and strategies for researchers, practitioners, and policymakers aiming to integrate, implement, or make context-specific adaptations of Cooperative Learning into educational processes.

Talkhan, Alhubaidah, Muthanna, & Qadhi (2025) highlighted that- Cooperative learning improves achievement in mathematics, increased student motivation, and enhanced skills in communication, collaboration, and critical thinking. Learning through collaboration is conducive to the overall development of the students; hence, it is an effective strategy not only in mathematics instruction but also in general education.

Research Questions

How does cooperative learning influence students' learning outcomes in mathematics?

Methodology

The present study used Qualitative Content Analysis to critically examined the role of Cooperative Learning on students' learning outcomes. Various documents like scholarly works, literatures were critically studied. The materials were systematically viewed to identify the key words. The analysis was interpretative and descriptive in nature to understand how Cooperative learning plays a crucial role in students' learning outcome. With advancement, how Cooperative learning caters the diverse needs of the individuals in a classroom for overall development of the child.

Results & Interpretation

Cooperative learning plays a crucial role in teaching-learning process for the overall development of the child. The Meta-Analysis study of Eslit, (2023) suggested that cooperative learning has a positive effect on student achievement across various subject areas and grade levels. Boke et al., (2025) examines the effect of Cooperative Learning (CL) interventions, compared to

traditional instructional methods, on students' learning outcomes across affective, cognitive, physical, and social domains in physical education. The findings provide instructive data and strategies for researchers, practitioners, and policymakers aiming to integrate, implement, or make context-specific adaptations of Cooperative Learning into educational processes. Kaymak et al., (2021) in their experimental research design showed that mathematics achievement increases when the cooperative learning technique is used. This is because students are able to correct their mistakes and understand their weaknesses by working together with other students to improve themselves in mathematics. Parveen et al., (2018) in their experimental design showed that students taught through cooperative learning did better on the post-test academic achievement than taught through conventional method. Van Ryzin and Roseth (2018) in their study conclude that cooperative learning can also help improve students' social interaction and decrease victimization, stress, emotional problems, bullying, and more. Talkhan et al., (2025) concluded that cooperative learning improves achievement in mathematics, increased student motivation, and enhanced skills in communication, collaboration, and critical thinking. Mendo-Lazaro et al. (2022) in their quasi-experimental research design showed that cooperative learning techniques are dynamic and increase students' perceptions of autonomy and competence, helping to boost motivation for competence, intrinsic motivation, and motivation for control in particular.

Literatures shows effective implementation of cooperative learning to improve students' learning outcomes. According to Giri and Guru (2025) in their experimental design showed that experimental group was taught through the Jigsaw cooperative learning method, while the controlled group has been taught in a traditional way. Study indicated that experimental group showed higher achievement in science than control group. Durmus Kilic (2008) in his quasi-experimental design showed that Jigsaw technique has more favourable findings on the academic performance of the students than the traditional learning method. Sharma et al., (2024) in their non-equivalent control group design showed that Jigsaw technique can improve the performance of senior secondary school-level students in biology, presenting a distinct alternative to traditional experimental teaching methods in India. The implementation of the jigsaw method has the potential to transform biology education in India and greatly enhance the understanding of biology.

Thus, the literatures clearly show that the influence of Cooperative Learning on Students' learning outcomes in mathematics is positive. Cooperative learning enhances students' motivation, academic achievement, communication skills and fosters positive interdependence. Thus, Cooperative learning must be integrated in the teaching learning process for the better learning outcomes of the students in mathematics.

Educational Implications

The educational implications of Cooperative Learning on Student's Learning Outcomes in Mathematics based on the literature reviews are mentioned below-

1. Integration of Cooperative Learning approach

Cooperative learning is an innovative approach and it must be integrated in teaching learning process for overall development of the child.

2. Focus on diverse needs of the child

Cooperative learning caters the diverse needs of the child and focuses on inclusion of all.

3. Teachers training and Professional Development

Cooperative learning focuses on professional development of the teachers so that better learning outcomes of the students can be achieved.

4. Social and Emotional Development

Cooperative learning focuses on social and emotional development of the child. Students in a group learn not only concept but also social skills and emotional skills. They learn how to better adjust in society and also accept others point of views.

5. Positive Interdependence

Cooperative learning fosters positive interdependences among students and they are the part of a group so group success is important.

Conclusion

Cooperative learning is an effective and innovative pedagogical strategy that can be used in the teaching learning process for improving the students' learning outcomes in mathematics. Cooperative learning can be used effectively according to the subject appropriateness. The researches done previously showed that cooperative learning focuses not only on academic achievement but also on the 21st century skills like positive interdependence, enhances communication skill, empathy, individual accountability and group accountability. For this purpose, a teacher must be trained according to the needs and requirement of a child. Teacher must be trained to use effective innovative approaches like cooperative learning in the classroom and along with this teacher must ensure that each child must contribute their best in a group and avoid social loafing and take responsibility for achieving the goals.

In conclusion, Cooperative Learning has emerged as an innovative approach that can shift traditional rote based learning to the children centred learning and it can foster students' academic achievement, increase their motivation in mathematics and reduce their mathematics anxiety and stress. Also, student will be consistent to take mathematics as their interest subject and ultimately it enhances students' learning outcomes in mathematics.

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THE IMPACT OF SELF-REGULATED LEARNING INTERVENTION ON SCHOOL STUDENTS' MATHEMATICS ACHIEVEMENT: A SYSTEMATIC REVIEW

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Abstract

Self-regulated learning is a process where learners direct and evaluate their learning towards achieving their predetermined objectives. It is crucial in mathematics learning, as it facilitates independent learning and keeps learners focused. Mathematics learning involves problem-solving where learners need to strategize, monitor, and evaluate the effectiveness of the methods they adopted. The study aimed to examine the impact of self-regulated learning intervention studies on school students' mathematics achievement and self-regulated strategy use through conducting a systematic review using Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines. Relevant literature was searched using the SCOPUS database, and selection was done based on the criteria set for the present study. Results of the study revealed that self-regulated learning strategies enhanced school students' mathematics achievement and improved their self-regulated strategy use. Results have educational implications for mathematics teachers, administrators, and policymakers to improve school students' mathematics achievement and self-regulation.

Keywords: *Self-Regulated Learning (SRL), Mathematics achievements, self-regulated strategy use*

Introduction

Mathematics plays a vital role in the development and advancement of individuals and society as a whole (Chen et al., 2024). Proficiency in the subject mathematics is essential to excel in other subject areas such as social science, science and history (Lee et al., 2023). However, learning mathematics has become a challenge for many students (Kholid & Naufan, 2025), which might have influences their academic achievement in the subject. According to Kizilcec et al. 2017 (as cited in Huang et al., 2024) one of the primary reasons for students' difficulty in solving mathematical problems is their lack of knowledge regarding diverse self-regulated learning methodologies. Learning mathematics required metacognitive skills, which will help learners in selecting and choosing appropriate methods and strategies to solve mathematics problems (Balan and Jönsson, 2025).

Self-regulation is defined as the thoughts, feelings and behaviours developed by the learners, directed towards fulfilling a purpose set by themselves (Zimmerman, 2000). Self-regulated learning involves setting learning goals, choosing and structuring strategies, assessing and reflecting learning outcomes, which enables learners to construct their own knowledge (Xiao & Yang, 2019). According to Zimmerman (2002) self-regulated learners are proactive learners engaged in setting their own learning goals, devising strategies, effectively monitor and reflect their own learning. Zimmerman further stated that self-regulated learners are self-satisfied, highly self-motivated, goal-oriented and adaptable to learning and therefore are more likely to succeed in academics and looks

at their future endeavours more positively. Self-regulated learners are those learners who possess the essential cognitive and metacognitive skills to comprehend, check and guide their own learning, along with the required motivational beliefs and attitudes to accomplish the set task (El-Adl & Alkharusi, 2020).

Dimension of Self-Regulated Learning (SRL)

Self-regulated learning is a broad field and involves the study of cognitive, metacognitive, behavioural, motivational and emotional aspects of learning (Panadero, 2017). At the cognitive level, SRL examines cognitive strategies which include rehearsal, elaboration, organization, structuring, decoding, selective attention (Garcia & Pintrich, 1994; Boekaerts, 1996b). Metacognition which is generally considered as thinking about thinking includes planning (setting goals, strategizing, selecting appropriate strategies), monitoring (testing, revising, tracking progress) and evaluating (reflection, assessing results and strategies used) one's own learning (Brown, 1987). Behavioural dimension of SRL deals with behavioural strategies which includes organizing physical environment, managing resources, time management, seeking help, effort, self-observation, choice behaviour (Pintrich, 2000). Motivational dimension of SRL includes students' self-efficacy, task value, goal orientation and self-attribution (Zimmerman & Moylan, 2009). And the affective components of SRL includes stress, anxiety, or boredom (Pekrun et al., 2002) aspects of learning.

Self-Regulated Learning (SRL) and Mathematics Achievement

Number of studies have been conducted regarding SRL and mathematics achievement. Review study of Fauzi and Widjajanti (2018) revealed a positive relationship between SRL and students' mathematics achievement. Their results also revealed that students with high SRL tends to have high motivation towards learning mathematics. Study of El-Adl & Alkharusi (2020) indicated statistically significant positive relationships between students' motivational strategies of SRL and academic achievement in mathematics. Meta-analysis review study of Dent & Koenka (2016) revealed that SRL strategies positively impacts mathematics achievement at all levels of education.

Results of research studies has clearly favoured using SRL strategies in enhancing students' mathematics learning, improving their academic achievement in mathematics. However, it is not clear about how exactly SRL strategies can be implemented in the mathematics classroom practice, particularly for school children (Balan and Jönsson, 2025). This systematic review will examine the intervention studies of SRL strategies in mathematics classrooms, to shed more light on its impact on students' mathematics achievement and SRL strategy use. Incorporating SRL strategies in the mathematics classrooms can train and enhance the critical thinking and problems solving ability of the learners which are the key principles of National Education Policy 2020. The study will encourage and assist mathematics teachers to comprehend and appreciate the significance of SRL in students' mathematics achievement and mathematics learning. The study will also inform school teachers, administrators and policy makers to promote usage of SRL strategies in the classrooms by providing the required resources. This systemic review will explore SRL intervention studies specific to mathematics and seek to provide answers to the following research questions.

Research Questions

1. What are the impacts of SRL interventions on School Students mathematics achievement?
2. What are the impacts of SRL interventions on School Students' self-regulated strategy use in mathematics?

Methodology

This systematic review adopted the methodology based on the guidelines established by PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses), to establish transparency, consistency and rigorousness of the study (Moher et al., 2009). Identification and selection of the articles go through systematic and rigorous process. SCOPUS database was chosen to conduct a search for the relevant literature. The search strategy included using searched keywords such as “Self-Regulated Learning” OR “SRL” OR “Self-Regulated Learning strategies” AND “Mathematics”. Subsequently, the searched keywords generated 253 literatures in total. Applying the inclusion and exclusion criteria set for the present study, eight (8) articles met the set criteria and were therefore, chosen to undergo qualitative assessment.

Inclusion and Exclusion Criteria

The present study included only interventions studies of Self-Regulated Learning specific to the mathematics learning and school students. Peer reviewed articles in English language, which are available in full text form and published between 2016 and 2025 inclusively were included for the study.

The study excludes those literatures that are not SRL interventions studies and not related to mathematics learning and school- aged students. Review articles, books, book chapters, book series and conference proceedings were excluded from the study.

The process followed in the identification and selection of the relevant literatures for the purpose of the study are highlighted below.

1. Identification. This phase includes searching relevant records using the established keywords from the SCOPUS database. As a result, 253 records were identified and after limiting to the year (2016 to 2025), articles and English language only from the SCOPUS database, 111 articles were sought for screening. No duplicates records were found in the process.
2. Screening. 111 articles were screened by going through their titles and abstracts and exclude those that do not meet the pre-determined criteria set for the present study. 82 articles were excluded and 29 articles were sought for full text review.
3. Eligibility. In this phase, the researcher searched for full texts of the 29 articles and examine for eligibility to be included in the present study. Only eight (8) articles met the criteria set for the purpose of the study and were therefore, chosen for the present systematic review
4. Included. Eight (8) articles meet the criteria set for the purpose of the study and were chosen for the study.

The visual representation of the selection process followed in choosing the articles is given below in **figure 1** (Adapted from Moher et al., 2009 & Page et al., 2021).

[Figure 1: Process involved in selecting articles for the present systematic review]

Qualitative Content Analysis (QCA) and results

Table 1: Author(s), country, sample, research design, objectives and results of the articles analysed in the study

[Table 1]

The table 1 presents a comprehensive summary of 8 studies that investigated the impact of Self-Regulated Learning (SRL) interventions on school students' mathematics achievements. This interpretation can explore the findings in relation to two research questions.

Impact on Mathematics achievement (RQ 1)

The studies showed that SRL interventions had a positive impact on students' mathematics achievement. The interventions improved students' mathematics achievement (Lin & Yang, 2021; Balan and Jönsson, 2025; Hacker, 2019; Lee et al., 2023) and enhanced their problem-solving skills (Leo & Muis, 2020; Chen et al., 2024; Huang et al., 2024). These findings indicate that SRL interventions can have a significant impact on students' academic achievement in mathematics.

Studies of Leo & Muis (2020), Chen et al. (2024) and Huang et al. (2024) indicated that students in the experimental group significantly perform better than those students in the control group in mathematics word problem solving. Their studies implied the effectiveness of Cognitive-emotional strategy training (Leo & Muis, 2020), self-regulated-based gamified interactive e-book (Chen et al., 2024) and Self-Regulated Level based Feedback (Huang et al. 2024) interventions in improving mathematics word problem solving ability of the school students.

Lin and Yang (2021) found that students in the experimental group (SRL intervention supported with multiple scaffolds) significantly perform better than those in the control groups in mathematics test. Their study also found that scores of students with different mathematics achievement levels (high, medium and low) in the experimental group were improved more than those in the other groups with different mathematics achievement levels. Also, the learning performance of students with high-achievement levels in the experimental group were significantly better than those in the control group. However, Balan and Jönsson (2025) found that the intervention (Self-Instructional SRL material) was more beneficial for low performing students than high performing students in terms of knowledge gain in fractions.

Studies of Hacker (2019) and Lee et al. (2023) reported that significant mean difference exists between pre-test and post-test for students in the experimental group in mathematics performance test, indicating improvement in mathematics performance as a result of the SRL strategies.

Impact on Self-Regulation of Learning (RQ 2)

The studies demonstrated that SRL interventions had a positive impact on students' self-regulated strategy use. Specifically, the interventions improved students' SRL strategy use (Leo & Muis, 2020; Chen et al., 2024; Hacker, 2019; Lee et al., 2023) and enhanced their self-regulation (Chen et al., 2024; Granberg et al., 2021; Lee et al., 2023). These findings suggest that SRL interventions can empower students to take control of their learning, set goals, and monitor their progress.

Study conducted by Leo and Muis (2020) reported that students in the CEST intervention group were found to be significantly using more SRL strategies than those in the control group. Also, students receiving the intervention were found to be better in managing their emotion in terms of regulating confusions faced while solving mathematics problems. Chen et al. (2024) found that students in the S-GIET intervention group make more usage of SRL strategies (goal-setting skills, task strategy awareness, time management skills) than those in control groups. Also, the effects of the intervention had indicated to increase students' motivation to learn mathematics.

Additionally, Granberg et al. (2021) reported that the SRL intervention has significant effect on perceived autonomy and self-efficacy of students. Their results are further reinforced by qualitative data which indicated that students at the end of the intervention improves their SRL behaviour in terms of setting goals, using strategies, initiating activities, monitoring and evaluating their learning, and striving to achieve their goals. Furthermore, Lee et al. (2023) reported that students

in experimental group increased their self-regulated strategy use and showed reduced task-irrelevant thoughts whereas those in the control groups did not.

However, study of Huang et al. (2024) found that implementing SRL strategy does not improve SRL strategy use of students in mathematics. Their results indicated that students in the control group improved their cognitive and metacognitive strategies usage than those in the experimental group.

Discussion

The results of the present systematic review revealed the effectiveness of implementing SRL strategies into regular mathematics classrooms. Findings indicated that SRL interventions have positive impact on the academic achievement of the school students in mathematics, enhancing their conceptual understanding, critical thinking and problem-solving abilities. Further, results of the present study indicated that almost all SRL intervention studies on mathematics enhances self-regulated strategy use among school students. SLR interventions influences students' better usage of self-regulatory functions such as goal setting, strategizing, planning, monitoring, evaluating and also positively impacting their motivations, behaviours and affection towards learning mathematics. The findings of the present study align with those of Wang and Sperling (2020), who indicated that self-regulated learning interventions enhance students' mathematical performance and their self-regulation skills. Similar findings were also reported in the study of Fauzi & Widjajanti (2018), indicating that self-regulated learning (SRL) enhances students' academic performance in mathematics.

The findings suggested that effectively using self-regulated learning (SRL) strategies in mathematics classes may contribute to alleviating issues related to underachievement in this subject, especially among school students. The research indicated that mathematics teachers can incorporate SRL strategies into their teaching, which could improve achievement in mathematics and enhance students' self-regulatory abilities. Furthermore, the study suggested that SRL strategies can be utilized alongside digital technology, which acts as a tool to support self-regulation in learning. Educational administrators and policymakers can offer training and necessary resources to teachers, enabling them to apply SRL strategies effectively to enhance the mathematics teaching and learning experience.

Conclusion

Self-regulated learning is a comprehensive domain that includes various facets of learning, including cognitive, metacognitive, behavioral, motivational, and emotional components. Self-regulated learners are adept at establishing their learning objectives, as well as monitoring and assessing their progress. They exhibit motivation and persistence in attaining their educational objectives. To master mathematics, students must exhibit persistence and assume responsibility for their own education.

The study's results demonstrated that the implementation of self-regulated learning methodologies in mathematics classrooms positively influences students' mathematics achievement and improves their self-regulation of learning. The results indicate the need of integrating self-regulated learning strategies into the instructional plan to enhance students' mathematical achievement and self-regulation in mathematics. Implementing self-regulated learning practices in the mathematics classroom will cultivate learners' self-regulation, enabling them to progressively assume control of their own education. Enhancing pupils' self-regulatory skills will not only elevate their mathematical proficiency but also foster lifelong learning abilities.

The varied SRL intervention strategies employed in the research underscore the flexibility and adaptability of SRL in mathematics teaching. This review's conclusions have ramifications for educators, administrators and policymakers aiming to enhance school students' mathematics achievement and self-regulation abilities.

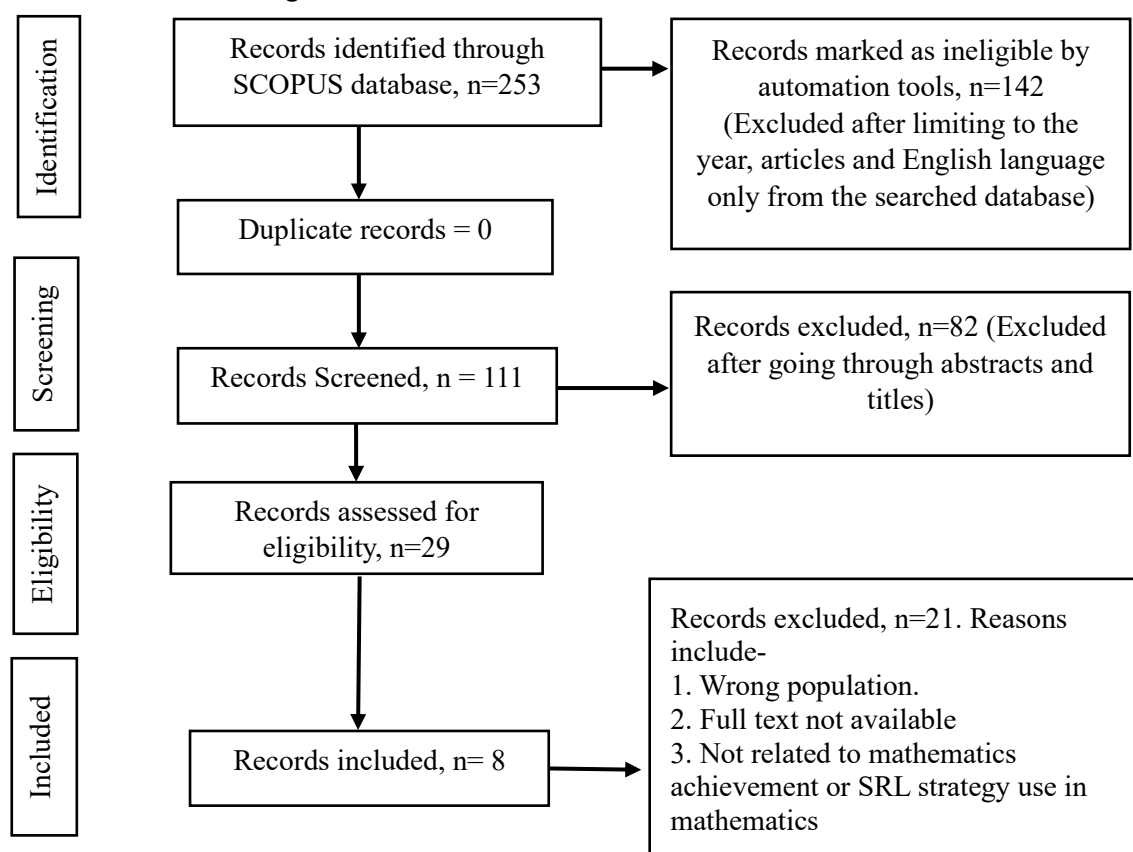


Figure 1: Process involved in selecting articles for the present systematic review

Table 1: Author(s), country, sample, research design, objectives and results of the articles analysed in the study

Sl No.	Author/s	Country	Sample & Research Design	Objectives	Outcome
1	Leo & Muis, 2020	Canada	67 students (5 th grade) Explanatory mixed methods design	Effectiveness of Cognitive Emotional Strategy Training (CEST) intervention in promoting emotional awareness and SRL strategies use of students.	Intervention significantly improves students' mathematics performance and improves their SRL strategies usage, better at controlling their emotion
2	Balan and Jönsson, 2025	Sweden	258 students (5 th & 6 th Grade)	Impact of Self-Instructional SRL material	Effective for low performing students than high performing students

			Quasi-experimental research		
3	Chen et al., 2024	China	120 students- (6 th grade) Quasi-experimental research design	Impact of Self-regulated based gamified interactive e-book on mathematics performance and self-regulation of students	Interventions significantly improve students' mathematics performance and self-regulation of learning abilities.
4	Lin and Yang, 2021	Taiwan	85 students- (5 th grade) Quasi-experimental research design	Impact of SRL model (multiple scaffolds) on students' mathematics performance	Students receiving multiple scaffolds through SRL model significantly perform better other students.
5	Hacker, 2019	United States	Study 1 59 students (4 th & 5 th grade) Study 2 34 students (5 th & 6 th grade) Quantitative research design	Impact of SRL strategy (FACT + R ² C ²) on students learning fractions	Study 1 Intervention significantly improves students' fractions knowledge and reasoning, building arguments, and total number of words written. Study 2 Intervention increases students' fraction knowledge and their computational accuracy
6	Huang et al. 2024	China	69 students (5 th grade) Quasi-experimental research design	Compare the impact of Task-Level-Based Feedback (TLF) and Self-Regulation-Level-based Feedback (SRLF) in promoting students SRL and solving math word problems	TLF was found better than SRLF in promoting SRL while SRLF had greater impacts than TLF in math word problem solving
7	Granberg et al., 2021	Sweden	32 students (7 th grade) Mixed method design	Impact of formative assessment on students' SRL.	Intervention improves students' SRL practice behaviour.

8	Lee et al., 2023	South Korea	69 students (4 th grade) Quasi-experimental research design	Effectiveness of SRL intervention on students SRL strategy use and mathematics performance	Students in the SRL intervention group increases SRL strategy use and also enhances their mathematics performance than other groups of students.

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CRITICAL THINKING, CREATIVITY, PROBLEM SOLVING IN HIGHER EDUCATION

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Abstract

In the context of rapid social, technological, and economic change, higher education faces increasing pressure to prepare graduates with transferable, future ready skills. Among these, critical thinking, creativity, and problem solving are widely recognized as essential competencies for academic success, employability, and active citizenship. This abstract examines the role and integration of these three interrelated skills within higher education. Critical thinking enables students to analyse information, evaluate evidence, question assumptions, and make reasoned judgments in complex and uncertain situations. Creativity supports the generation of original ideas, innovative approaches, and alternative perspectives, allowing learners to move beyond routine solutions. Problem solving connects these skills by requiring students to apply critical and creative thinking to real world challenges in the systematic and reflective ways.

Higher education institutions play a crucial role in fostering these competencies through learner centred pedagogies such as inquiry based learning, project based learning, collaborative tasks, and interdisciplinary approaches. Assessment practices that emphasize reflection, authentic tasks, and open ended problems further support skill development. However, challenges remain, including content heavy curricula, traditional assessment methods, and limited faculty training in innovative teaching strategies.

Key words: Critical Thinking, Creativity, Problem Solving.

Introduction

Higher education plays a vital role in shaping individuals who can contribute meaningfully to society. Traditionally, universities were seen primarily as institutions for the transmission of knowledge. However, in the contemporary global context, mere acquisition of information is no longer sufficient. The rapid advancement of technology, globalization, and the evolving nature of work demand graduates who can think critically, generate creative ideas, and solve complex problems effectively.

Critical thinking, creativity, and problem solving are widely recognized as core competencies that enable students to navigate uncertainty, evaluate information, and make informed decisions. These skills are essential not only for academic success but also for professional growth, civic engagement, and lifelong learning. Higher education institutions therefore have a responsibility to cultivate these abilities through teaching, learning, and assessment practices.

This paper explores the significance of critical thinking, creativity, and problem solving in higher education. It examines their definitions, roles, interconnections, teaching strategies, challenges, and overall impact on student development.

Concept of Critical Thinking

Critical thinking is commonly defined as the ability to analyse, evaluate, interpret, and synthesize information in a logical and reflective manner. It involves questioning assumptions, assessing evidence, identifying biases, and drawing reasoned conclusions. In higher education, critical thinking is regarded as a higher order cognitive skill that goes beyond memorization and recall of facts.

Critical thinking encourages students to engage actively with knowledge rather than accept information passively. It allows learners to distinguish between fact and opinion, recognize flawed arguments, and evaluate the credibility of sources. This skill is particularly important in an era of information overload, where students are constantly exposed to vast amounts of data from various media sources.

In academic settings, critical thinking supports research, academic writing, and scholarly inquiry. Students who think critically are better equipped to formulate research questions, analyse data, and present coherent arguments. As a result, critical thinking is considered a cornerstone of quality higher education.

Importance of Critical Thinking in Higher Education

The development of critical thinking skills is essential for achieving the goals of higher education. One of its primary benefits is the promotion of deep learning. Instead of memorizing content for examinations, students learn to understand concepts, analyse ideas, and apply knowledge in meaningful ways.

Critical thinking also enhances decision making skills. University students often face complex academic and personal choices. The ability to evaluate options logically and consider consequences enables them to make informed decisions. Furthermore, critical thinking fosters intellectual independence by encouraging students to form their own opinions based on evidence and reasoning.

In professional contexts, employers increasingly value graduates who can analyse problems, evaluate information, and think strategically. Thus, critical thinking is not only an academic skill but also a key employability attribute developed through higher education.

Concept of Creativity

Creativity refers to the ability to generate original ideas, approaches, or solutions by thinking beyond conventional boundaries. It involves imagination, curiosity, flexibility, and the willingness to explore new possibilities. In higher education, creativity is not limited to artistic disciplines but is relevant across all fields of study, including science, technology, business, and social sciences.

Creative thinking allows students to approach problems from multiple perspectives and develop innovative solutions. It supports originality in research, project design, and knowledge application. Creativity also encourages risk taking and experimentation, which are essential for intellectual growth and discovery.

Higher education institutions play a crucial role in nurturing creativity by providing learning environments that value originality, exploration, and independent thinking.

Role of Creativity in Higher Education

Creativity is a key driver of innovation and progress in higher education. It supports interdisciplinary learning by encouraging students to integrate ideas from different fields of

knowledge. This approach enables learners to address complex problems that cannot be solved using a single discipline.

In academic research, creativity leads to the development of new theories, methods, and perspectives. Students who are encouraged to think creatively are more likely to engage in original research and contribute new insights to their fields of study.

Moreover, creativity enhances adaptability. In a rapidly changing world, the ability to think creatively helps students respond effectively to new challenges and opportunities. Higher education institutions that promote creativity prepare students to become innovative thinkers and leaders in their professions.

Concept of Problem Solving

Problem solving is the process of identifying a problem, analysing its components, generating possible solutions, selecting the most appropriate option, and evaluating the outcome. In higher education, problem solving often involves dealing with complex, real world issues that do not have straightforward answers.

Problem solving requires both analytical and creative thinking. Students must understand the nature of the problem, evaluate available information, and consider multiple alternatives. This process helps learners develop systematic and strategic approaches to challenges.

Higher education emphasizes problem solving as a means of applying theoretical knowledge to practical situations. Through problem based learning, case studies, and projects, students learn to address real life issues effectively.

Importance of Problem Solving in Higher Education

Problem solving is essential for academic success and professional readiness. It enables students to connect theory with practice and apply knowledge in meaningful contexts. This skill is particularly important in fields such as engineering, medicine, business, and education, where professionals regularly encounter complex problems.

In higher education, problem solving also promotes collaboration and teamwork. Many academic tasks require students to work together to analyse problems and develop solutions. This experience enhances communication skills and prepares students for collaborative work environments.

Additionally, problem solving fosters resilience and perseverance. By engaging with challenging tasks, students learn to cope with difficulties, evaluate failures, and refine their approaches. These qualities are essential for lifelong learning and personal growth.

Relationship Among Critical Thinking, Creativity, and Problem Solving

Critical thinking, creativity, and problem solving are closely interconnected and mutually reinforcing. Critical thinking helps students analyse information and evaluate possible solutions. Creativity enables them to generate innovative ideas and explore alternative approaches. Problem solving integrates both critical and creative thinking to develop effective solutions.

These skills work together in academic and real world contexts. For example, when faced with a research problem, students must critically evaluate existing literature, creatively design research methods, and solve methodological challenges. The integration of these skills leads to deeper learning and more effective outcomes.

Higher education institutions that foster all three skills create learning environments that support intellectual growth, innovation, and adaptability

Teaching Strategies for Developing These Skills

Universities use various teaching strategies to promote critical thinking, creativity, and problem solving. Inquiry based learning encourages students to ask questions, explore ideas, and construct knowledge independently. Problem based learning presents real world problems that require analytical and creative solutions.

Project based learning allows students to apply knowledge to practical tasks and develop problem solving skills collaboratively. Discussion based teaching and debates promote critical thinking by encouraging students to evaluate different viewpoints and justify their arguments.

Assessment methods also play a crucial role. Open ended questions, research projects, case analyses, and reflective writing are more effective in developing higher order thinking skills than traditional rote learning examinations.

Conclusion

Critical thinking, creativity, and problem solving are essential competencies in higher education. These skills enable students to analyse information, generate innovative ideas, and address complex challenges effectively. In an increasingly uncertain and dynamic world, higher education institutions must prioritize the development of these abilities.

By integrating critical thinking, creativity, and problem solving into teaching, learning, and assessment practices, universities can empower students to become independent thinkers, innovative problem solvers, and lifelong learners. Ultimately, fostering these skills contributes to academic excellence, professional success, and meaningful societal engagement.

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EDUCATION AS A PATHWAY TO EMPLOYABILITY AND EMPOWERMENT: A SYSTEMATIC REVIEW OF LITERATURE

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Abstract

In the knowledge-based economy of today, education is crucial in determining social mobility and employment prospects. In order to investigate how education affects employment outcomes and economic empowerment, this paper examines both theoretical viewpoints and empirical findings. Grounded in Human Capital, Job Signalling, Adult Learning, and Endogenous Growth theories, it shows that education enhances creativity, adaptability, lifelong learning, productivity, and skills. Evidence from different contexts indicates that education contributes to job preparedness, income stability, and upward mobility. Case examples, such as the Plan-It Girls initiative in India and youth empowerment projects in Tanzania, illustrate how skill-based and inclusive programs can create transformative change. At the same time, persistent challenges—such as underemployment, mismatched skills, and unequal access—limit these benefits. Overall, the review argues that education serves not only as a route to employment but also as a driver of confidence, empowerment, and inclusive economic growth.

Keywords: Education, Employability, Economic Empowerment.

Introduction

Today's economy runs on knowledge. Education is now crucial for securing a job and establishing financial stability. Beyond equipping individuals with basic literacy and numeracy, education serves as a powerful tool for cultivating technical expertise, transferable skills, and social competencies that are essential for navigating dynamic labour markets. The role of education is no longer confined to preparing individuals for a single occupation; instead, it prepares them for lifelong adaptability, innovation, and participation in an increasingly globalised economy.

The education–employability link is not automatic or linear. Employability depends on curriculum quality and relevance, practical experience, and alignment with industry needs. Social capital, networks, and career guidance also expand opportunities beyond formal qualifications. Labour-market structures and demand conditions further shape outcomes, often leading to skill mismatches despite higher education.

Human capital and credentialism theories show that education builds skills and signals qualifications, improving employment outcomes. However, underemployment, skill gaps, and unequal access remain challenges. Education supports employability both directly through skill development and indirectly by boosting confidence, adaptability, and mobility. Its impact depends on relevant curricula, practical training, and inclusive access aligned with labour-market needs.

Objectives of the Study

- To examine the theoretical foundations that explain the relationship between education and employability.

- To review empirical evidence on how education influences employment outcomes and empowerment.

1. Theoretical Foundations of Education and Employability.

Education drives employment and economic progress at both individual and societal levels. It equips people with knowledge, technical and transferable skills, boosting productivity, employability, income, and social mobility while fostering confidence and adaptability. At broader levels, education strengthens workforce development, supports innovation, and enables sustained economic growth. Multiple theories explain this link between education, employment, and empowerment

1.1. Human Capital Theory (HCT)

Human Capital Theory, developed by Gary Becker (1964) and Theodore Schultz (1971), views education, skills, and experience as valuable capital that increases productivity and employability. Education equips individuals with both general (communication, analytical) and specific technical skills, improving their career prospects and enabling smooth transitions across sectors. Thus, investment in education enhances youth competitiveness, employment opportunities, and long-term economic standing.

1.2. Job Signalling Theory

Proposed by Michael Spence (1973), Job Signalling Theory explains that in markets with asymmetric information, education serves as a signal of productivity to employers who cannot directly observe a worker's ability. While education may not always enhance actual skills, it acts as a credible indicator of competence, since high-productivity individuals find it easier to acquire. Employers, therefore, rely on such signals to assign jobs and salaries.

In career transitions, especially for new graduates or those entering new fields, educational credentials function as key signals of potential, diligence, and trainability. This explains why individuals invest in higher education to strengthen their signals, improve credibility, and increase the likelihood of securing better career opportunities.

1.3. Adult Learning Theory

Malcolm Knowles' Adult Learning Theory (1984) or andragogy, outlines that adults learn best when learning is self-directed, experience-based, practical, and problem-centred. Unlike children, adults are motivated by immediate goals such as career advancement or acquiring new skills, and they prefer learning that connects directly to real-life applications.

This theory highlights the importance of flexible, relevant, and skill-oriented programs—such as online courses or workplace training—that respect adults' autonomy and build on their prior experiences. It provides a strong foundation for designing career-focused and lifelong learning initiatives.

1.4. Endogenous Growth Theory

Paul Romer's Endogenous Growth Theory (1994) emphasises that long-term growth stems from internal drivers such as knowledge, skills, and innovation rather than external factors. By treating knowledge as a non-rival good, Romer highlights the role of education, R&D, and supportive policies in fostering innovation and productivity. This theory underlines that continuous learning and human capital investment enable individuals to adapt, innovate, and access better opportunities, thereby contributing to both personal development and broader economic growth.

2. Empirical Evidence on Education and Employment Outcomes and Empowerment.

Education strongly shapes employment outcomes by providing essential skills for a dynamic labour market. Evidence shows that higher education enhances employability, better job opportunities, income security, and upward mobility. Reviewing such empirical findings helps understand how education meets labour market needs and guides effective policy and practice.

2.1. The Transformative Role of Education in Enhancing Employability and Empowerment.

Education is a significant doorway to employability and empowerment, as evidenced by several studies that document its wide-ranging impact. Araujo emphasises the significance of education for the acquisition of professional capabilities and the advocacy of labour rights, suggesting the necessity for an integrated education strategy in today's rapidly evolving employment market (Araujo, 2024). Similarly, adult education is proven to enable people to increase their agency and self-esteem, and this is directly related to improved work prospects ("Adult Education as a Pathway to Empowerment," 2023). For Aboriginal Australians, learning to be empowered significantly enhances literacy and numeracy, and these subsequently lead to improved employment (Wilson et al., 2019). Furthermore, Cerdá discusses the necessity of distance education and lifelong learning in order to acquire skills aligned with the needs of the existing labour market and hence foster social and economic empowerment (Cerdá & Francisco, 2018). Lastly, Lizaola et al. highlight the manner in which Mexican higher education equips young people with the ability to bring about social and labour empowerment, translating into economic development and reduced inequality (Lizaola et al., 2018).

2.2. Bridging Education and Employment Pathways.

Education is an essential means of achieving employability because it equips people with the skills and knowledge needed to succeed in a changing labour market. To improve job readiness and promote economic growth, it is crucial to match educational outputs with industry demands, as highlighted by the integration of skill education in India's National Education Policy (NEP) 2020 (Patil, 2024). According to studies, students often lack awareness of the education-employment pathways available to them; therefore, higher education institutions must provide clear guidance to help students understand these links (Lock & Kelly, 2020). Advocating for labour rights and creating sustainable careers also requires a comprehensive educational strategy that incorporates ongoing learning and curriculum alignment with market demands (Araujo, 2024; Bettencourt, 2012). In general, employability enhancement and ensuring that graduates are adequately equipped to handle the demands of the contemporary workforce depend on efficient educational policies and practices (Subudhi & Das, 2015).

2.3. Employability as a Pathway to Economic Empowerment.

Studies conducted in various settings have shown that increasing employability is crucial to enhancing economic empowerment. The Plan-It Girls program in India demonstrates that equipping teenage girls with employable skills, combined with fostering self-efficacy and challenging gender stereotypes, significantly empowers them economically by preparing them for the transition from school to the workforce (Kumar et al., 2021). The employability of young people in Tanzania has also been positively impacted by youth economic empowerment projects that emphasise training, savings, credit facilities, and start-up tools. This suggests that these initiatives can improve economic empowerment by giving young people the tools and resources they need to find work ("Influence of youth economic empowerment...", 2022) (Magali & Mbagwa, 2022). Additionally, SDG 8, which links the development of employable skills to both national progress

and individual economic empowerment, emphasises the importance of education in employability (Ravindran & Mathews, 2023). Furthermore, online education and lifelong learning—discussed in the context of socio-technical e-learning—are essential for preparing people for the workforce of the twenty-first century. By encouraging media literacy and active citizenship, this strategy not only improves employability but also gives people social and economic power (Cerdá & Francisco, 2018). When taken as a whole, these studies highlight the importance of focused educational and empowerment programs, whether they come from formal schooling or community-based projects, in enhancing employability and, in turn, economic empowerment.

Conclusion

This review shows that education is a key path to employability and empowerment in a knowledge-based economy. Human capital and signalling theories highlight their role in boosting skills, productivity, and credibility, while adult learning and endogenous growth theories stress adaptability, lifelong learning, and innovation. Evidence shows that education enhances job readiness, income security, and mobility, as seen in initiatives such as Plan-It Girls and youth empowerment programs in Tanzania. Overall, education is both a tool for employment and a driver of confidence and inclusive growth—its impact strengthened by labour-market-aligned curricula, practical training, and equitable access.

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THE ROLE OF BUDDHIST EDUCATION IN CONTEMPORARY SOCIETY

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Abstract

Buddhist education offers a rich collection of ideas and practices that powerfully connect with the intricacies of contemporary existence. It examines the many applications of Buddhist teachings in modern society, emphasizing its significance and ability to bring about positive change in several areas. The discussion explores fundamental principles of Buddhist education, such as mindfulness, compassion, interdependence, and ethical frameworks. It explores the practical applications of these ideas, demonstrating how they are incorporated into contemporary settings. Buddhist education encompasses all aspects of our lives, such as using mindfulness practices to reduce stress and improve well-being in a fast-paced environment and providing ethical guidelines for responsible decision-making in a globalized society.

Key words: *Buddhist, Education, Philosophy, Modern life*

Introduction

Amidst a period characterized by rapid technical progress and cultural development, the deep wisdom inherent in ancient philosophies remains relevant. It provides valuable guidance for navigating the intricacies of contemporary existence. Of all these, Buddhist education is particularly notable for its enduring values that powerfully connect with the difficulties and ambitions of modern society. Buddhism, derived from the teachings of Siddhartha Gautama, goes beyond just a religious philosophy. It encompasses a comprehensive approach to life, emphasizing mindfulness, compassion, and connection. The ideas inherent in Buddhist education reflect and examine our shared moral awareness, providing avenues for personal satisfaction, social cohesion, and global welfare.

This discussion examines the many uses of Buddhist education in our contemporary society. Buddhist teaching is relevant in several aspects of our lives, ranging from mindfulness techniques that help reduce stress in a fast-paced environment to ethical frameworks that assist in making choices in a highly linked global community. This research aims to reveal the deep connection between ancient wisdom and the difficulties and ambitions of modern society by exploring its core principles. This investigation seeks to clarify how the practical applications of Buddhist teachings operate as sources of wisdom, directing our path towards individual development, social cohesion, and a more empathetic society. By seeing things from this perspective, we uncover the profound ability to incorporate age-old knowledge into the very essence of our contemporary lives. Participate in this expedition as we navigate through the pathways of Buddhist education, deciphering its eternal insights and revealing its great significance in constructing a more enlightened, compassionate, and peaceful society.

Objective

The objective of the study is to examine the role of Buddhist Education in contemporary Society.

Methodology

The study uses philosophical research methods and relies on secondary data from research papers and articles.

Mindfulness and wellbeing

Buddhist teachings emphasize the cultivation of mindfulness, a practice that has gained respect in modern psychology for its positive effects on mental well-being. It enhances attention and alertness, hence decreasing stress and enhancing overall well-being. Buddhist teachings highlight the significance of mindfulness, a practice that is becoming recognized in modern psychology for its substantial impact on mental well-being. As advocated in Buddhist philosophy, mindfulness promotes active engagement in the present moment, fostering an elevated awareness of one's thoughts, emotions, and environment. Enhanced mindfulness reduces stress and cultivates overall well-being.

The fundamental tenet of mindfulness in Buddhism is cultivating total presence and awareness of one's experiences without judging or attaching to them. This approach encourages individuals to unbiasedly observe their thoughts and emotions, acknowledging them without being overwhelmed. Individuals improve their understanding of their cognitive processes by cultivating a state of non-reactive awareness, allowing them to respond to circumstances with more clarity and emotional equilibrium. Mindfulness-based treatments, derived from Buddhist principles, have shown efficacy in several domains of mental well-being. Research suggests that practising mindfulness methods might successfully reduce symptoms of anxiety and depression by promoting a state of non-judgmental acceptance towards one's experiences. Furthermore, studies have shown that mindfulness meditation might improve an individual's capacity to concentrate and manage their emotions, fostering overall psychological wellness.

Mindfulness is strongly associated with the reduction of stress. By focusing their attention on the present moment, individuals may alleviate the psychological burden caused by worries about the future or regrets about the past. The pioneered the development of the Mindfulness-Based Stress Reduction program, which has shown significant efficacy in reducing stress levels and enhancing coping mechanisms among participants. Incorporating Buddhist mindfulness principles has become more common in modern society, marked by the pervasive existence of many sources of stress. Mindfulness practices have been used in many settings, including educational institutions, professional situations, and therapeutic interventions. Schools have used mindfulness programs to enhance students' focus and emotional regulation, while companies have adopted mindfulness-based strategies to reduce employee stress and enhance productivity.

However, secularizing and commercializing mindfulness practices may be traced back to Buddhist teachings and have sparked debates over their authenticity and ethical consequences. Some argue that removing mindfulness from its spiritual and ethical roots might diminish its capacity to effect substantial transformation, reducing it to a mere technique for relieving stress. The use of cultural aspects and the monetization of mindfulness practices raise ethical considerations. Buddhism's teachings place great importance on mindfulness practice and provide a robust framework for enhancing one's mental well-being. Mindfulness, characterized by complete awareness of the current moment and non-reactive observation, has shown significant promise in reducing stress and improving overall psychological well-being. However, the ethical concerns surrounding the secularization of these practices highlight the need for a comprehensive

approach to ensure the authenticity and ethical integrity of mindfulness applications in modern society.

Compassion and Ethics

Buddhist education emphasizes the development of compassion and adherence to ethical principles. Amidst the prevalence of conflicts and ethical challenges in the contemporary world, these teachings may serve as a compass to steer people and society towards making more sympathetic and morally upright choices. The focus on empathy and moral behaviour in Buddhist education is a guiding principle in navigating the intricacies of the contemporary world, which is filled with conflicts and moral quandaries. Buddhists emphasize the development of compassion as a fundamental aspect of ethical conduct. The focus on compassion goes beyond simple pity; it entails actively participating and caring about the welfare of others, promoting a feeling of connectivity and empathy.

Amidst a society characterized by a wide range of value systems and competing interests, the teachings of compassion derived from Buddhist education provide a comprehensive and universally applicable ethical framework. It argues that they promote people and society beyond limited borders and viewpoints, cultivating a broader and more compassionate approach to moral decisions. Through the cultivation of a profound understanding of interdependence, these teachings encourage people to reflect on the broader consequences of their actions on others and the global community. Buddhist concepts of compassion and ethics are not limited to individual behaviour but also encompass social and global domains. Through promoting compassionate action and ethical conduct, people can actively address societal injustices, cultivate peaceful cohabitation, and resolve problems by engaging in discourse and cultivating understanding. These teachings motivate humans to behave in manners that advance the well-being of all creatures, surpassing self-interest and fostering a shared ethical obligation.

In modern contexts characterized by moral complexity and ethical dilemmas, the relevance of Buddhist education becomes more significant. By integrating these teachings into school curricula, professional training, and social standards, people may develop a solid moral compass rooted in compassion and ethical integrity. This strategy fosters individual qualities and leads to a fairer, more compassionate, and morally strong society. Buddhist education's teachings of compassion and ethics provide a timeless and globally relevant foundation for ethical behaviour and decision-making. They provide a means to overcome personal prejudices, cultivate empathy, and direct people and society towards ethically upright and compassionate decisions among prevailing conflicts and moral quandaries in the contemporary world.

Interconnectedness and Ecology

Buddhism emphasizes the concept of interconnectedness and the notion that all phenomena are mutually reliant. This is consistent with contemporary concerns on environmental sustainability, promoting a more balanced and cooperative connection with nature. Based on the notion of interdependence, the fundamental Buddhist precept of interconnectedness strongly aligns with modern concerns about environmental sustainability. Buddhist teachings stress the inherent interconnectedness of all things, emphasizing the deep and interdependent relationship between every phenomenon. This viewpoint emphasizes that humans are not distinct from nature but essential to the broader ecological network.

Amidst the current circumstances characterized by the deterioration of the environment, climate change, and biodiversity decline, the Buddhist concept of interconnectedness provides

valuable perspectives and direction. By acknowledging the mutual reliance of all living organisms and natural components, humans are prompted to embrace a more attentive and balanced connection with the environment. This change in viewpoint questions the anthropocentric worldview, prompting a more profound comprehension of the interdependence among people, animals, plants, and the whole ecosystem. Acknowledging the interconnectedness of different elements fosters a feeling of obligation and guardianship towards the environment. The concept encourages people to contemplate the repercussions of their activities on the broader ecological system, endorsing sustainable behaviors that reduce damage and enhance the overall welfare of the linked ecosystem. This is in line with contemporary demands for ecological consciousness, conservation initiatives, and sustainable lifestyle habits aimed at safeguarding the fragile equilibrium of the earth.

In addition, the idea of interconnectedness in Buddhism goes beyond the physical world to include the interconnection of acts and their repercussions. Karma, often known as the principle of cause and effect, highlights that each action has consequences that spread across the linked fabric of life. In the context of environmental sustainability, this concept urges people and communities to consider the long-term effects of their actions on the environment and future generations. The incorporation of Buddhist principles of interconnectedness into modern environmental movements advocates for a comprehensive strategy for tackling ecological issues. By cultivating a stronger bond and respect for the natural world, people are encouraged to collectively assume responsibility and actively safeguard the fragile equilibrium of ecosystems. This approach goes beyond simple environmental advocacy; it signifies a fundamental change in thinking towards a more balanced and enduring connection between people and the natural world.

Ultimately, Buddhism's focus on the interconnection and interdependence of all things provides a deep conceptual structure that resonates with contemporary worries over the preservation of the environment. These teachings provide vital insights and direction for promoting a sustainable and environmentally aware society by acknowledging the interconnectedness of all things and advocating for a peaceful connection with nature.

Emotional intelligence

Which is pertinent in modern culture, particularly in resolving conflicts. A key aspect of Buddhist teachings is acknowledging and examining emotions without forming opinions, which promotes self-awareness and empathy. Buddhist education aims to enhance emotional intelligence by fostering a deepened awareness of one's emotions, comprehending their fundamental origins, and acquiring the skills to manage and express them effectively. Emphasizing emotional awareness and control is fundamental to successful conflict resolution as it allows people to negotiate emotionally intense circumstances with clear thinking and calmness.

Conflicts often occur in varied and intricate social environments due to contrasting viewpoints, values, and emotions. Buddhist teachings emphasize the development of emotional intelligence, which involves empathizing with others and gaining a profound knowledge of their feelings and viewpoints. By cultivating empathy, people enhance their ability to defuse disputes and reach mutually agreeable resolutions via communication and comprehension. Buddhist education promotes the cultivation of mindfulness and the ability to remain non-reactive when confronted with intense emotions. This method allows persons in confrontations to temporarily stop, contemplate, and reply with expertise rather than react instinctively. By fostering a composed and unresponsive attitude, people can alleviate uncomfortable circumstances and provide a favorable atmosphere for productive discourse and dispute resolution.

Incorporating emotional intelligence gained from Buddhist teachings into dispute-resolution procedures fosters a more compassionate and all-encompassing approach. The practice promotes active listening, transparent communication, and a sincere readiness to comprehend and recognize the feelings and viewpoints of all parties engaged in the dispute. This compassionate interaction promotes a feeling of shared admiration and confidence, establishing the foundation for cooperative resolution of issues and reconciliation. Buddhist beliefs promote non-violent methods and compassionate communication to resolve problems. By integrating these concepts into conflict resolution methods, people and society may shift away from confrontational tactics and instead aim for outcomes that stress comprehension, reconciliation, and enduring peace. Focusing on emotional intelligence in Buddhist education provides essential resources for effectively managing disputes in many social environments. By advocating for emotional awareness, empathy, mindfulness, and non-reactivity, these teachings are crucial in increasing understanding and resolving problems via constructive discussion, empathy, and mutual respect.

Mind Body Connection

Contemporary culture has come to acknowledge the physical and mental health advantages of meditation and yoga, which originated in Buddhist traditions. The practices of meditation and yoga, which have strong foundations in Buddhist traditions, have gained extensive acknowledgement and acceptance in modern culture because of their significant impact on physical and mental health. Meditation, an essential Buddhist ritual, has, beyond its religious roots, become a widely adopted method valued for its comprehensive advantages. Research has repeatedly shown that meditation techniques, such as mindfulness meditation originating from Buddhist traditions, may have a beneficial effect on mental health by decreasing stress, anxiety, and symptoms of depression. Meditation promotes cognitive clarity, concentration, and emotional control, enhancing one's overall mental health.

The connection between the mind and body is stressed in Buddhist-inspired activities, such as meditation and yoga, by current scientific understanding. These practices emphasize the complex connection between mental and physical health, recognizing that mental well-being considerably impacts physical health and vice versa. Recent scientific studies have gathered empirical data confirming these activities' beneficial impact on many physiological functions. Research has shown that meditation may cause changes in the structure and functioning of the brain, resulting in enhanced attention, emotional control, and ability to handle stress. Moreover, evidence suggests that yoga may induce favorable alterations in the neurological system, immunological function, and cardiovascular well-being.

Incorporating these practices into modern society signifies an increasing acknowledgement of their capacity to improve general welfare. They provide convenient and practical resources for anyone looking to handle stress, enhance cognitive concentration, and foster a more healthful way of life. These activities have a wide-ranging impact beyond cultural and religious limitations, allowing individuals from many backgrounds to engage in them easily. Activities such as meditation and yoga, which originated in Buddhist customs, have garnered acknowledgement in modern culture due to their comprehensive advantages. Their capacity to influence mental and physical health aligns with contemporary scientific knowledge, leading to their universal acceptance as essential instruments for improving well-being and fostering a more profound connection between the mind and body.

Educational Approach

Buddhist education often emphasises experiential learning, encouraging students to seek and uncover truths independently. This student-focused approach aligns with contemporary educational theories, emphasising analytical reasoning and independent learning. The focus on experiential learning in Buddhist education harmonises effortlessly with modern educational theories that encourage critical thinking and self-directed learning. Buddhist education is based on the principles of inquiry and discovery, which promote active engagement with teachings. This approach fosters profound knowledge via personal research and experience.

The learner-centered approach in Buddhist education aligns with contemporary pedagogical paradigms that promote student empowerment and active engagement in the learning process. Instead of just absorbing information, people are urged to inquire, contemplate, and investigate ideas, enabling a deeper absorption of knowledge. Buddhist education greatly emphasizes critical thinking, thoroughly analyzing ideas and concepts from many viewpoints. This methodology encourages people to critically examine, assess, and differentiate realities independently, fostering a more profound comprehension beyond simply accepting knowledge. Similarly, modern educational ideologies prioritise cultivating critical thinking abilities as essential for navigating a more complex and knowledge-abundant environment.

Furthermore, the learner-centred method in Buddhist education emphasises self-directed learning, encouraging people to assume responsibility for their education and personal development. This approach aligns with contemporary educational methodologies, prioritising self-governance and cultivating abilities for continuous learning. It enables people to establish objectives, investigate their interests, and assume accountability for their learning process, promoting autonomy and drive. Experiential learning in Buddhist education places significant importance on the actual application and direct interaction with teachings. The practical nature of this method enables people to combine theoretical knowledge with actual experiences, leading to a more profound internalisation and practical comprehension of ideas. Similarly, modern educational philosophies advocate for interactive learning experiences that connect theoretical knowledge with practical application.

The learner-centred approach of Buddhist education, which focuses on experiential learning, critical thinking, and self-directed discovery, aligns with modern educational ideas. This technique promotes active engagement with information, critical examination of assumptions, and independent exploration of facts. It facilitates intellectual progress and cultivates a profound understanding, autonomy, and lifetime learning abilities.

Stress reduction in workplace

Workplaces increasingly use mindfulness methods drawn from Buddhist practices to improve employee well-being and productivity and alleviate stress. Mindfulness techniques derived from Buddhist traditions have become more prevalent in professional environments as helpful methods for improving employee well-being, productivity, and stress management. Mindfulness techniques, such as meditation and focused breathing, are employed in workplace wellness programs and employee training sessions to reduce stress and improve mental well-being. These practices promote mindfulness, engagement, focus, and acceptance without criticism. This helps people maintain a sense of tranquillity and mental clarity even when faced with work-related stressors.

Research has shown that including mindfulness-based therapies in the workplace may decrease stress levels among workers. Through mindfulness, people develop heightened self-awareness, emotional control, and resilience, which empowers them to manage better stress encountered on the job. Furthermore, the practice of mindfulness has been associated with enhancements in employee productivity and work satisfaction. As people improve their ability to handle stress via mindfulness activities, they gain better attention, concentration, and cognitive function. This ultimately results in higher productivity and efficiency in the workplace.

The use of mindfulness practices in the workplace highlights a change in corporate cultures towards placing more importance on employee well-being and cultivating a more supportive work environment. Employers acknowledge the significance of implementing techniques that foster mental well-being and alleviate stress, recognizing their beneficial effects on individual workers and overall organizational performance. In addition, workplace mindfulness programs often include activities such as mindfulness training, meditation sessions, and seminars on stress reduction approaches. These programs aim to provide workers with practical techniques to effectively handle stress, improve their ability to bounce back from challenges, and develop a more harmonious approach to balancing work and personal life.

Integrating mindfulness methods drawn from Buddhist practices into working environments is a proactive strategy to enhance employee well-being, alleviate stress, and enhance productivity.

Global harmony and understanding

Buddhism promotes pacifism and fosters intercultural and interfaith understanding. Amidst a society characterized by conflicts, these values have the potential to promote global peace and mutual respect. The teachings of Buddhism, which prioritize peace, compassion, and understanding, have significant implications for promoting global harmony and mutual respect in a world characterized by conflicts and variety. Buddhism promotes universal principles that transcend cultural and religious divisions, providing valuable insights that may foster mutual understanding amongst diverse cultures. The core principle of Buddhist philosophy is the notion of interconnectedness, emphasizing the common humanity and interdependent essence of all living entities. This viewpoint promotes acknowledging shared characteristics among people, cultivating a feeling of worldwide kinship. Buddhism fosters mutual tolerance and peace by recognizing the interdependence of all living beings, regardless of cultural or religious distinctions. The Buddhist ideal of non-violence, known as ahimsa, is crucial in promoting world peace. Ahimsa goes beyond mere abstinence from physical violence and embraces the avoidance of damage via verbal expression and mental contemplation. This concept promotes the development of empathy and compassion in people, fostering a society characterized by understanding and the absence of aggressiveness. Amidst a society plagued by conflicts, these teachings provide a pathway to resolving problems using communication, negotiation, and mutual Comprehension.

Furthermore, Buddhist doctrines emphasize the significance of mindfulness and being fully aware of the present moment. Mindfulness promotes a receptive and unbiased mindset, allowing people to approach events without any preconceived ideas or prejudices. The attribute of mindfulness has the potential to dismantle preconceptions and biases, hence promoting a more inclusive and peaceful global society. The Buddhist principle of correct comprehension promotes the development of sagacity and discernment toward the essence of existence. The focus on comprehension and discrimination promotes a sophisticated perception of many cultures, ideas, and viewpoints, cultivating a mindset of receptiveness and tolerance.

Amidst the current era, characterized by frequent clashes arising from cultural, religious, and political disparities, the tenets upheld by Buddhism may provide valuable guidance in cultivating worldwide concord. Developing a mentality of compassion, non-violence, mindfulness, and understanding, these teachings help to establish bridges across disparate cultures, fostering a shared commitment to peace and mutual respect. Buddhism promotes peace and comprehension beyond personal convictions and cultural limits, providing valuable guidelines for managing the difficulties of our varied and interrelated world. By adopting and internalizing these lessons, both people and civilizations have the potential to actively contribute to the establishment of a more peaceful and inclusive global society.

Conclusion

The intersection of Buddhist teachings with current ideals is evident, providing deep insights and practical assistance in several aspects of life. The teachings, ranging from the promotion of mental well-being via mindfulness techniques to the cultivation of world peace through the focus on compassion, strongly align with contemporary ideas. The focus of Buddhist education on self-awareness, resilience, and purpose perfectly corresponds with modern desires for personal development and advancement. Compassion, mindfulness, and interconnectivity promote a more empathic and inclusive attitude, leading people and society towards understanding, harmony, and mutual respect.

Moreover, integrating Buddhist principles into domains such as dispute resolution, alleviating workplace stress, and engaging in community service underscores their pragmatic significance and efficacy in tackling present-day obstacles. These teachings guide achieving a more compassionate, equitable, and socially accountable society by promoting peace, campaigning for social justice, or developing a feeling of belonging. The fundamental and enduring knowledge inherent in Buddhist teachings surpasses cultural and temporal limitations, providing a framework for individual growth, societal unity, and moral conduct in the contemporary day. Adopting these lessons promotes a transition towards a more empathetic and attentive lifestyle, which enhances personal welfare and benefits society. The teachings of Buddhism provide lasting advice and inspiration for managing the complexity of life with knowledge, compassion, and resilience.

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THE STUDY OF GRIEVANCE RELATED TO CONSUMER BEHAVIOUR IN THE FMCG INDUSTRY

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ABSTRACT

This survey was created to learn about the many complaints customers have when making FMCG purchases and how these experiences affect their purchasing decisions. Basic demographic information, including age, gender, occupation, level of education, and frequency of daily FMCG purchases, is the first step in the process. Concerns about product quality are covered in the next section, including whether or if customers frequently receive things that are spoilt, damaged, or not what was described.

The questionnaire also looks at issues with packaging and labeling, such as confusing information, damaged packets, false claims, or trouble reading expiration dates. Concerns about pricing, such as overpricing, hidden fees, or discrepancies between MRP and real selling price, are also covered because they frequently lead to discontent.

The study also looks at issues with product availability, such as stockouts, outdated merchandise in retailers, or trouble obtaining refunds or replacements. The grievance redressal section provides information on how easy it is for customers to file complaints and how well businesses handle them.

Lastly, the survey records the ways in which these complaints influence consumer behavior, such as brand switching, decreased purchases, or sharing unfavorable comments with others. The overall objective is to gain a thorough understanding of consumer experiences and recommend enhancements for the FMCG complaints system.

Key Words: Consumer Grievance, FMCG Industry, Brand Switching, Product Quality Issues, Grievance Redressal Mechanism

INTRODUCTION

The Indian FMCG industry is one of the most dynamic and consumer-driven sectors in the country. It provides essential products that reach households daily biscuits, dairy items, snack, bread, and other packaged food. Among the many brands that dominate this sector, **Britannia** holds a special position because of its long-standing reputation for trust, quality, and value. However, in recent years, consumer expectations have evolved sharply. People now look beyond product taste and price they want consistency, transparency, trustworthy packaging, accurate labeling, and easy grievance-solving systems. When expectations are not met, grievances emerge, and in the FMCG industry, those grievances spread quickly because consumers discuss them openly, both offline and online.

In the northern region of India comprising states like Uttar Pradesh, Uttarakhand, Punjab, Haryana, Delhi, and NCR Britannia products form a large part of daily consumption. Yet, this region also reports a noticeable rise in consumer grievances: damaged packaging, broken biscuits,

stale taste, mismatched expiry details, MRP differences, and poor retailer storage conditions. These issues not only affect immediate satisfaction but shape how consumers behave in the long run. For example, when someone repeatedly receives poorly sealed packets of biscuits, they may quietly shift to another brand like Parle or Sunfeast. When pricing discrepancies occur at local shops, trust declines. When complaint emails or helpline numbers do not produce a timely response, consumers feel ignored.

Consumer behaviour today is heavily influenced by emotional responses, social-media discussions, and peer perceptions. A single grievance can become a trigger for brand switching, especially when alternatives are easily available at every shop. The FMCG industry, due to its fast-moving nature, does not allow companies the luxury of ignoring small issues. Even minor quality problems, if repeated, reduce loyalty sharply. This study therefore focuses on understanding the types of grievances experienced by consumers of Britannia products in North India and how those grievances influence overall buying behaviour.

This research is based on **primary data collected from 500 consumers** across various districts of North India, using a structured questionnaire and regression analysis. The purpose is to identify the most influential grievance factors product quality, packaging, pricing issues, and grievance redressal and examine how each factor affects consumer decisions such as repeat purchase, satisfaction, and switching behaviours. The findings will help FMCG companies strengthen their quality control and grievance-handling practices, and also contribute meaningfully to academic literature by providing region-specific insights.

REVIEW OF LITERATURE

Consumer behaviour in the FMCG sector has been widely studied across different perspectives, especially in relation to product dissatisfaction and grievance patterns. **Kotler and Keller (2019)** provide a foundational understanding of how consumer perceptions are formed, arguing that FMCG buyers make quick judgments based on product experience. According to their model, even a small deviation from expected quality can disrupt trust and lead to brand switching because consumers in this category have numerous alternatives available at similar price points.

Continuing the focus on dissatisfaction, **Sharma and Goyal (2021)** conducted an empirical study on packaged food quality, emphasizing that minor defects—such as improper sealing, change in taste, or texture inconsistency—often trigger strong emotional reactions among consumers. Their findings confirm that quality-related grievances remain the primary reason for discontent in the Indian FMCG biscuit segment. This becomes particularly relevant for brands like Britannia, where product consistency is a major expectation.

Packaging as a determinant of consumer grievance is highlighted by **Verma (2020)**, who found that nearly 41 percent of reported FMCG complaints were linked to poor packaging or tampering-related concerns. His research stresses that packaging is no longer just a protective layer—it is a trust-building element. Any visible damage or leakage immediately raises doubts about hygiene and authenticity, especially in food items.

Addressing grievance redressal, **Singh and Kaur (2019)** examined how complaint-handling mechanisms influence loyalty. Their findings show that delayed responses, lack of transparency, and unresponsive helplines significantly reduce consumer trust. They note that with rising digital awareness, consumers expect brands to acknowledge and resolve complaints quickly.

Price-related grievances were studied by **Mishra (2022)**, who found that MRP discrepancies or hidden additional charges strongly affect middle-income households. Even small differences

between printed and actual selling prices create feelings of exploitation, which ultimately harm brand reputation.

In another study focused specifically on biscuits, **Gupta and Sharma (2018)** concluded that many quality grievances arise not during manufacturing but due to storage and handling at the retailer level. They observed that exposure to heat, moisture, or improper stacking often leads to breakage or reduced freshness, which consumers still attribute to the brand.

Concerns related to labelling and misleading information are examined by **Jain and Verma (2021)**. Their research shows that unclear expiry dates, exaggerated nutritional claims, or inconsistent labeling practices can create confusion and distrust. This is especially problematic in FMCG items such as bread, dairy-based goods, and cakes, where shelf life is limited.

The shift toward digital grievance expression is highlighted by **Ali and Ahmed (2020)**, who found that dissatisfied consumers increasingly turn to social media, WhatsApp groups, and messaging platforms to share complaints rather than contacting formal redressal channels. This behaviour amplifies the impact of grievances, influencing collective perceptions.

Brand-switching tendencies in the FMCG sector were explored by **Ramaswamy (2017)**. He concluded that switching costs are extremely low in packaged food categories, making it easy for consumers to shift to competitors like Parle, Sunfeast, or ITC when grievances repeat or remain unresolved.

A study by **Narang (2022)** found that consumer trust in packaged food is particularly fragile, especially among mothers purchasing snacks for children. A single negative product experience—such as stale biscuits or improper sealing—creates long-term hesitation.

Examining overall grievance patterns, **Kulkarni and Singh (2020)** reported that most consumers either do not know where to report complaints or feel the process is complicated and slow. Their findings highlight gaps in the communication channels brands use to address customer concerns.

Finally, **Devi and Mehra (2023)** emphasized the increasing confidence of North Indian consumers in voicing complaints publicly due to social media empowerment. They found that consumers now expect brands to acknowledge grievances openly, as public responsiveness enhances credibility and consumer engagement.

RESEARCH GAP

A review of existing studies reveals that although several researchers have explored consumer dissatisfaction, **very few studies target grievances related to a single leading brand** like Britannia. Most research generalizes FMCG categories, ignoring brand-specific issues and regional variations. Another major gap is the lack of **empirical, regression-based studies** focusing on how different types of grievances correlate with consumer behaviour. Very few studies quantify the impact of product quality issues, pricing issues, packaging issues, or slow grievance redressal on future buying and brand loyalty.

Also, earlier studies rarely focus specifically on **North India**, despite differences in retail practices, climate, and storage conditions that influence FMCG quality. Retailers here often stock products in high temperature, dust, or moisture, creating quality defects not caused by the manufacturer. Yet these issues severely affect consumer perception.

Furthermore, research has not adequately addressed modern grievance channels such as WhatsApp help lines, email support, and social-media complaint handling. Today's consumers

expect fast responses. When companies fail to acknowledge complaints on platforms like Instagram, the grievance intensifies and spreads within networks.

Therefore, this study fills this multilayered gap by:

- focusing on **one brand—Britannia**,
- using **500 primary respondents** from North India,
- applying **regression analysis**,
- exploring how consumer grievances directly influence **behaviour and brand switching**.

OBJECTIVES OF THE STUDY

This study has been designed to explore the patterns, causes, and behavioural outcomes of consumer grievances related to Britannia products in various parts of North India. The objectives go beyond simple identification and aim to understand the deeper psychological and behavioural responses of consumers. Each objective is elaborated below to provide clarity on the direction and scope of the research.

1. To identify the major types of grievances experienced by consumers of Britannia products.

The first objective aims to capture the broad spectrum of issues faced by consumers, ranging from product quality, taste variation, texture changes, broken biscuits, moisture problems, packaging damage, incorrect expiry dates, or unexpected price differences. Since Britannia is one of India's most trusted and widely consumed FMCG brands, even small deviations from expectations can generate discomfort or distrust. Understanding these grievances helps in mapping the exact pain points that trigger dissatisfaction.

2. To examine the relationship between product quality issues and consumer behaviour.

Product quality is a decisive factor in FMCG consumption. When consumers come across stale products, odd smell, contamination, or inconsistency in quality, they often revise their attitudes toward the brand. This objective focuses on analysing how such quality-related grievances directly influence purchase intention, brand switching, repeat buying patterns, and overall customer satisfaction. The intent is to identify whether minor or major quality disruptions significantly alter consumer behaviour.

3. To study how packaging issues affect buying decisions and trust.

Packaging not only preserves the product but also shapes consumer perception. Any damage, leakage, improper sealing, faded printing, or tampering can immediately raise suspicion. This objective evaluates the emotional and cognitive responses that packaging issues create, especially among households purchasing biscuits and dairy products for children. The aim is to understand how packaging integrity influences trust and buying decisions.

4. To analyse how pricing discrepancies shape consumer satisfaction and brand image.

Price is one of the most sensitive factors in FMCG purchases. Instances of being overcharged, incorrect MRP printing, or inconsistent pricing across stores may lead consumers to interpret the brand as unfair or unethical. This objective examines how such pricing grievances influence satisfaction levels, perceived value, fairness judgement, and the long-term image of the brand.

5. To evaluate the effectiveness of grievance redressal and its impact on consumer loyalty.

This objective seeks to understand whether consumers feel heard, respected, and valued when they report complaints. An ineffective or delayed response may weaken loyalty, whereas prompt

and empathetic redressal can rebuild trust. The focus is on understanding how Britannia's grievance handling mechanisms influence retention and positive word-of-mouth.

6. To offer practical recommendations for reducing grievances in the FMCG sector.

Based on the findings, the final objective is to propose feasible improvements related to quality control, packaging design, pricing accuracy, retailer supervision, and customer support systems. These recommendations aim to minimize grievances and enhance consumer satisfaction in the FMCG industry as a whole.

HYPOTHESES OF THE STUDY

In order to examine the relationships between different types of consumer grievances and their behavioural outcomes, the following hypotheses have been developed. Each hypothesis is accompanied by a brief explanation to highlight its rationale and relevance to the FMCG context, particularly for Britannia products in North India.

H1: Product quality grievances significantly affect consumer behaviour.

This hypothesis is based on the assumption that when consumers encounter quality-related issues—such as stale biscuits, unusual taste, contamination, or inconsistency in texture—they reassess their perception of the brand. In FMCG, where alternatives are easily available, even small quality deviations can influence purchase decisions. Consumers may reduce consumption, postpone purchase, shift to competitor brands, or share negative feedback. Thus, quality grievances are expected to have a direct and measurable impact on consumer attitudes and buying behaviour.

H2: Packaging grievances significantly influence brand switching.

Packaging plays a critical role in shaping trust, especially in packaged food products. When consumers find damaged wrappers, torn seals, leakage, tampering, or unclear expiry labels, they often doubt the safety of the product. Such experiences frequently lead consumers to seek more reliable alternatives. This hypothesis is built on the idea that packaging issues trigger suspicion, reduce trust, and push consumers to switch to competitive brands like Parle or Sunfeast. Therefore, packaging grievances are expected to be a key driver of brand switching behaviour.

H3: Pricing grievances significantly affect customer satisfaction.

FMCG purchases are highly price-sensitive, particularly among middle-income groups. Instances such as incorrect MRP, being charged more than the printed price, or inconsistent pricing across stores create perceptions of unfairness. When customers feel they are not receiving fair value for money, their satisfaction levels decline sharply. This hypothesis reflects the belief that pricing-related issues play a strong role in shaping overall satisfaction, influencing how consumers evaluate both the product and the company.

H4: Ineffective grievance redressal is the strongest predictor of negative consumer behaviour.

While product, packaging, and pricing grievances are important, the way a company responds to complaints often determines long-term loyalty. If consumers feel ignored, receive delayed responses, or perceive the redressal process as complicated, their dissatisfaction deepens. This can result in negative word-of-mouth, loss of trust, and permanent brand switching. This hypothesis proposes that ineffective grievance redressal has a stronger influence on negative consumer behaviour than other grievance types, making it a critical factor for maintaining loyalty.

RESEARCH METHODOLOGY

The present study adopts a quantitative research approach to examine the patterns of consumer grievances related to Britannia products and their influence on consumer behaviour across several

northern Indian states. The methodology has been designed to ensure that the data collected is reliable, relevant, and reflective of real consumer experiences.

A total sample of **500 respondents** was selected from key regions of North India, specifically **Uttar Pradesh, Uttarakhand, Punjab, Haryana, and Delhi**. These regions were chosen because they represent diverse consumer groups, varying from urban retail markets to semi-urban households, where Britannia products are widely consumed. The sampling process followed a combination of **purposive and convenience sampling**. Purposive sampling ensured that only actual Britannia consumers were included, while convenience sampling enabled practical access to shoppers in markets, departmental stores, residential societies, and local retail outlets.

The primary tool for data collection was a **structured questionnaire** based on a **5-point Likert scale**, ranging from “Strongly Agree” to “Strongly Disagree.” The questionnaire consisted of sections on product quality grievances, packaging issues, pricing discrepancies, grievance redressal experience, and consumer behaviour outcomes such as satisfaction, brand trust, and switching intention. Questions were framed in simple and relatable language to ensure clarity and accurate responses from participants belonging to different demographic backgrounds.

To ensure the reliability of the instrument, a pilot test was conducted on 50 respondents. Based on the responses received, minor wording adjustments were made. After finalization, the tool demonstrated a strong internal consistency, reflected by a **Cronbach’s Alpha value of 0.87**, which indicates that the scale items were suitable for further analysis.

Data collection was carried out through both offline and online modes. Offline surveys were administered in retail markets and shopping areas, whereas online forms were circulated through social media groups and community networks. This blended approach made it possible to reach a broader and more diverse respondent base across the five states.

For data analysis, **Correlation** and **Multiple Regression Analysis** were used. Correlation helped identify the strength of relationships between different grievance factors and consumer behaviour, while multiple regression determined the extent to which product quality, packaging issues, pricing grievances, and grievance redressal collectively predicted behavioural outcomes such as satisfaction and brand switching.

Ethical considerations were carefully observed throughout the study. Participation was voluntary, and respondents were informed about the academic purpose of the research. No personal identification details were collected, ensuring privacy and confidentiality. Participants were allowed to withdraw at any stage without any obligation.

DATA ANALYSIS (Regression Analysis)

To understand the extent to which different types of consumer grievances influence overall consumer behaviour toward Britannia products, a multiple regression analysis was conducted. The dependent variable for the model was **consumer behaviour**, which included indicators such as satisfaction, trust, repurchase intention, and likelihood of switching brands. The independent variables included **product quality grievances, packaging issues, pricing grievances, and grievance redressal inefficiency**.

The regression model demonstrated strong explanatory power, with an **Adjusted R² value of 0.62**, indicating that **62% of the variation in consumer behaviour can be predicted** by the four grievance factors included in the study. This suggests a robust model where the selected predictors substantially explain behavioural outcomes among Britannia consumers across North India.

The **overall model was statistically significant**, as shown by the **F-value of 58.71 ($p < 0.001$)**. This confirms that the independent variables, when taken together, provide meaningful insights into how grievances shape consumer perceptions and actions.

A closer look at the standardized beta coefficients reveals important patterns:

- **Redressal Inefficiency ($\beta = 0.47$)** emerged as the **strongest and most influential predictor** of negative consumer behaviour. This means that when consumers feel their complaints are ignored, delayed, or handled poorly, their dissatisfaction increases sharply. They become more likely to switch brands, discourage others from buying, and reduce their trust in Britannia. This finding aligns with the idea that modern consumers expect quick and transparent support when things go wrong.
- **Product Quality ($\beta = 0.41$)** was the second most significant predictor. Quality issues such as stale biscuits, breakage, unusual taste, or texture inconsistencies strongly affected consumer feelings and decisions. Quality lapses directly challenged the brand's reliability, which has traditionally been Britannia's strength.
- **Packaging Issues ($\beta = 0.33$)** also showed a significant impact. Many respondents highlighted concerns about damaged wrappers, improper sealing, faded printing, or tampering. Such packaging problems created doubt about freshness and safety, especially among parents purchasing biscuits and dairy items for children.
- **Pricing Issues ($\beta = 0.22$)**, though relatively less influential than other variables, still had a meaningful effect on behaviour. Incorrect MRP printing, overcharging by retailers, or inconsistency across stores triggered fairness concerns and reduced satisfaction levels.

Taken together, the results clearly show that **grievance redressal inefficiency is the strongest determinant of negative consumer behaviour**, outweighing even product quality issues. This highlights the critical importance of responsive and consumer-friendly grievance systems in the FMCG sector. Even when product or packaging issues occur, timely redressal can prevent brand switching and preserve trust.

Overall, the regression findings emphasize that addressing grievances with empathy, speed, and transparency is essential for sustaining long-term consumer loyalty.

DISCUSSION

The findings of this study highlight that consumer grievances in the FMCG sector evoke strong emotional and behavioural responses, especially when they relate to trusted brands like Britannia. Consumers in North India often form deep associations with everyday food products, and when their expectations of quality or safety are not met, the emotional reaction is immediate. Many respondents reported feeling “cheated,” “disappointed,” or “worried,” particularly when the product was intended for children. This emotional disruption plays a central role in shaping subsequent behaviour, leading to reduced trust, reluctance to repurchase, and in more severe cases, complete brand rejection.

The strength of the emotional response is amplified by the role of **social media**, which acts as both a grievance-sharing platform and a public accountability mechanism. The study found that consumers rarely approach formal grievance redressal channels; instead, they discuss their negative experiences in WhatsApp groups, local Facebook communities, and Instagram comment sections. This aligns with Ali and Ahmed (2020), who observed that social media has become a primary outlet for expressing dissatisfaction, often spreading far more rapidly than formal complaints.

Negative posts, once shared, can influence large groups of potential buyers and cultivate collective distrust toward the brand.

The regression results also reinforce insights from earlier literature. For instance, the strong impact of **product quality grievances**, reflected through a significant β -value, supports Sharma and Goyal's (2021) findings that even minor quality variations trigger dissatisfaction in FMCG consumers. Similarly, the influence of **packaging issues** on brand switching aligns with Verma (2020), who emphasized that damaged or tampered packaging instantly raises suspicion among buyers. Respondents in this study echoed similar concerns, particularly regarding improper sealing and unclear expiry labels.

Interestingly, the role of **pricing grievances** was significant but relatively weaker than other factors. This partially reflects Mishra's (2022) observation that although consumers are price-sensitive, they are willing to tolerate minor price differences if product quality is consistently reliable.

The most notable insight relates to grievance redressal. Like Singh and Kaur (2019), this study found that ineffective redressal sharply intensifies negative behaviour. Respondents expressed frustration over delayed responses or generic automated replies, which made them feel undervalued. The regression coefficient clearly demonstrates that inefficiency in grievance handling has a stronger behavioural impact than the grievance itself. This suggests that consumers may forgive product-related issues but not the feeling of being ignored.

Overall, the discussion highlights that consumer grievances are not merely transactional problems but deeply emotional experiences. Effective redressal, transparent communication, and quality consistency are essential for restoring trust and preventing long-term reputational damage.

CONCLUSION

The present study set out to examine how different types of consumer grievances influence the behaviour of Britannia customers across various regions of North India. The findings make it clear that grievances in the FMCG sector are not isolated incidents but powerful experiences that shape how consumers think, feel, and act toward a brand. In a category as competitive as packaged foods, even minor dissatisfaction can create ripples that significantly affect purchasing decisions and long-term loyalty.

One of the most important insights from the study is that **grievances strongly influence consumer behaviour**, particularly when they relate to product quality and safety. Respondents showed sharp emotional reactions to issues such as stale taste, broken biscuits, inconsistent texture, or damaged packaging. These emotional responses—ranging from disappointment to mistrust—directly contributed to weakened satisfaction levels and reduced brand confidence. For a brand like Britannia, which is deeply embedded in everyday household consumption, these reactions carry substantial weight.

Another key outcome is the **high tendency for brand switching**. The regression analysis clearly demonstrated that packaging defects and product quality issues drive consumers to explore alternative brands such as Parle, Sunfeast, or ITC. FMCG consumers generally face low switching barriers, and the moment trust is compromised, they quickly adopt substitutes. This confirms earlier literature that emphasizes how fragile brand loyalty can be in the food category.

However, the most critical finding relates to **grievance redressal inefficiency**, which emerged as the strongest predictor of negative behaviour. While product or pricing issues can be forgiven to some extent, consumers are far less tolerant when their concerns are ignored or responded to poorly.

The analysis revealed that ineffective grievance handling intensified dissatisfaction more than the grievance itself. This indicates that the emotional reassurance provided through timely and empathetic redressal is a crucial part of consumer satisfaction. When consumers do not feel heard, they often share their negative experiences publicly—especially on social media—further damaging the brand image.

Therefore, it is essential for Britannia to **strengthen its grievance redressal mechanisms**, ensuring prompt responses, transparent procedures, and personalized communication. Improving packaging standards, enhancing retailer monitoring, and tightening quality control checks can further reduce the occurrence of grievances.

In conclusion, the study highlights that consumer grievances in the FMCG industry extend far beyond functional issues; they deeply influence perceptions, trust, and loyalty. For Britannia to maintain its market leadership, it must focus not only on product excellence but also on creating a more responsive, reliable, and consumer-centric grievance management system.

IMPLICATIONS

The findings of this study offer several practical implications for Britannia and other FMCG companies aiming to improve consumer satisfaction and reduce the frequency of grievances. As consumer expectations evolve, it is essential for brands to integrate technology, strengthen supply chain practices, and adopt more consumer-centric approaches to grievance management.

One of the most actionable recommendations is the integration of **QR-code-based complaint systems** directly on product packaging. By scanning the code, consumers could instantly access a dedicated complaint portal or WhatsApp helpline. This would eliminate the need to search for contact details and encourage more formal reporting of grievances rather than relying solely on social media discussions. The convenience and accessibility of QR-based systems would also help companies gather real-time data and respond promptly.

Another key implication relates to improving product safety through **advanced sealing technology**. Many grievances in this study were linked to loose or damaged packaging, which created doubts about freshness and hygiene. Investing in better sealing mechanisms—such as double seals, tamper-evident strips, or automated leak-detection systems—could significantly reduce both packaging-related complaints and the negative emotions associated with them.

The study also highlights the importance of **regular retailer audits**. Since many products fail at the retail level due to improper handling, harsh storage conditions, or exposure to heat and moisture, audits can help ensure that retailers follow proper storage guidelines. Scheduled and surprise inspections would allow Britannia to identify gaps, take corrective action, and enforce higher compliance standards across the distribution network.

Another crucial implication is the need for **faster and more personalized digital complaint handling**. Given that grievance redressal inefficiency was the strongest predictor of negative behaviour in the regression model, strengthening this system is essential. Automating the initial response while ensuring that follow-up communication is handled by trained representatives can enhance the consumer experience. Real-time tracking of complaint status, similar to courier or food delivery systems, could further reassure customers that their issues are being taken seriously.

Finally, the research underscores the need for **proper storage training for retailers**, especially in smaller shops and semi-urban markets. Many quality-related grievances stem from inadequate storage practices rather than manufacturing defects. Training modules, short videos, or printed

guidelines can help shopkeepers understand the importance of maintaining temperature, avoiding direct sunlight, and handling products carefully.

Overall, these implications emphasize that addressing consumer grievances requires a holistic approach—combining better technology, stronger supply chain practices, and more responsive communication. Implementing these improvements can help Britannia build stronger consumer trust, reduce brand switching, and enhance long-term loyalty.

FUTURE SCOPE

The present study offers valuable insights into consumer grievances and their impact on behavioural outcomes; however, it also opens several avenues for future research that can enrich the understanding of grievance redressal mechanisms in the FMCG sector. One of the most promising directions is the inclusion of **cross-brand comparative studies**. Since the current research is limited to a single brand, future investigations can analyse how different FMCG brands—local and national—vary in their redressal responsiveness, product handling standards, and complaint management systems. Such comparative frameworks can highlight industry-wide best practices and provide a more holistic view of consumer expectations.

Another emerging direction lies in integrating **Artificial Intelligence (AI) and machine learning models** to predict, classify, and analyse consumer complaints in real time. FMCG companies today receive complaints through multiple digital touchpoints, such as WhatsApp, Instagram, brand websites, toll-free numbers, and retailer feedback networks. Future studies could develop AI-driven sentiment analysis systems to detect early dissatisfaction signals, automate complaint categorisation, and even suggest proactive interventions. Predictive analytics could identify patterns—such as commonly affected regions, product categories, or batch numbers—which may help brands take corrective action before the issue escalates.

A strong opportunity also exists for **qualitative, interview-based research**. While the present study relies on a structured questionnaire, future scholars may incorporate focus group discussions, in-depth interviews, and consumer storytelling sessions to capture the emotional and psychological aspects of dissatisfaction. Such qualitative tools may uncover hidden triggers behind grievances, personal expectations from brands, and culturally rooted consumption behaviours that quantitative scales cannot fully capture.

Additionally, future research may expand the sample base to include **rural consumers, senior citizens, and Gen-Z buyers**, as their expectations and complaint behaviours differ significantly. Exploring the impact of **social media influencers**, product unboxing culture, and user-generated content (UGC) on grievance perception can offer further depth to FMCG grievance studies.

Longitudinal studies that track consumers over time can also assess how complaint experiences influence long-term loyalty, trust rebuilding, and brand reputation recovery.

Overall, future research can broaden both the methodological scope and technological integration, thereby generating deeper, actionable insights for strengthening FMCG grievance redressal systems.

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ACHIEVEMENT MOTIVATION OF THE MIDDLE SCHOOL STUDENTS IN KERALA

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Abstract

Education is the process in which and by which the knowledge, character of the students are shaped and moulded. Motivation is the very heart of the learning process. The vital role of motivation in life and learning is indispensable. Achievement Motivation provides a means of powerful and higher aim in the life of the students. As a human concept Achievement Motivation involves creativity in the discovery of patterns of learning and reaching the goal. In this study the researcher aimed to study the Achievement Motivation of the higher secondary school students in the state of Kerala, India. The tool for Achievement Motivation consists of three dimensions namely achievement, affiliation and power were developed by the researcher. The study involved in testing the significant difference between/among the gender, type of family and locality of the middle school students belong to the class eighth standard. Results revealed that in related to gender, type of family and locality with respect to affiliation and achievement the female students, students from joint family and urban locality students were having high affiliation and achievement motivation than their counter parts. It is also found that the dimensions of achievement motivation used in the study are well correlated among themselves with positive significance at 1% level. The study concluded that a Achievement Motivation is very important motive in the life and education of the students. It not only helps the students to perform well in academic achievement but it is also one of the means to abide success in the academic process.

Keywords: Achievement motivation, High school students, Achievement, Affiliation and Power.

INTRODUCTION

Education is a crucial catalyst for personal, motivational, and social transformation. Education is essential to the process of nation-building. Investment in education is crucial for fostering significant development in any nation, particularly in developing countries like India is striving to expedite their advancement. It is essential for every student at a school to obtain an education, and it is equally imperative that they possess a desire and strong motivation to independently explore and uncover further knowledge beyond their curriculum. Education is the process by which the knowledge and character of pupils are shaped and molded.

Motivation can be characterized as a necessity, an aspiration, a longing, or an impetus for knowledge. It is a philosophy that encourages learning and the pursuit of improvement. Motivation is a significant characteristic of a genius and an erudite individual. No smart individual exists who lacks the motivation to act and attain goals. It is intrinsic motivation that drives exceptional scientists, economists, and socialists to accomplish outstanding and unique achievements. Motivation is the essence of the learning process. The essential role of motivation in life and education is crucial. Success and achievement in life and learning mostly depend on one's desire to strive and attain goals.

Achievement motivation offers a significant and elevated purpose in kids' lives. Achievement Motivation, as a human construct, encompasses creativity in identifying learning patterns and attaining objectives. Consequently, it is a fundamental domain of education. Individuals must cultivate Achievement Motivation concepts and skills, as this will enhance their understanding and motivation in studying, ultimately aiding them in attaining their goals. In education, accomplishment motivation seeks to equip students with the appropriate impetus to attain their objectives. Achievement motivation is a notion that is not frequently utilized. It serves as a framework for our conduct. It is the conceptual objective that individuals endeavor to attain. Achievement motivation refers to an individual's inclination to pursue task success, maintain perseverance in the face of adversity, and get pride from their accomplishments. Zenen (2002). This study examines achievement motivation through the following dimensions, which are elucidated as follows:

- **Achievement** (getting things done): Students that are driven by success require challenges in order to succeed academically. They thrive on conquering challenging issues or circumstances by continuing to participate in all the activities that enhance their academic achievement. Students who are driven by success perform very well both by themselves and in collaboration with other high achievers. Teachers must give students the right kind of feedback in order for their evaluation to be fair and balanced. In order to make improvements, pupils must be aware of what they are doing well and poorly.
- **Affiliation** (having good relationships): Students that are driven by affiliation do best in their teams or groups. When giving students feedback, it's important to provide them impartial criticism that highlights their positive team dynamics and fosters mutual trust.
- **Power** (having influence over others): When they are actively engaged in their academic work, students with a strong need for power perform at their best. Because they like to compete for completing tasks or work that are goal-oriented. Parents and teachers must inspire their children by assisting them in achieving their future academic objectives.

REVIEW OF RELATED LITERATURE

The study looked into by Roy and Sah (2025), looks into how motivated students in higher secondary schools are to achieve their goals in the Guwahati area. It focuses on the general levels of motivation and differences between genders. A descriptive survey method was used to choose a group of 115 students from six government higher secondary schools in the Guwahati area. The students were chosen through random sampling, and 61 were male and 54 were female. The results show that most students have an average level of success motivation. There was a clear difference between the genders: female students were more motivated than male students. Supportive teaching methods and programs can help motivate teenagers to do well, especially boys. These results show why that is important. The study gives teachers, parents, and law maker's useful information on how to get students more interested in school and help them do better.

The necessity and aspiration for accomplishment serve as the foundation of achievement motivation. The research conducted by Sarwer, Azeem, and Alam (2024) aims to evaluate the accomplishment motivation levels of secondary school pupils in relation to specific demographic variables. A sample of 1007 secondary school kids from the Rajouri and Poonch districts of Jammu & Kashmir has been included. The Achievement Motivation Scale developed by Deo and Mohan (2011) has been utilized to gather the requisite information. The study's results indicate that the average secondary school student exhibits a low level of accomplishment motivation. Concerning

demographic characteristics, it has been determined that gender does not exhibit a significant difference; however, a substantial difference has been identified in the accomplishment motivation of secondary school students based on their place of residence and the type of school they attend.

The research by Jadav (2023) examines the accomplishment motivation of higher secondary school pupils in relation to gender and residential area. The Achievement Motivation Inventory (AMI) developed by Jansari in 2012 was utilized. The sample had a total of 120 students, consisting of 60 boys (30 from urban areas and 30 from rural areas) and 60 girls (30 from urban areas and 30 from rural areas). The data was gathered from Sabarkantha District. The data was evaluated and processed according to the manual. The 'F' test was being computed. The findings indicated that the group of male higher secondary school students exhibited greater achievement motivation than their female counterparts. Additionally, there was no significant difference in the mean scores of achievement motivation between higher secondary school students from urban and rural areas, nor was there a notable interaction effect concerning gender and residential area on achievement motivation scores.

Achievement motivation is a psychological concept that refers to the desire and determination individuals possess towards achievement or accomplishment. The primary aim of the study by Karim Ansary (2023) is to investigate the correlation between achievement motivation and academic performance among higher secondary school students. The researcher employed a descriptive survey research method to conduct this study. A sample of 381 higher secondary school pupils was recruited using a basic random selection procedure. The researcher employed the 'Rao Achievement Motivation Test' to get responses from the pupils. The study's findings indicated a significant positive correlation between achievement motivation and academic performance among higher secondary school students, with no notable differences observed between male and female students, nor between rural and urban students concerning their achievement motivation.

NEED AND IMPORTANCE OF THE STUDY

Education is an essential human activity. It is linked to the life and aspirations of society, making it a strong tool for change. It has the potential to improve and elevate its recipient's status in society. Middle school pupils receive education at the adolescent level. It is at this period when boys and girls begin to see themselves as independent agents. It is a stage in which students believe that they can accomplish something important, that they are valuable members of society. It is a stage in which kids are strongly motivated to do or demonstrate something in their lives. This is a wonderful period in which the pupils must choose, be motivated, and motivate themselves for their success.

Achievement Motivation is an extremely essential motivator in students' lives and education. It not only helps students achieve well in academics, but it is also one of the ways to instill good character in students. Achievement Motivation influences students' academic performance and is based on the urge that motivates an individual to succeed. Students' behavior, activities, attitudes, and beliefs are influenced by their inner drive to succeed. Achievement Motivation propels pupils to success; it stems mostly from a desire for success and a fear of failure. If a person has a stronger desire for achievement, they will be more focused and directed toward it. These people are mostly driven by their inner motivations. Achievement motivation will also assist the investigator in determining how hard students work to improve their academic studies and hobbies. Middle school students with a strong need for achievement are goal-oriented and motivated by a desire for personal success. Students driven by association appreciate relationships and seek praise and acceptance from their peers. Power is defined as the urge to influence or control individuals and

events. Personalized power used influence for personal advantage. Socialized power, on the other hand, is used to exert influence on behalf of others or the organization. As a result, achievement motivation, particularly among students, would play a significant role in influencing the lives of individuals and society.

RESEARCH QUESTIONS

1. Is there is any significant mean difference between the male and female middle school students in the dimensions of achievement motivation namely achievement, affiliation, power and with overall achievement motivation?
2. Is there is any significant mean difference between the type of family named nuclear and joint family in the dimensions of achievement motivation namely achievement, affiliation, power and with overall achievement motivation?
3. Is there is any significant mean difference between the rural and urban locality of the students in the dimensions of achievement motivation namely achievement, affiliation, power and with overall achievement motivation?
4. Is there is significant correlation among the dimensions of achievement motivation namely achievement, affiliation, power and with overall achievement motivation for the middle school students?

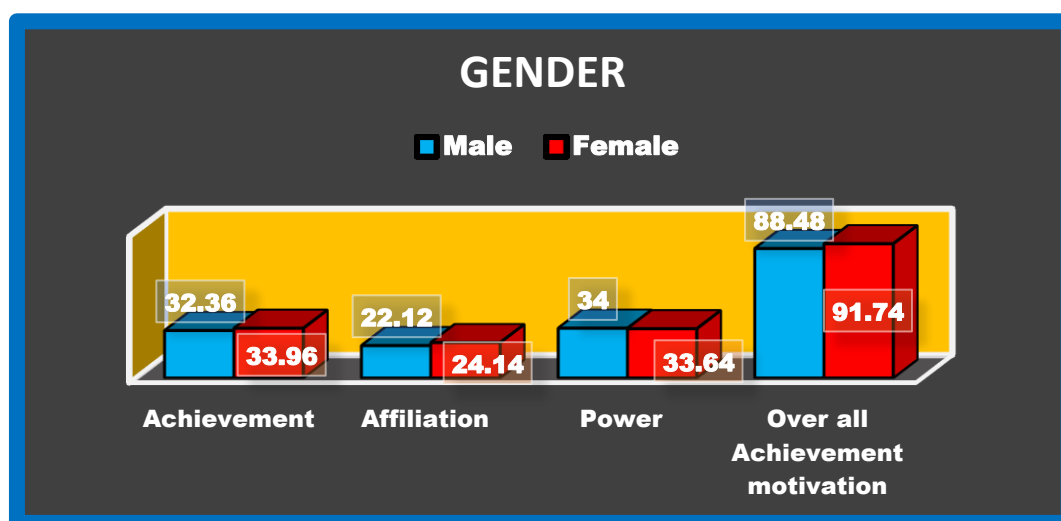
METHODOLOGY

The survey method is adopted for the study among the secondary school students in state of Kerala, India. The data is collected from both the male (50) and female students (50), totally 100 students were involved in the study. The middle school students especially from the VIII standard students were taken for the study. The tool for Achievement Motivation consists of three dimensions namely achievement (10), affiliation (7) and power (10) were developed by the researcher. The study involved in testing the significant difference between/among the gender, type of family and locality of the high school students belong to the class eighth standard. There was nearly about 27 items, which is scored as 5 point linkert scale ranging from one for strongly disagree to five for strongly agree. The data were analysed using the SPSS.

FINDINGS OF THE STUDY

Question -1

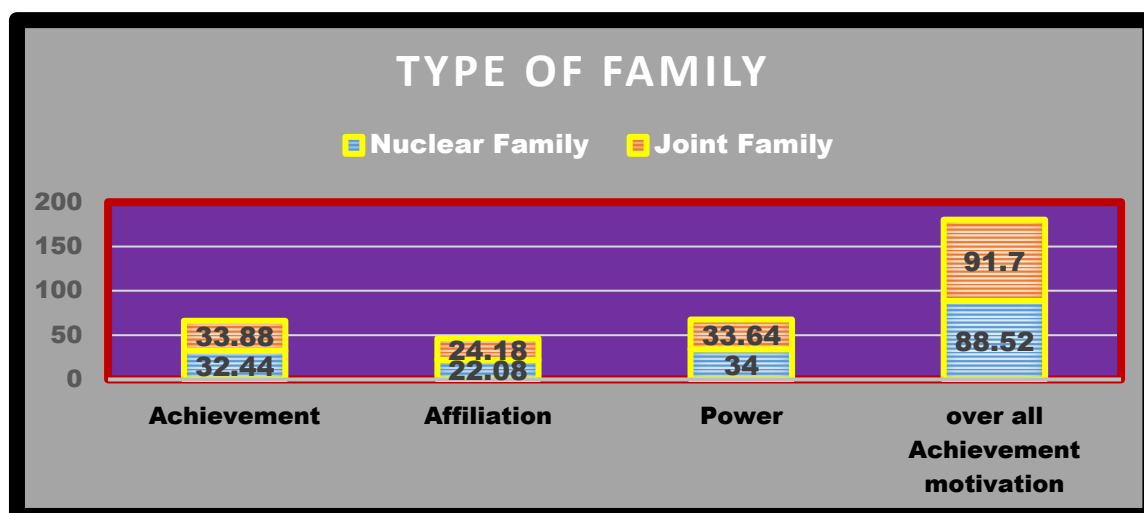
Graph showing the significant mean difference between the male and female middle school students in the dimensions of achievement motivation namely achievement, affiliation, power and with overall achievement motivation



It is inferred from the above graph that female students have more affiliation and achievement motivation than the male students. Further it is noted that affiliation is significant at 1% level and achievement motivation is significant at 5% level. Whereas, in the dimensions of achievement and power it is reported that both the male and female students are found to be same, i.e., there is no difference between them.

Question -2

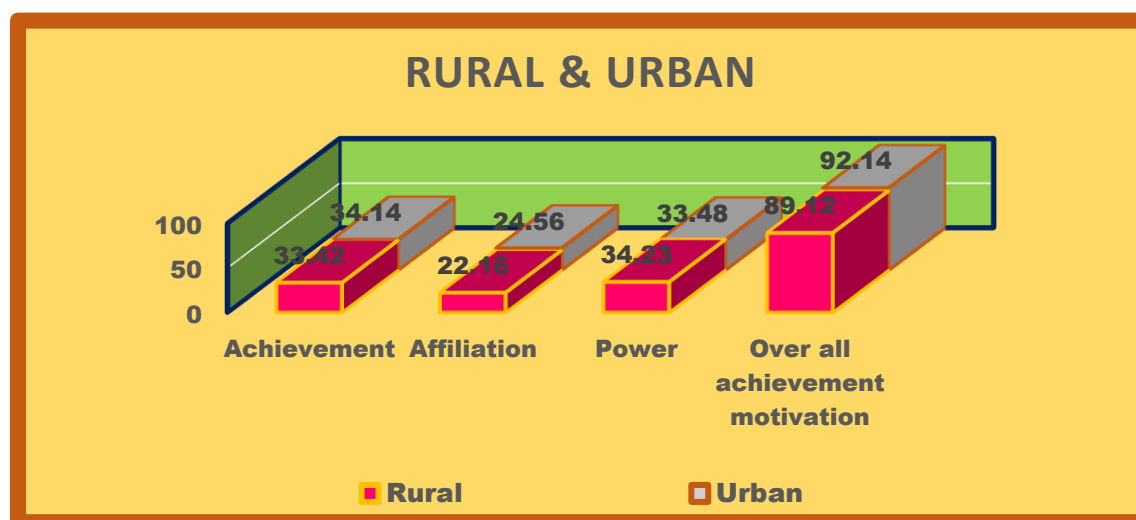
Graph showing the significant mean difference between the type of family named nuclear and joint family of the middle school students in the dimensions of achievement motivation namely achievement, affiliation, power and with overall achievement motivation



It is observed from the above graph that students from nuclear family have more affiliation and achievement motivation than their counter parts. Further it is noted that affiliation is significant at 1% level and achievement motivation is significant at 5% level. Whereas, in the dimensions of achievement and power it is reported that the students belong to both nuclear and joint family are found to be same, i.e., there is no difference between them.

Question -3

Graph showing the significant mean difference between the rural and urban locality of the school students in the dimensions of achievement motivation namely achievement, affiliation, power and with overall achievement motivation



It is inferred from the above graph that students from urban locality have more affiliation and achievement motivation than the students from the rural locality. Further it is noted that affiliation is significant at 1% level and achievement motivation is significant at 5% level. Whereas, in the dimensions of achievement and power it is reported that students from both urban and rural locality are found to be same.

Question – 4

The correlation among the dimensions of Achievement Motivation

Dimensions	Achievement	Affiliation	Power	Overall Achievement Motivation
Achievement	1	0.534**	0.537**	0.577**
Affiliation	x	1	0.579**	0.569**
Power	x	x	1	0.599**
Overall Achievement Motivation	x	x	x	1

It is noted from the above table that the dimensions of achievement motivation have been correlated among themselves. It is also found that there is a positive significant relationship among the dimensions of the achievement motivation and it is significant at 1% level.

CONCLUSION

This study found that female students, students from joint families, and students from cities had higher affiliation and success motivation than their peers. Success motivation is a very important part of students' lives and schooling. It helps students do well in school and is also a way to do well in the academic process. Middle school students should want to do great things. A high amount of aspiration is what makes people want to achieve a lot. The teacher and parents should set high goals for the students so that they will try to reach them and get used to achieving more and more. The study shows how important it is to make learning easier, use motivational methods, and give both boys and girls the same chances so that students can reach their full potential.

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ROLE OF ARTIFICIAL INTELLIGENCE IN PROMOTING INNOVATIVE PEDAGOGY IN TEACHER EDUCATION

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Abstract

The integration of Artificial Intelligence (AI) into teacher education is transforming traditional teaching–learning approaches. AI tools and technologies, such as intelligent tutoring systems, adaptive learning platforms, and AI-assisted assessment, support innovative pedagogy that fosters active learning, personalization, and critical thinking among prospective teachers. This study explores the role of Artificial Intelligence in promoting innovative pedagogical practices in teacher education institutions. Using a descriptive survey method, data were collected from 200 prospective teachers through a structured questionnaire. Analysis revealed that AI significantly enhances teaching effectiveness, engagement, and pedagogical creativity. The findings suggest that integrating AI in teacher preparation programs can improve instructional strategies and prepare future teachers for digital classrooms.

Keywords: Artificial Intelligence, Innovative Pedagogy, Teacher Education, Educational Technology, Prospective Teachers

1. Introduction

Teacher education is undergoing a paradigm shift in the 21st century due to rapid technological advancements. Traditional lecture-based approaches are no longer sufficient to meet the demands of a digital learning environment. **Artificial Intelligence (AI)** has emerged as a powerful tool to facilitate innovative pedagogy in teacher education. AI-enabled platforms provide adaptive learning, personalized feedback, intelligent tutoring, and real-time analytics that enhance both teaching and learning experiences.

Innovative pedagogy emphasizes **student-centered learning, collaboration, critical thinking, and creativity**. In teacher education, prospective teachers need to adopt and practice these pedagogical strategies to prepare for modern classrooms. The integration of AI into teacher education programs can transform conventional teaching methods, making them more effective, engaging, and aligned with 21st-century learning goals.

2. Review of Related Literature

Research indicates that AI can support the development of innovative pedagogical strategies:

- **Holmes et al. (2019)** suggest that AI-powered tools provide real-time feedback and adaptive instruction, enabling personalized learning paths for students.
- **Selwyn (2016)** highlights that technology-enhanced teaching promotes collaboration, critical thinking, and active learning among learners.
- **OECD (2020)** emphasizes the potential of AI in higher education to improve teaching quality, monitor learning outcomes, and foster digital skills.

- Studies in teacher education indicate that AI facilitates **practical learning experiences** such as virtual labs, simulation-based training, and AI-assisted lesson planning, which improve pedagogical innovation.

Despite these advantages, limited empirical research has examined the direct role of AI in **promoting innovative pedagogy in teacher education**, creating a need for studies like the present one.

3. Objectives of the Study

1: To assess the level of awareness of Artificial Intelligence among prospective teachers

- **Explanation:**
Before AI can contribute to innovative pedagogy, prospective teachers must be aware of AI tools and applications in education. This objective investigates their knowledge, familiarity, and exposure to AI tools such as intelligent tutoring systems, adaptive learning platforms, AI-based assessment tools, and educational chatbots.
- **Importance:**
Understanding awareness levels helps in identifying gaps in teacher education programs and designing training interventions.

2: To examine the role of Artificial Intelligence in promoting innovative pedagogical Practices.

- **Explanation:**
This objective studies how AI supports modern pedagogical strategies, including:
 - Personalized and adaptive learning
 - Active learning and student engagement
 - Creative and collaborative teaching methods
 - Feedback and assessment innovation
- **Importance:**
It highlights the pedagogical value of AI, showing how technology can transform traditional teacher-centered approaches into innovative student-centered learning environments.

3: To analyze the perception of prospective teachers towards AI-based learning tools

- **Explanation:**
Prospective teachers' attitudes and perceptions towards AI significantly influence their willingness to integrate it into teaching. This objective explores their acceptance, confidence, and readiness to use AI in lesson planning and classroom management.
- **Importance:**
Positive perceptions can lead to effective AI adoption, whereas negative perceptions indicate areas where training and awareness programs are needed.

4: To explore the challenges and opportunities of integrating AI into teacher education pedagogy

- **Explanation:**
AI integration is not without challenges. This objective examines barriers such as lack of infrastructure, insufficient training, technical difficulties, and resistance to change, along with opportunities like enhanced learning outcomes, innovation, and professional skill development.

- Importance:
Identifying challenges and opportunities provides practical insights for policymakers, curriculum designers, and teacher educators to implement AI successfully.

4. Research Methodology

4.1 Research Design

The study used a **descriptive survey method**, appropriate for understanding current trends, perceptions, and the role of AI in teacher education without experimental manipulation.

4.2 Population and Sample

The population included prospective teachers enrolled in teacher education institutions. A **sample of 200 prospective teachers** was selected using **simple random sampling**.

4.3 Tools for Data Collection

A structured questionnaire was used, divided into four sections:

1. Awareness of AI in education
2. Perceived role of AI in innovative pedagogy
3. Perceptions towards AI-based learning tools
4. Challenges and opportunities of AI integration

The questionnaire used a **5-point Likert scale** ranging from Strongly Disagree (1) to Strongly Agree (5).

4.4 Data Analysis

Data were analyzed using **mean, standard deviation, and correlation analysis** to identify trends and relationships between AI awareness and its role in promoting innovative pedagogy.

5. Analysis and Interpretation of Data

5.1 Awareness of AI among Prospective Teachers

Statement	Mean	SD	Interpretation
I am aware of AI-based tools for teaching	4.2	0.65	High
I use AI tools to prepare lesson plans	3.8	0.72	Moderate
AI can enhance my teaching skills	4.3	0.60	High

Interpretation:

Most prospective teachers demonstrated **high awareness of AI** and recognized its potential to enhance pedagogical skills. Usage in lesson planning is moderate, indicating a need for more practical integration.

5.2 Role of AI in Innovative Pedagogy

Pedagogical Aspect	Mean	SD	Interpretation
AI supports personalized learning	4.4	0.58	High
AI encourages active learning	4.2	0.63	High
AI enhances creativity in teaching	4.1	0.67	High
AI improves collaboration among learners	4.0	0.70	High

Interpretation:

AI is perceived to significantly support **innovative pedagogical practices**, particularly in personalized learning, active engagement, and creative teaching strategies.

5.3 Correlation Analysis

Variables	r-value	Significance
Awareness of AI & Role of AI in Pedagogy	0.56	Significant at 0.01
Awareness of AI & Perception of AI Tools	0.52	Significant at 0.01

Interpretation:

There is a **moderate positive correlation** between AI awareness and its perceived role in innovative pedagogy. Prospective teachers with greater AI awareness also show a stronger understanding of its pedagogical benefits.

6. Findings of the Study

1. Prospective teachers exhibit a **moderate to high awareness** of AI tools in education.
2. AI is perceived as a significant enabler of **innovative pedagogy**, including personalized learning, active engagement, creativity, and collaboration.
3. AI awareness positively correlates with perceptions of its pedagogical role, suggesting that familiarity with AI enhances acceptance and application.
4. Practical challenges include **limited access to AI tools, lack of training, and infrastructural constraints**.

7. Educational Implications

- Teacher education programs should **incorporate AI-based modules** and hands-on workshops.
- Prospective teachers need **training on AI-enabled lesson planning and classroom management tools**.
- Policy frameworks must support **infrastructure development** to integrate AI tools in teacher education.
- AI-supported pedagogy can enhance **21st-century teaching skills**, preparing teachers for modern digital classrooms.

8. Conclusion

Artificial Intelligence plays a **transformative role in promoting innovative pedagogy** in teacher education. Prospective teachers with awareness and exposure to AI tools demonstrate a better understanding of personalized learning, active engagement, and collaborative teaching strategies. Integrating AI in teacher preparation programs can bridge the gap between traditional teaching and modern, technology-enhanced pedagogy. Hence, AI should be considered an essential component of teacher education curricula for fostering innovative teaching practices and preparing future-ready educators.

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UNCERTAIN TRANSITIONS: YOUTH CHALLENGES AND MARGINALIZATION IN A CRUMBLING ECONOMY - AN ANALYSIS OF SRI LANKAN YOUTH AFTER THE POLITICAL AND ECONOMIC BREAKDOWN

Shakila Gallage, G. I. Madushani

01. Introduction

Economic instability has become a defining feature of the 21st century, intensified by global shocks such as the COVID-19 pandemic, supply chain disruptions, rising inflation, and geopolitical conflicts. These factors have collectively pushed many nations, particularly developing economies, into prolonged stagnation (World Bank, 2022). Within this turbulent context, youth aged 18–35 represent one of the most vulnerable populations. Limited work experience, precarious employment conditions, and constrained access to financial and educational resources make them disproportionately affected by economic downturns (ILO, 2020).

In Sri Lanka, the crisis has been particularly severe due to years of unsustainable debt management, fiscal mismanagement, and declining foreign reserves, culminating in the 2022 political-economic breakdown (Kelegama, 2022). This crisis manifested in record-high inflation of nearly 70% in September 2022 (Central Bank of Sri Lanka, 2022), shortages of essential goods, fuel, and medicine, and currency depreciation that eroded household purchasing power.

The youth unemployment rate has consistently remained alarmingly high. In 2023, youth unemployment averaged 23.5%, significantly higher than the national unemployment rate of 4.8% (Department of Census and Statistics, 2023). Female youth were particularly disadvantaged, with unemployment rates nearly double those of male youth. This gap reflects systemic gender biases in hiring, limited childcare support, and cultural constraints on female labor participation (UNDP, 2022).

Furthermore, underemployment has surged, with many young people trapped in informal or gig- economy jobs, such as delivery services and daily-wage labor, offering little job security or social protection. According to the ILO (2021), over 70% of Sri Lankan youth workers are employed informally, exposing them to volatility and exploitation.

The crisis has also destabilized the education system. Rising costs of tuition, textbooks, and transportation have pushed many youths to abandon higher education or vocational training. UNICEF (2022) reported that over 30% of university students experienced disruptions in their studies due to financial hardship, while rural youth faced greater barriers to accessing digital learning resources during pandemic lockdowns.

Brain drain has intensified, with skilled youth increasingly seeking opportunities abroad. According to the Sri Lanka Bureau of Foreign Employment (2023), more than 300,000 Sri Lankans migrated for work in 2022, with a significant portion comprising educated young professionals, leading to a long-term erosion of human capital.

The socioeconomic collapse has severely affected youth mental health. The World Health Organization (2022) noted rising rates of anxiety, depression, and stress-related disorders among Sri Lankan youth, exacerbated by uncertainty about future employment and migration prospects. Surveys conducted by local NGOs indicated that nearly 40% of young respondents in urban

Colombo expressed feelings of hopelessness regarding their future, while rural respondents cited frustration over lack of opportunities and inequitable development.

The erosion of public trust in political institutions has intensified youth disillusionment. Mass protests such as the “Aragalaya” movement in 2022 were heavily youth-led, reflecting their frustrations with corruption, nepotism, and ineffective governance (De Mel, 2022). Youth aspirations are shifting from traditional pathways of stable careers and domestic livelihoods toward transnational opportunities and migration. This trend risks deepening socio-economic inequality, as those who migrate often belong to relatively privileged social strata, leaving marginalized youth further disadvantaged.

This study examines the experiences of 180 youth participants residing in Colombo, who migrated from various parts of Sri Lanka in pursuit of education, employment, or stability. It aims to assess the impact of the country’s economic crisis on young people and to identify strategies that can support their socio-economic stability and overall well-being. Specifically, the research investigates employment challenges, including job insecurity and underemployment, and explores how economic instability disrupts educational pursuits, such as discontinuation, postponement, or shifts to more affordable courses. It also examines the mental health and well-being implications of financial and social pressures, while analyzing how economic conditions influence life aspirations, including migration, entrepreneurship, and personal milestones. Ultimately, the study seeks to provide actionable insights for designing inclusive, youth-centered economic recovery policies, emphasizing the importance of vocational training, expanded mental health services, and transparent governance mechanisms to ensure that young Sri Lankans can overcome systemic barriers and actively contribute to the country’s long-term resilience.

2. Methodology

Research Design

This study adopts a quantitative, cross-sectional survey design to capture measurable trends in the experiences of youth. Data were collected through a structured questionnaire administered to youth respondents residing in Colombo, focusing solely on quantifiable variables for statistical analysis.

Study Population & Sample

The study population comprised youth aged 18–35 years, both male and female, in Sri Lanka, with a sample of 180 participants residing in the Colombo district, representing migrants from rural, semi-urban, and urban regions across all provinces. Participants were selected using a simple random sampling method to ensure unbiased representation across educational, employment, gender, and socioeconomic groups.

Data Analysis

Quantitative Data: Analyzed using SPSS with descriptive statistics (frequencies, percentages) and inferential tests (Chi-square, regression) to identify correlations between economic instability and youth outcomes.

03. Literature Review

The global economy has undergone significant disruptions in recent years, with developing countries bearing the brunt of crises stemming from the COVID-19 pandemic, geopolitical tensions, climate shocks, and inflationary pressures. One of the most affected groups amid these economic challenges has been youth, who face persistent barriers to employment, education, and

overall well-being (ILO, 2020). This literature review examines existing scholarship on the impact of economic crises on youth globally and within the Sri Lankan context, focusing on unemployment, education, mental health, and migration.

Youth Unemployment and Economic Marginalization

According to Honwana (2012) youth unemployment is a longstanding global issue, often intensified during periods of economic instability. The International Labor Organization (ILO) highlights that youth are three times more likely than adults to be unemployed, and many are engaged in precarious or informal jobs that offer little security or upward mobility (ILO, 2020). In fragile economies, limited job creation and high competition contribute to what has been termed the "waithood" period, during which young people remain dependent on families and unable to transition into adulthood (Honwana, 2012).

In Sri Lanka, the problem is especially pronounced. According to the Department of Census and Statistics (2023), the youth unemployment rate has hovered around 23%, significantly higher than the national average. The mismatch between the education system and labor market needs has exacerbated this issue, as many graduates lack skills demanded by employers (Gunatilaka, 2020). Moreover, the collapse of key sectors such as tourism and manufacturing after 2020 has disproportionately affected entry-level employment opportunities for youth.

Education Disruption and Access Barriers

Access to quality education and training is critical for youth to navigate economic transitions. Globally, economic crises have led to reduced public spending on education, making it harder for young people, especially from low-income backgrounds, to pursue higher education (UNESCO, 2021). In the Sri Lankan context, the economic crisis of 2022 led to severe budget cuts, fuel shortages, and school closures, which interrupted education for millions of students (UNICEF Sri Lanka, 2022). Many university students reported difficulty attending classes due to transportation costs and lack of internet access for online learning (Amarasinghe et al., 2022).

Such disruptions not only affect academic outcomes but also erode the future career prospects of young people, limiting their ability to escape cycles of poverty and economic dependence.

Mental Health and Social Well-Being

Economic instability significantly influences the mental health of youth. Global studies show a rise in depression, anxiety, and suicidal ideation among young people during economic downturns, often due to feelings of hopelessness, social exclusion, and uncertainty about the future (Patel et al., 2018). In Sri Lanka, WHO (2022) reported an increase in mental health-related complaints among youth following the economic crisis, driven by financial stress, family conflict, and joblessness.

The stigma surrounding mental health in Sri Lanka further prevents many young people from seeking help. Moreover, the lack of youth-friendly, affordable mental health services presents a critical gap in the country's public health system.

Migration and Brain Drain

A growing consequence of youth disillusionment with the economy is international migration. As economic opportunities shrink domestically, many skilled young Sri Lankans have opted to seek employment abroad, leading to a brain drain. Studies have found that migration is increasingly seen not only as a way to escape poverty but as a necessary path to survival and social mobility

(Perera & Wickramasinghe, 2022). However, this also results in the loss of talent and a weakened national capacity to rebuild the economy.

Policy Responses and Gaps

While the Sri Lankan government has introduced several youth employment and entrepreneurship initiatives, such as the National Youth Policy and various vocational training programs, scholars argue these measures often lack proper implementation, monitoring, and alignment with real market demand (Gunawardena, 2019). Furthermore, most policies do not address the intersection of youth unemployment with other structural issues such as gender inequality, rural marginalization, and political disenfranchisement.

The literature reveals that economic collapse has profound and multidimensional impacts on youth. From unemployment and interrupted education to mental health crises and emigration, the challenges are deep and interconnected. In the Sri Lankan context, these challenges are magnified by ongoing political instability and structural inefficiencies. Addressing them requires not only economic recovery but a youth-centered development approach that invests in education, employment, mental health, and inclusive policy-making.

04. Results and Discussion

To address the research objectives, the data were systematically analyzed using the Statistical Package for the Social Sciences (SPSS). The findings derived from this analysis, along with their interpretation and discussion, are presented in the following sections.

Figure 1: Province of Residence - Gender Cross Tabulation

	Gender		Total
	Male	Female	
Province of Residence Southern	30	18	48
Western	22	15	37
Central	6	6	12
North	4	0	4
North Western	13	2	15
Eastern	6	2	8
Sabaragamuwa	25	11	36
Uva	5	1	6
North Central	8	6	14
Total	119	61	180

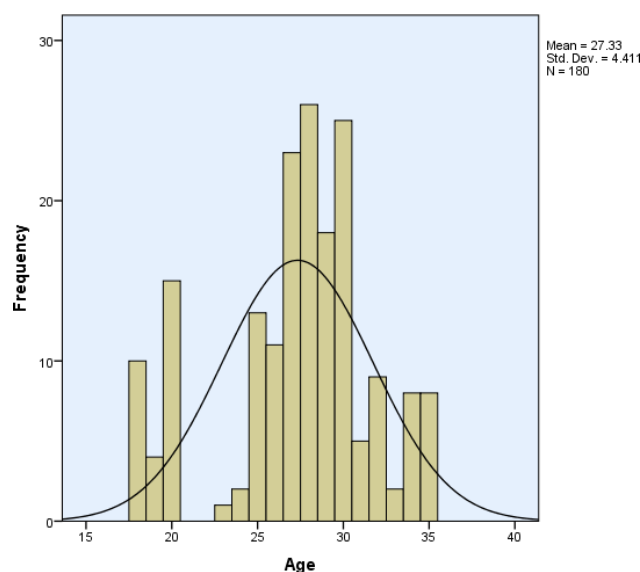
Source: Field Study, 2025

According to the table, the majority of respondents are male, with a significant proportion originating from the Southern Province, accounting for 30 out of 119 individuals. In contrast, only four respondents are from the Northern Province. This distribution reflects a broad geographical representation across the island. Notably, no female respondents were recorded from the Northern Province. Most respondents reside in the Southern, Western, and Sabaragamuwa Provinces, with female participants also predominantly originating from these same areas.

A gender-based migration pattern is evident, as a higher number of male respondents have migrated to the Colombo District for employment purposes. The gender gap among respondents is 58, suggesting that a considerably larger number of males are seeking work-related opportunities outside their home regions. This trend may be attributed to the societal expectation that males attain

economic stability and fulfill greater responsibilities. Consequently, many young men migrate to urban areas such as Colombo in search of employment, aiming to address personal and familial obligations.

Figure 2: Age of the Respondents



Source: Field Study, 2025

The age distribution of respondents, as illustrated in Figure 2, reflects the targeted sample of current residents in Colombo aged between 18 and 35 years. The majority of participants fall within the 25 to 35 age range, with a notably higher concentration observed between the ages of 27 and 30. This suggests that individuals in this age group are more actively engaged in employment or transitional life stages.

Figure 3: Current Occupational Status

Occupational Status

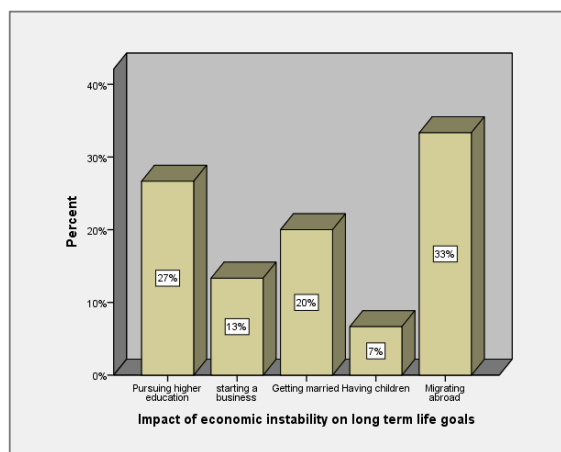
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Full-time permanent	30	16.7	16.7	16.7
	Part-time	51	28.3	28.3	45.0
	Temporary/casual	49	27.2	27.2	72.2
	Freelance/gig-based	17	9.4	9.4	81.7
	Unemployed	33	18.3	18.3	100.0
	Total	180	100.0	100.0	

Source: Field Study, 2025

The table presents the occupational status of the respondents, highlighting a significant trend among the youth population. According to the data, a majority of contributors (a combined total of 100 out of 180) are engaged in non-permanent forms of employment, including part-time jobs and temporary or casual work. In contrast, only 30 individuals hold full-time permanent positions, while 33 contributors are currently unemployed and therefore lack any occupational status. Additionally, 17 contributors are identified as freelancers. These findings suggest that the majority of the youth contributors do not possess stable, long-term employment. The prevalence of temporary and

insecure job arrangements indicates a broader issue of employment instability among the youth, which may have implications for their economic security and long-term career development.

Figure 4: Impact of economic instability on long-term goals



Source: Field Study, 2025

According to the chart, the majority of data contributors (33%) reported being unable to migrate abroad. In the current socio-economic context, many young individuals are actively seeking opportunities to migrate in pursuit of greater sustainability. Factors influencing this migration trend include economic opportunities, quality of life, socio-political instability, and access to free education systems. Recent statistics indicate that approximately 1 in 16 Sri Lankans have intentions to migrate. Furthermore, 27% of youth participants stopped pursuing higher education as a response to prevailing economic instability, suggesting that limitations in career advancement and a lack of incentives in permanent employment have motivated them to seek alternative pathways for personal and professional development.

Additionally, the data reveals that a considerable portion of married respondents have postponed having children, citing the need for financial stability as a prerequisite; this group accounts for 7% of respondents, representing the lowest percentage impacted by economic instability in relation to long-term goals. Moreover, there is a growing interest among young people in entrepreneurship; however, 13% of respondents indicated that they were unable to start a business due to financial constraints. Economic instability has also led 20% of youth to delay marriage, reflecting a broader impact on personal and societal milestones. Overall, the findings underscore that economic challenges are compelling youth to postpone or reconsider key life goals, with significant implications for their future careers and personal trajectories.

Figure 5: Impact of the economic situation on education

Impact of the economic situation on the education

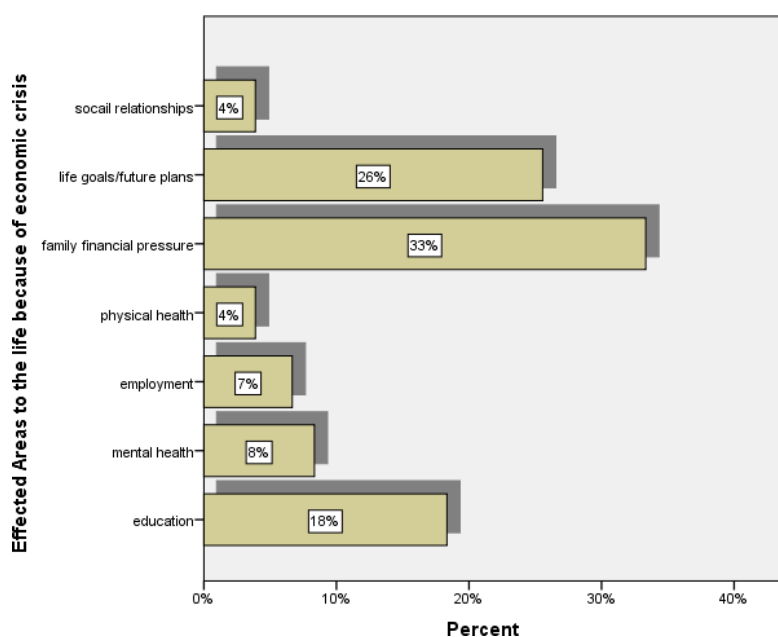
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Dropped out due to financial reasons	44	24.4	24.4	24.4
	Postponed higher education	36	20.0	20.0	44.4
	Switched to a more affordable course	38	21.1	21.1	65.6
	Reduced study time	26	14.4	14.4	80.0
	No significant impact	36	20.0	20.0	100.0
	Total	180	100.0	100.0	

Source: Field Study, 2025

Figure 5 illustrates the impact of economic instability on respondents' educational pursuits. As indicated in Figure 4, which addresses the broader effects on long-term life goals, 27 respondents reported discontinuing their pursuit of higher education due to economic challenges. Additionally, 36 out of 180 respondents stated they had postponed their plans to pursue advanced degrees such as Master's, MPhil, or PhD programs, while another 36 respondents reported switching to more affordable academic courses in response to financial constraints.

These findings indicate that the majority of respondents faced difficulties in continuing their education due to economic instability. A total of 144 individuals reported being affected in various ways, including postponing, altering, or discontinuing their educational pursuits, demonstrating the significant impact of financial hardship on academic progress. In contrast, only 36 respondents reported no major disruption to their education; it is possible that these individuals are either not currently pursuing studies or are engaged in stable, full-time employment. The situation is particularly challenging for those who are simultaneously managing academic responsibilities and employment, underscoring the compounded pressures faced by working students in an unstable economic environment.

Figure 6: Effects Areas to Life due to economic instability



The chart illustrates the areas of life most affected by the economic crisis, highlighting its significant impact on individuals aged between 18 and 35. According to the data, 33% of respondents reported that their family financial situation had been adversely affected. Given that the majority of participants are migrants who place a strong emphasis on family bonds and relationships, the financial strain on their families is particularly impactful. These familial relationships are often considered central to their lives, making financial challenges more profound.

In addition to financial stress, 26% of respondents indicated that their life goals were negatively impacted, as presented in Figure 4. This is particularly concerning, as individuals in this age group often have numerous plans and aspirations for their future. Furthermore, 18% reported disruptions to their educational pursuits, reflecting another critical area of life affected by the crisis. The chart identifies seven primary areas influenced by economic instability. Beyond financial, educational, and goal-oriented impacts, 8% of respondents experienced effects on their mental health, while 7%

reported employment-related challenges. Lastly, 4% of participants noted impacts on both their social relationships and physical health. For example, many migrants rely on external food sources, and due to financial limitations, may skip meals ultimately affecting their physical well-being.

Overall, the data underscores how economic instability can have widespread and multifaceted effects on young adults, particularly those who are already in vulnerable positions due to migration and limited resources.

Figure 7: Employment related Issues in the past few years

Employment-related issues in the past few years

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Job loss	16	8.8	11.0	11.0
	Pay cuts	28	15.5	19.2	30.1
	Inability to find a job	69	38.1	47.3	77.4
	Lack of Industrial opportunities	33	18.2	22.6	100.0
	Total	146	80.7	100.0	
Missing	System	35	19.3		
Total		181	100.0		

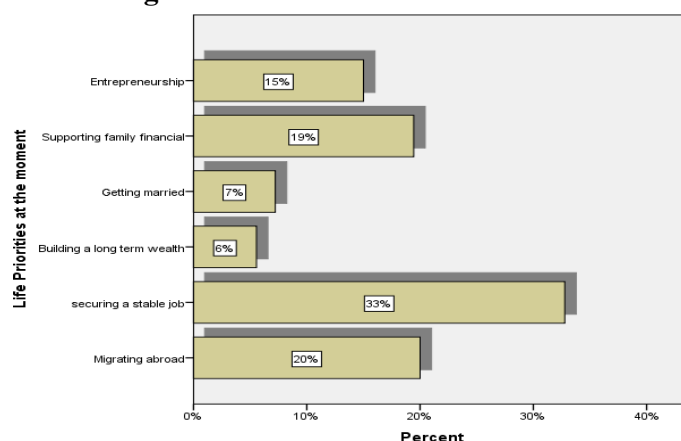
Source: Field Study, 2025

The table presents data on how respondents' employability was affected over the past two to five years, particularly in relation to the COVID-19 pandemic and its aftermath. This information is primarily relevant to individuals aged 25 and above. Thirty-five respondents did not provide relevant data, likely because they were either students or financially dependent on their parents during that period, and thus not actively participating in the labor market.

Among the 146 respondents considered, 16 individuals reported losing their jobs during the pandemic. Additionally, 69 respondents experienced difficulties in securing employment, highlighting the challenges faced in the job market. Furthermore, 28 respondents underwent salary reductions, while 33 expressed fear and uncertainty regarding their job security.

These findings indicate that all 146 respondents experienced some form of economic instability during or following the pandemic. Whether through job loss, employment insecurity, or financial setbacks, each respondent was impacted, underscoring the widespread and lasting effects of the economic crisis on employability.

Figure 8: Life Priorities at the moment



The figure illustrates the current life priorities of respondents aged between 18 and 35. According to the data, 33% of participants identified securing a stable job as their top priority. This aligns with findings presented in Figure 3, which show that 100 respondents are currently engaged in part-time or temporary employment, indicating a widespread desire for more permanent and secure positions.

Additionally, 20% of respondents expressed an intention to migrate abroad, while 19% reported relying on financial support from their families. This is consistent with the data in Figure 6, where 33% of respondents indicated that their families are experiencing financial pressure. Furthermore, 15% of participants aspire to become entrepreneurs, reflecting a growing interest in self-employment as a response to economic instability.

Only 7% of respondents indicated plans to get married in the near future, despite being within the typical age range for marriage. This may suggest that economic uncertainty is influencing personal and long-term life decisions. Overall, the figure highlights the respondents' focus on employment, financial security, and future planning in a post-pandemic economic context.

Conclusion

Economic instability has had a profound impact on the educational, professional, and personal lives of young adults aged 18–35. A majority of respondents reported disruptions to their education: 27 discontinued higher studies, 36 postponed advanced degrees, and another 36 shifted to more affordable courses. In total, 144 out of 180 respondents were affected, reflecting how financial hardship limits academic opportunities, particularly for working students balancing jobs and studies.

Beyond education, the crisis has significantly strained family finances, with 33% of participants reporting household-level impacts. Life goals were negatively affected for 26%, while 18% experienced setbacks in education. Additional effects included mental health challenges (8%), employment issues (7%), and smaller but notable impacts on social relationships and physical health (4%). Migrant respondents, in particular, felt these pressures more intensely due to strong family obligations and limited resources.

Employment outcomes have been equally concerning. Of the 146 respondents actively in the labor force, all experienced instability during or after the COVID-19 pandemic: 16 lost jobs, 69 faced difficulties securing work, 28 endured salary cuts, and 33 reported fears of job insecurity. These findings underscore the long-lasting consequences of the economic crisis on employability.

In terms of current priorities, securing stable employment was the top goal (33%), followed by migration abroad (20%) and reliance on family financial support (19%). Interest in entrepreneurship was expressed by 15% of respondents, while only 7% planned marriage in the near future, indicating how economic uncertainty continues to reshape life choices and delay life milestones.

Suggestions

To address economic instability among young adults, key interventions are needed. Expand scholarships, affordable courses, and flexible learning options while providing mentorship to support education. Strengthen financial resilience through literacy programs, household support, and temporary relief measures. Boost employment stability via vocational training, apprenticeships, long-term jobs, and youth-focused placement services. Safeguard well-being with accessible mental health support, community networks, and affordable health programs. Finally, empower entrepreneurship through microfinance, startup grants, business training, and mentorship, enabling young adults to achieve personal and professional goals despite economic challenges.

- **Education:** Expand scholarships, affordable courses, and flexible learning options; provide career counseling and mentorship.
- **Family & Life Goals:** Offer financial literacy programs, targeted support for low-income households, and temporary relief measures.
- **Employment:** Increase access to vocational training, apprenticeships, and long-term job opportunities; provide youth-focused job placement services.
- **Well-being:** Ensure accessible mental health services, community support networks, and affordable nutrition/health programs.
- **Entrepreneurship & Future Planning:** Provide microfinance, startup grants, business training, and mentorship opportunities.

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HUMAN CAPITAL DEVELOPMENT THROUGH EDUCATIONAL REFORMS: A STRATEGIC MANAGEMENT PERSPECTIVE

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Abstract

In the contemporary global economy, human capital has emerged as a decisive factor influencing national productivity, innovation, and long-term development. Education plays a central role in shaping this human capital by equipping individuals with knowledge, skills, values, and adaptability required in a rapidly changing world. In recent decades, governments across the globe have initiated extensive educational reforms aimed at improving quality, relevance, inclusivity, and employability. However, the effectiveness of such reforms depends not merely on policy formulation but on their strategic management and implementation. This paper examines educational reform as a strategic instrument for human capital development from a management perspective. It analyses the interrelationship between education, human capital formation, legal and policy reforms, and strategic leadership. Drawing upon global experiences and contemporary reform initiatives, including those in developing economies, the study highlights the importance of governance, planning, resource management, and innovation in translating educational reforms into tangible human capital outcomes.

Keywords: Human Capital Development, Educational Reform, Strategic Management, Leadership, Policy Implementation, Global Perspectives

1. Introduction

The transition towards knowledge-driven economies has significantly reshaped the role of education in national development. Education is no longer perceived solely as a social obligation or public service but as a strategic investment that directly contributes to human capital formation and economic competitiveness. In the 21st century, countries are increasingly measured by the quality of their human resources, which in turn depends on the effectiveness of their education systems.

Educational reforms have become a global phenomenon, driven by factors such as technological change, globalization of labour markets, demographic shifts, and rising expectations from employers and society. While governments introduce policies and legal frameworks to modernize education, the real challenge lies in managing these reforms at institutional and systemic levels. From a strategic management viewpoint, educational reform is a complex change process that requires vision, leadership, coordination, and continuous evaluation. This paper explores how strategic management principles can enhance the role of educational reform in developing human capital capable of meeting contemporary global challenges.

2. Human Capital and the Role of Education

Human capital refers to the collective skills, competencies, knowledge, and attitudes possessed by individuals that contribute to economic and social productivity. Education is widely acknowledged as the primary mechanism through which human capital is created and enhanced. Investment in education improves workforce efficiency, promotes innovation, and supports social mobility.

Modern education systems are expected not only to impart academic knowledge but also to develop critical thinking, creativity, communication abilities, digital literacy, and lifelong learning skills. As labour markets evolve rapidly, education must continuously adapt to ensure alignment between learning outcomes and economic requirements. Strategic planning in education is therefore essential to maximize returns on human capital investment.

3. Educational Reform as a Strategic Tool

Educational reform encompasses deliberate changes in curriculum, pedagogy, assessment, governance, financing, and regulatory frameworks. From a management perspective, reform is a strategic intervention designed to improve system performance and outcomes. However, reforms often fail to achieve intended objectives due to weak implementation, lack of coordination, and resistance to change.

Strategic management enables education systems to move beyond incremental adjustments towards transformational change. It involves setting clear goals, analysing internal and external environments, allocating resources efficiently, and monitoring progress. When reforms are strategically managed, they are more likely to enhance human capital by improving quality, equity, and relevance of education.

4. Policy and Legal Reforms in Education

Legal and policy frameworks provide the foundation for educational reform. They define governance structures, institutional autonomy, accountability mechanisms, and quality standards. In many countries, recent reforms have focused on decentralization, outcome-based regulation, quality assurance, and integration of technology in education.

However, legal mandates alone cannot bring about meaningful change. Institutions must interpret policies in ways that align with their missions and capacities. Strategic leadership plays a crucial role in translating policy objectives into operational plans and institutional practices. Effective management ensures compliance while encouraging innovation and responsiveness.

5. Strategic Management in Educational Institutions

Leadership and Governance

Leadership is a critical determinant of successful educational reform. Strategic leaders articulate a clear vision for human capital development and mobilize stakeholders towards shared goals. Contemporary governance models emphasize institutional autonomy combined with accountability, allowing leaders to respond flexibly to emerging challenges.

Distributed leadership, participatory decision-making, and professional management practices are increasingly important in managing complex educational organizations. Leaders must balance academic values with managerial efficiency to ensure sustainable reform outcomes.

Planning, Resource Allocation, and Capacity Building

Strategic planning connects reform objectives with practical actions. Educational institutions must align their programmes, curricula, and assessment methods with national development priorities and labour market needs. Resource allocation, including financial investment and infrastructure development, should support these strategic goals.

Human resource development is equally vital. Faculty and administrators require continuous professional development to adapt to new pedagogies, technologies, and evaluation systems. Strategic capacity building strengthens institutional readiness for reform.

6. Global Perspectives on Human Capital Development

International experience demonstrates that countries investing strategically in education achieve superior human capital outcomes. Education systems in countries such as Finland, Singapore, and South Korea illustrate how coherent policy frameworks combined with strong management practices can produce skilled, adaptable workforces.

Global organizations emphasize competencies such as problem-solving, digital skills, and lifelong learning as essential for future employment. Cross-national collaboration, benchmarking, and knowledge sharing have become important strategies for enhancing educational quality and human capital development.

7. Technology and Innovation in Educational Reform

Technological advancement has transformed the delivery and management of education. Digital platforms, online learning, and data-driven decision-making offer new opportunities to expand access and improve efficiency. Educational reforms increasingly incorporate technology to personalize learning and enhance skill development.

From a strategic management perspective, technology adoption must be planned and inclusive. Addressing digital divides, ensuring quality assurance, and building digital competencies among educators are essential to realizing the human capital benefits of educational technology.

8. Challenges in Linking Educational Reform to Human Capital Outcomes

Despite ambitious reforms, several challenges hinder effective human capital development. These include gaps between policy and practice, limited institutional capacity, inequitable access to quality education, and resistance to organizational change. In addition, rapid economic and technological changes often outpace reform implementation.

Strategic management helps address these challenges by promoting adaptability, stakeholder engagement, and evidence-based decision-making. Continuous monitoring and evaluation enable institutions to adjust strategies and sustain reform momentum.

9. Strategic Framework for Human Capital–Oriented Educational Reform

Based on the analysis, a strategic framework for linking educational reform to human capital development includes:

1. Clear vision and long-term goals aligned with national development priorities
2. Supportive legal and policy environments focused on outcomes
3. Strong leadership and accountable governance structures
4. Strategic investment in infrastructure and human resources
5. Integration of technology and innovation
6. Continuous assessment and feedback mechanisms

This integrated approach ensures that reforms contribute meaningfully to human capital formation.

10. Conclusion

Human capital development is a central objective of educational reform in the 21st century. However, achieving this objective requires more than policy declarations and legal changes. Strategic management plays a decisive role in transforming educational reforms into effective instruments for developing skilled, adaptable, and productive human resources. By aligning leadership, governance, planning, and innovation with reform goals, education systems can

respond effectively to global challenges while promoting inclusive and sustainable development. From a strategic management perspective, the future of education lies in its ability to continuously evolve in support of human capital growth.

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REFORMING EDUCATION IN POST-LIBERALIZATION INDIA: A HISTORICAL PERSPECTIVE ON NEP 1986 AND NEP 2020

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Abstract

The Indian education system has undergone significant transformation since Independence, with education policy playing a central role in shaping its philosophy, structure, and outcomes. Marking critical milestones, the National Education Policy (NEP) 1986 and its revision in 2020 reflect changing societal needs, global trends, and developmental aspirations. While NEP 1986 sought to democratize education and promote equity by expanding access and improving quality, NEP 2020 presents a paradigm shift toward holistic, flexible, multidisciplinary, learner-centric education aligned with 21st-century skills. This paper critically examines the evolution of educational priorities, structural reforms, pedagogical innovations, equity measures, governance frameworks, challenges, and future directions. The comparative analysis highlights continuity and change, emphasizing how NEP 2020 builds upon, reimagines, and contextualizes previous frameworks to address contemporary needs.

Keywords: *National Education Policy, Indian Education System, NEP 1986, NEP 2020, Educational Reform, Holistic Learning*

1. Introduction

Education is a fundamental driver of human development and national progress. In India, education policy has played a pivotal role in responding to socio-economic challenges, cultural diversity, technological change, and global competitiveness. Two landmark policies National Education Policy (NEP) 1986 and National Education Policy (NEP) 2020 mark historically significant junctures in the evolution of India's educational priorities.

NEP 1986 was adopted in a rapidly changing socio-political context, aiming to expand access and improve quality at all levels of education. After more than three decades — marked by globalization, technological revolution, and rapid demographic shifts — India introduced NEP 2020, a comprehensive framework envisioning transformational reforms from early childhood care to higher education. This article compares these policies, tracing shifts in philosophy, structure, implementation strategies, and potential impact.

2. Historical Context of NEP 1986

India's first formal National Education Policy was launched in **1986** under Prime Minister Rajiv Gandhi's government, replacing the education policy of 1968. Its core objectives included:

- **Universalization of Education:** Ensuring access to education for all children up to 14 years, focusing on reducing gender and social disparities.
- **Equity and Social Justice:** Special measures for disadvantaged groups, especially Scheduled Castes, Scheduled Tribes, and girls.
- **Quality Improvement:** Emphasizing teacher training, curriculum reforms, and standardization of educational outcomes.
- **Adult Literacy:** A strong push for adult education and lifelong learning.

- **Technical and Vocational Education:** Encouraging diversified pathways for skill development and employability.

The policy envisioned a **child-centered approach**, aiming to make education relevant to the economic and cultural needs of the nation.

Key Features of NEP 1986

1. **Free and Compulsory Education:** For all children up to age 14.
2. **Curriculum Rationalization:** Balancing arts, sciences, and vocational skills.
3. **Teacher Professionalization:** In-service training and pre-service preparation.
4. **Open Schooling:** Setting up the National Institute of Open Schooling (NIOS).
5. **Decentralization:** Encouraging greater autonomy for institutions.

Despite its progressive vision, NEP 1986 faced challenges in implementation due to resource limitations, systemic inequities, and administrative bottlenecks.

Major Educational Policies and Reforms in India (1986–2020)

Between the adoption of the National Education Policy (NEP) 1986 and the introduction of NEP 2020, India did not frame a new comprehensive national education policy; however, this period was marked by a series of significant policy initiatives, programmes, and committee recommendations that progressively reshaped the education system. The Programme of Action (1992) operationalized NEP 1986 by strengthening decentralization, teacher education, and minimum learning levels. Subsequently, the District Primary Education Programme (1994) and Sarva Shiksha Abhiyan (2001) focused on universalizing elementary education, improving infrastructure, enrolment, and retention, particularly in educationally backward regions. Curriculum reforms such as the National Curriculum Framework (2005) promoted child-centered, constructivist pedagogy and reduced rote learning. At the policy level, the National Knowledge Commission (2005–2009) and the Yashpal Committee (2009) emphasized interdisciplinary learning, institutional autonomy, research orientation, and a global knowledge perspective, especially in higher education.

Simultaneously, legislative and sector-specific reforms strengthened the education ecosystem. The Right of Children to Free and Compulsory Education Act (2009) established education as a fundamental right, reinforcing access and accountability at the elementary level, while the Rashtriya Madhyamik Shiksha Abhiyan (2009) expanded access to secondary education. Higher education governance and quality were addressed through the Rashtriya Uchchatar Shiksha Abhiyan (2013), and teacher education was standardized through the NCTE Regulations (2014), introducing longer and more rigorous professional preparation. Skill development initiatives and digital learning platforms such as SWAYAM, DIKSHA, and NPTEL further aligned education with employability and technological advancement. Collectively, these reforms represent a phase of incremental but strategic transformation, bridging the access-focused vision of NEP 1986 with the holistic, flexible, and future-oriented framework articulated in NEP 2020.

3. Evolution Leading to NEP 2020

Over three decades, India witnessed rapid globalization, digital transformation, and evolving workforce demands. These developments highlighted the limitations of learning outcomes, rigid curricular structures, and the lack of interdisciplinary and skills-based education.

To address these challenges, the Government of India established committees, including the **Yashpal Committee (2009)** and other expert groups, to reassess and recommend reforms in school

and higher education frameworks. These consultations culminated in the **National Education Policy 2020**, approved by the Union Cabinet on July 29, 2020 — the first comprehensive policy in 34 years.

4. NEP 2020: Philosophy and Key Reforms

NEP 2020 represents a **paradigm shift** in India's education policy by emphasizing flexibility, creativity, and multi-disciplinary learning. Its vision is to nurture **holistic development**, critical thinking, and lifelong learning.

4.1. Major Structural Reforms

- **School Education Restructuring:** From the conventional 10+2 model to a new **5+3+3+4** curricular structure.

Stage	Ages	Focus
Foundational	3–8	Play-based, holistic learning
Preparatory	8–11	Experiential learning
Middle	11–14	Conceptual understanding
Secondary	14–18	Depth, critical thinking

- **Early Childhood Care and Education (ECCE):**
 - Recognition of ages 3–6 as foundational learning.
 - Emphasis on play-based and discovery-based pedagogy.
- **Holistic and Multidisciplinary Higher Education:**
 - Flexible curricula with multiple exit options and credit transfers.
 - Emphasis on liberal arts, sciences, and vocational integration.
 - Introduction of **Multidisciplinary Education and Research Universities (MERUs)**.

4.2. Curriculum, Pedagogy, and Assessment

- Shift from rote memorization to **competency-based learning**.
- Continuous formative assessment.
- Promotion of critical thinking, creativity, and problem-solving.

4.3. Teacher Education and Professional Development

- Integration of teacher preparation into multidisciplinary institutions.
- Rigorous **four-year integrated B.Ed.** programs.
- Emphasis on reflective practice and technology use.

4.4. Technology and Digital Learning

- Digital platforms for content delivery.
- Use of AI, virtual labs, and MOOCs.
- Technology to support equity and accessibility.

4.5. Equity, Inclusion, and Multilingualism

- Focus on inclusion of socio-economically disadvantaged groups.
- Promotion of **multilingual education**, with emphasis on mother tongue/local language instruction till Grade 5 (preferably till Grade 8).

5. Comparative Analysis: NEP 1986 vs. NEP 2020

5.1. Philosophical Shifts

Aspect	NEP 1986	NEP 2020
Learning Approach	Access & equity focus	Holistic, learner-centric, competency-based
Curriculum	Rote and subject-based	Interdisciplinary, flexible
Assessment	Summative	Continuous, formative
Teacher Role	Content delivery	Facilitator, mentor

5.2. Structural Reforms

NEP 1986 laid the foundation for expansion, but NEP 2020 transforms structure by integrating early childhood, secondary, higher education, and vocational strands into a connected ecosystem.

5.3. Quality and Governance

While NEP 1986 emphasized quality through conventional means (teacher training, curriculum committees), NEP 2020 envisages **outcome-oriented governance**, regulatory overhaul, and autonomy for institutions.

6. Key Challenges Ahead

Despite visionary reforms, implementation remains challenging:

- **Infrastructure Gaps:** Especially in rural and under-resourced schools.
- **Teacher Preparedness:** Need for large-scale capacity building.
- **Assessment Transition:** Shifting mindset from rote to competency-based evaluation.
- **Equity Concerns:** Ensuring inclusion without widening disparities.
- **Technology Access:** Digital divide affecting learning continuity.

7. Implications for Policy, Practice, and Research

7.1. Policy

- Reallocation of budgets to support ECCE, teacher education, and digital infrastructure.
- Monitoring frameworks to assess policy outcomes.

7.2. Educational Practice

- Classroom transformation with active learning strategies.
- Integration of vocational education from early stages.

7.3. Research and Innovation

- Studies on early childhood learning outcomes.
- Research in multilingual education efficacy.
- Innovation in assessment and technology implementation.

8. Conclusion

The evolution from NEP 1986 to NEP 2020 reflects a broadening vision — from basic access and equity to holistic, future-ready education. NEP 2020's learner-centric, flexible, and integrated framework holds promise for transforming India's educational landscape, aligning it with global aspirations and local needs. Effective implementation, sustained political commitment, and collaborative stakeholder engagement are essential to realize this vision.

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HOW CAN TEACHER EDUCATION REFORMS UNDER NEP 2020 PREPARE INDIAN TEACHERS FOR THE GLOBAL EDUCATION WORKFORCE?

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Abstract

The globalization of education and the growing international mobility of teachers have transformed teaching into a globally competitive profession. In this context, the National Education Policy (NEP) 2020 marks a significant shift in reorienting teacher education in India towards global relevance, professionalism, and technological integration. This paper addresses the central question: How can teacher education reforms under NEP 2020 prepare Indian teachers for the global education workforce? Adopting a conceptual and policy analysis approach, the study examines key teacher education reforms such as the Integrated Teacher Education Programme (ITEP), professional standards, continuous professional development, and institutional accountability. It further analyses the role of emerging technologies, including artificial intelligence, digital pedagogy, online certifications, and virtual teaching platforms, in enhancing global readiness. The paper also explores global competency requirements, international demand regions, and critical legal and ethical considerations related to qualification recognition, accreditation, AI ethics, and data privacy. A conceptual framework for developing “global-ready teachers” is proposed, followed by policy and institutional recommendations. The study concludes that NEP 2020, when strategically aligned with emerging technologies and global standards, can effectively prepare Indian teachers for sustainable international career pathways.

Keywords: NEP 2020, Teacher Education Reforms, Global Employability, Emerging Technologies, Teacher Mobility

1. INTRODUCTION

The role of teachers has undergone a profound transformation in the 21st century, shaped by globalization, digitalization, and the growing international mobility of the educational workforce. Teaching is no longer confined within national boundaries; instead, it has emerged as a globally competitive profession driven by international standards, cross-cultural competence, and technology-enabled pedagogies. Countries across the Middle East, Southeast Asia, Europe, and online education platforms increasingly seek professionally trained, digitally competent, and globally adaptable teachers (Raj, 2024). In this context, preparing teachers not only for national classrooms but also for global education systems has become a strategic priority for educational reforms worldwide.

India, with its vast pool of trained teachers and long-standing tradition of teacher education, has significant potential to contribute to the global education workforce. However, challenges such as curriculum rigidity, limited exposure to international teaching standards, and uneven integration

of digital competencies have historically constrained the global employability of Indian teachers (Anandraj, 2024). Recognizing these challenges, the National Education Policy (NEP) 2020 marks a landmark shift in reimagining teacher education as a professional, multidisciplinary, and technology-integrated enterprise aligned with global best practices.

The NEP 2020 emphasizes high-quality teacher preparation through integrated teacher education programs, continuous professional development, competency-based training, and the strategic use of digital and emerging technologies. The policy envisions teachers as facilitators of learning, innovators, and lifelong learners capable of adapting to diverse educational contexts (Tripon, 2025). Furthermore, the policy's focus on digital literacy, artificial intelligence, online learning platforms, and blended pedagogical models creates new pathways for Indian teachers to acquire globally relevant skills and qualifications.

Simultaneously, rapid advancements in emerging technologies, such as artificial intelligence, learning analytics, virtual classrooms, and digital credentialing systems, are redefining teacher preparation and professional practice. These technologies enable personalized learning, international collaboration, remote teaching opportunities, and access to global certification programmes such as TEFL, TESOL, and online teaching qualifications (Meihami & Malmir, 2024). When effectively integrated into teacher education reforms, technology serves as a powerful enabler for preparing teachers for transnational mobility and global employment opportunities (Vaithianathan et al., 2024).

Against this backdrop, this study examines teacher education reforms under the NEP 2020, with a specific focus on how emerging technologies can be leveraged to prepare Indian teachers for the global education workforce. This study adopts a conceptual and policy analysis approach to explore the alignment between NEP 2020 provisions, technological innovations in teacher education, and competencies required for global teaching careers. It further proposes a conceptual framework for developing “global-ready teachers” and offers policy and institutional recommendations to strengthen India's teacher education system in line with international demands.

2. TEACHER EDUCATION REFORMS UNDER NEP 2020 (WHAT reforms exist to enable global readiness?)

The National Education Policy (NEP) 2020 recognizes teachers as the cornerstone of educational transformation and places teacher education at the center of systemic reform. Moving away from fragmented and input-driven models, the policy envisions a professional, multidisciplinary, and competency-based teacher education ecosystem aligned with national priorities and global standards (Kulal et al., 2024). Key reforms proposed under the NEP 2020 include the introduction of the Integrated Teacher Education Programme (ITEP), establishment of professional standards and continuous professional development (CPD), adoption of multidisciplinary approaches, and strengthened institutional accountability mechanisms (Devi & Konwar, 2025).

2.1 Integrated Teacher Education Programme (ITEP)

One of the most significant reforms introduced by the NEP 2020 is the four-year Integrated Teacher Education Programme (ITEP), which is designed to become the minimum qualification for school teachers by 2030. The ITEP replaces standalone teacher education programmes with a holistic model that integrates subject knowledge, pedagogical training, foundational literacy and numeracy, educational psychology and practical school experience. This integrated structure

ensures early professional socialization of teachers and promotes coherence between content mastery and pedagogical competence (Devi & Konwar, 2025).

ITEP adopts a multidisciplinary framework, allowing student teachers to engage with disciplines such as science, humanities, arts, and vocational studies alongside education courses. Such integration is particularly relevant for preparing teachers for diverse international curricula and teaching environments (Nopas & Kerdsonboon, 2024). By embedding internships, practicum-based learning, and experiential components throughout the program, ITEP strengthens classroom readiness, adaptability, and reflective practice—key attributes expected of teachers in global education systems (Theelen et al., 2019).

2.2 Professional Standards and Continuous Professional Development (CPD)

The NEP 2020 emphasizes the establishment of clear professional standards to enhance teacher quality, accountability, and career progression. The policy proposes the development of National Professional Standards for Teachers (NPST), which define competencies related to subject expertise, pedagogy, ethics, technology use, and professional conduct (Dayagbil & Alda, 2024). These standards are intended to guide teacher preparation, appraisal, promotion, and continuous learning.

Complementing professional standards, the NEP 2020 mandates continuous professional development (CPD) as a core requirement for teachers at all stages of their careers. A minimum of 50 hours of CPD per year is recommended, with a strong emphasis on digital learning platforms, online courses, and blended training models. CPD initiatives are expected to focus on emerging pedagogies, inclusive education, digital competencies, and global teaching practices (Bascopé et al., 2025). Such a structured approach to lifelong professional learning enhances the global competitiveness of Indian teachers by aligning their skills with international standards.

2.3 Multidisciplinary and Competency-Based Reforms

A defining feature of the NEP 2020 is its shift from content-heavy curricula to competency-based education. Teacher education programmes have been restructured to emphasize critical thinking, problem-solving, creativity, communication skills, and ethical reasoning. This approach prepares teachers to transmit knowledge and design learner-centered, inquiry-driven, and technology-supported learning environments (Sharma & Jain, 2025).

Multidisciplinary exposure enables future teachers to understand interconnected knowledge systems and adapt to diverse curricula across countries. Competency-based reforms also support the development of digital pedagogy, assessment literacy, and intercultural competence—skills increasingly demanded in global education markets (Nopas & Kerdsonboon, 2024). By focusing on measurable outcomes and professional competencies, the NEP 2020 aligns Indian teacher education with international teacher preparation models (Narkhede et al., 2025).

2.4 Institutional Accountability and Quality Assurance

The NEP 2020 introduced robust mechanisms to ensure institutional accountability and quality assurance in teacher education. Teacher education institutions (TEIs) are required to meet stringent accreditation standards, maintain academic autonomy, and adopt transparent governance practices (Aithal & Aithal, 2020). The policy calls for the phasing out of substandard institutions and the consolidation of teacher education within multidisciplinary higher education institutions (Pham, 2018).

Quality assurance frameworks emphasize outcome-based evaluation, faculty development, research engagement, and effective use of educational technologies. Enhanced institutional accountability ensures that teacher education programmes remain relevant, credible and internationally comparable. Such reforms are critical for building global trust in Indian teacher qualifications and facilitating international recognition and mobility (Chakroun & Keevy, 2018).

Collectively, these reforms establish the structural and professional foundations necessary for preparing teachers for global educational contexts.

3. ROLE OF EMERGING TECHNOLOGIES IN TEACHER PREPARATION

(HOW do technologies operationalize NEP reforms globally?)

How Technologies Operationalize NEP Reforms Globally

The rapid advancement of digital and intelligent technologies has fundamentally reshaped teacher preparation in developed nations. Teacher education systems in countries such as the USA, UK, Finland, Singapore, Australia, and Canada have increasingly pivoted toward technology-enabled pedagogy, global collaboration, digital credentials, and flexible career pathways. In alignment with this global shift, the **National Education Policy (NEP) 2020** recognizes emerging technologies not only as tools but also as critical enablers for improving teacher quality, expanding professional opportunities, and preparing Indian teachers for active participation in the global education workforce.

3.1 Artificial Intelligence (AI) and Digital Pedagogy

In advanced education systems, Artificial Intelligence (AI) has been integrated into teacher education to enhance personalized learning, instructional design, and assessment literacy. AI literacy is now considered a core competency, requiring teachers to understand ethical usage and human–AI collaboration in the classroom. Globally, this manifests through **adaptive learning platforms** that personalize content, **learning analytics** to track progress, and **intelligent tutoring systems** that support differentiated instruction (Meylani, 2024). Teacher curricula in developed nations now emphasize AI-supported lesson planning and data-informed decision making. Under the NEP 2020, similar competencies are promoted through digital pedagogy training and technology integration in Continuous Professional Development (CPD). This strategic alignment ensures that teachers evolve into digitally fluent professionals capable of navigating technology-rich global classrooms (Buendgens-Kosten, 2024).

3.2 Online Certifications and Global Teaching Credentials

Developed nations view globally standardized certifications, such as **Teaching English as a Foreign Language (TEFL)** and **Teaching English to Speakers of Other Languages (TESOL)**, as vital indicators of teaching competence, particularly for international schools and online platforms. Modern teacher preparation has adapted to this by offering fully online certification courses, blended learning models, and virtual teaching practicums that focus on cross-cultural communication and global curriculum standards (Che Ahmat et al., 2021). The NEP 2020 aligns with this trend by encouraging **multiple entry–exit pathways** and credit-based certifications. By integrating these international standards within the Indian teacher education framework, Indian educators can gain globally recognized credentials, significantly enhancing their employability in regions such as the Gulf, Southeast Asia, and Europe (Kulal et al., 2024).

3.3 Global Classrooms and Remote Teaching Models

The concept of the classroom has expanded beyond physical borders, with developed nations preparing teachers for virtual exchange programs and international collaboration. Post-pandemic education systems have institutionalized online schools and hybrid learning environments, necessitating a focus on **online instructional design**, digital engagement strategies, and virtual student well-being(Rao et al., 2021). The NEP 2020 mirrors this evolution by promoting digital learning ecosystems and the use of national digital platforms. This creates a pathway for Indian teachers to transition from local classrooms to **borderless digital teaching spaces**, enabling them to teach international students remotely, work for global EdTech companies, and participate in international teaching projects(Raj, 2024).

3.4 Technology-Enabled Teacher Mobility

Technology acts as a powerful "mobility multiplier" by facilitating the portability of qualifications. Developed nations increasingly utilize **digital certificates, blockchain-based credential verification**, and online portfolios to allow seamless verification of skills and international job applications. Consequently, teacher education programs now emphasize the maintenance of a professional digital presence and global networking(Anandraj, 2024; Kulal et al., 2024; Raj, 2024). For Indian teachers, the NEP 2020 reforms facilitate the alignment of skills with global standards. Through technology, Indian educators can leverage online recruitment platforms to apply for overseas positions and engage in academic collaborations, extending their career pathways far beyond the national education system(C, 2024).

3.5 Synthesis: Technology as a Catalyst for Global Readiness

Ultimately, emerging technologies do not merely support teacher education; they redefine teachers' identities, roles, and reach. While developed nations use technology to standardize quality and enhance global employability, the NEP 2020 positions India to mirror this success. By effectively implementing these technological interventions, India can produce globally competent teachers and transform its teacher education sector into a globally competitive professional system(Bhagoji, 2024). In this context, technology functions as a critical bridge that translates the NEP 2020 reforms into tangible and globally relevant teacher competencies.

4. PREPARING INDIAN TEACHERS FOR THE GLOBAL JOB MARKET

(WHAT global competencies and markets must teachers be prepared for?)

The globalization of education has transformed teaching into a mobile and internationally competitive profession. Schools, universities, international boards, and online education platforms across developed and emerging economies increasingly seek teachers who possess not only subject expertise and pedagogical competence but also global skills, technological fluency, and intercultural sensitivity (Temirkhanova et al., 2024). In this context, preparing Indian teachers for the global job market requires a strategic alignment of skills, language proficiency, intercultural competence, and awareness of international demand. The NEP 2020 provides a strong policy foundation for this transition by emphasizing professionalism, flexibility, and global relevance in teacher education.

4.1 Global Skills Required for International Teaching Careers

To function effectively across diverse educational systems, teachers must master a global competency framework that integrates advanced pedagogical and digital skills. On the pedagogical front, developed nations prioritize learner-centered, inquiry-based methods, outcome-based curriculum design, and the ability to differentiate instruction for multicultural classrooms

(Norhagen et al., 2024). This is complemented by strict requirements for assessment literacy aligned with international standards and a commitment to reflective practice. Simultaneously, the modern teaching landscape demands high proficiency in digital tools, including Learning Management Systems (LMS), data analytics, and the ethical use of AI (De-Torres et al., 2024). The NEP 2020 supports this dual focus through competency-based teacher education and integrated practicums, ensuring that Indian teachers are not only pedagogically sound but also digitally fluent enough to operate in international schools and on global education technology platforms.

4.2 Language Proficiency and Communication Skills

English proficiency remains a non-negotiable gateway for international teaching positions, particularly in English-medium institutions and online platforms, where clarity in instruction and professional documentation is paramount. Developed nations expect teachers to demonstrate high-level academic English, focusing on classroom discourse and professional communication (Harper & De Jong, 2009). Teacher education programs abroad often integrate specific modules on academic language training to meet these standards. The NEP 2020 aligns with this global expectation by promoting multilingualism and communication flexibility (Mahapatra & Anderson, 2022). By strengthening academic and professional English alongside multilingual competence, the policy ensures that Indian teachers can meet the rigorous language demands of global classrooms while retaining their unique cultural identity.

4.3 Intercultural Competence and Global Citizenship

Teaching in global contexts requires deep intercultural competence—the ability to navigate diverse cultural backgrounds, socioeconomic contexts, and varying learning values with sensitivity and ethical awareness. This goes beyond mere tolerance; it involves actively practicing inclusivity and upholding the values of global citizenship. Developed countries have addressed this by integrating intercultural education courses and virtual exchange programs into their teacher preparation models (Miller Dyce et al., 2024). The NEP 2020 echoes this necessity by emphasizing constitutional values, equity, and inclusion. By embedding these competencies into Indian teacher education, the policy prepares educators to function confidently in multicultural environments, fostering respect for diversity and global connectivity (Gorski & Parekh, 2020).

4.4 Major Global Demand Regions for Teachers

The global demand for qualified teachers varies significantly by region, creating distinct opportunities for Indian educators to work overseas. Middle Eastern and Gulf countries offer high demand for English-medium instruction with attractive remuneration, while Southeast Asia presents a growing sector for STEM and special education professionals (Rizvi, 2019). In contrast, the markets in Europe, Australia, and North America are highly selective, emphasizing accreditation and strict professional standards. Additionally, the rapid expansion of global online education platforms offers location-independent opportunities for digitally skilled teachers to work. Indian teachers equipped with NEP-aligned qualifications and international certifications are increasingly competitive across these varied landscapes, provided they tailor their skills to regional requirements (Narkhede et al., 2025).

4.5 Role of NEP 2020 in Enhancing Global Employability

The NEP 2020 plays a pivotal role in bridging the gap between national preparation and global readiness by professionalizing teacher education and promoting multidisciplinary learning. The policy facilitates this shift by supporting digital education ecosystems, encouraging lifelong professional development, and enabling flexible and modular learning pathways (Devi & Konwar,

2025). When these structural reforms are combined with emerging technologies and international certifications, the NEP 2020 effectively positions Indian teachers as globally competent professionals. It transforms the local teacher education system into a launchpad for accessing high-quality international teaching opportunities.(Kumar et al., 2020)

4.6 Synthesis: From National Preparation to Global Placement

Preparing Indian teachers for the global job market requires a holistic approach that seamlessly integrates professional pedagogy, language proficiency, intercultural competence, and technological preparedness. Success depends on awareness of international demand regions and the ability to adapt to them(Kumar et al., 2020). Teacher education reforms under NEP 2020, when strategically aligned with these global education trends, have the potential to transform Indian teachers from nationally trained professionals into globally employable ones. This transition not only benefits individual careers but also contributes significantly to international education systems and enhances India's academic footprint on the world stage(P. S. Aithal & Aithal, 2020).

5. LEGAL, POLICY, AND ETHICAL CONSIDERATIONS

What conditions must be met to ensure sustainable global participation?

Preparing Indian teachers for the global education workforce requires not only pedagogical and technological readiness but also careful attention to legal recognition, accreditation, and ethical use of digital technologies. As teacher mobility increasingly crosses national and digital boundaries, robust legal and ethical frameworks are essential to ensure credibility, trust, and professional integrity(Alam et al., 2024).

5.1 Recognition of Qualifications and International Equivalence

Global employability fundamentally depends on whether Indian teacher qualifications are legally recognized and considered equivalent in host countries. While the NEP 2020 professionalizes teacher education through the Integrated Teacher Education Programme (ITEP) and multidisciplinary degrees, developed nations typically rely on rigorous qualification equivalency frameworks before recruitment(Tabassum et al., 2025). For instance, a teacher with a 4-year ITEP degree may still require credential evaluation by international agencies to be appointed to an international school. Furthermore, schools often demand additional global certifications, such as TEFL or TESOL, even when national qualifications are strong. Consequently, teacher education institutions must align their curricula with international competency frameworks and actively support graduates in navigating these complex credential verification processes to ensure seamless mobility(Che Ahmat et al., 2021).

5.2 Accreditation, Licensing, and Professional Standards

Accreditation is the bedrock of quality assurance and global trust in teacher-education programmes. The NEP 2020 mandates strict accreditation norms and the closure of substandard institutions to bolster this trust(Kulal et al., 2024). However, global standards often go further; many developed countries require teachers to meet specific licensing and professional standards beyond academic degrees. International schools, for example, prefer graduates from accredited institutions who can provide documented proof of teaching practicum hours in the field. Similarly, online teaching platforms often require proof of a licensed status. Therefore, Indian institutions must maintain transparent governance, embed global standards into their programs, and meticulously document practicum, CPD, and professional competencies to meet international scrutiny(Lander et al., 2020).

5.3 Ethical Use of Artificial Intelligence in Teacher Preparation

While AI enhances efficiency and personalization in education, it introduces significant ethical concerns regarding fairness, accountability, and professional judgment issues. The NEP 2020 encourages the adoption of emerging technologies but stresses the need for ethical integration—a sentiment mirrored by developed nations that now include AI ethics in teacher curricula (Cheng & Lee, 2024). Concrete risks include AI-based assessment tools that may unintentionally disadvantage specific learner groups due to algorithmic bias or an over-reliance on AI-generated lesson plans that erode teacher autonomy (Altinay et al., 2024). To mitigate this, teacher education programs must train educators in ethical AI usage, promote human–AI collaboration rather than substitution, and emphasize transparency and explainability in all AI-supported decisions (Asy’Ari & Sharov, 2024).

5.4 Data Privacy, Digital Safety, and Professional Responsibility

In an era of global and digital teaching, handling sensitive learner data across jurisdictions makes data protection and privacy compliance critical (Mbah & Evelyn, 2024). The NEP 2020 highlights the safe and responsible use of educational technology, aligning with the strict data protection regulations enforced by developed nations (Khan, 2025). Teachers working for international online platforms must strictly comply with these rules; the use of third-party digital tools without informed consent can result in severe legal and ethical violations for the teacher. Accordingly, teacher preparation must include rigorous training in digital data ethics and international data protection norms, ensuring that teachers adhere to professional guidelines for online conduct (Norhagen et al., 2024).

5.5 Cross-Border Employment and Professional Ethics

Teachers working abroad or in digital spaces must adhere to a dual framework of professional ethics and host country regulations. The NEP 2020 emphasizes professional integrity and accountability, which is essential as global education systems expect teachers to uphold strict codes of conduct. This includes respecting local cultural norms and institutional policies while teaching abroad (Beynon* et al., 2004). The misrepresentation of qualifications or experience can lead to serious legal and professional consequences. Therefore, teacher education programs should include dedicated modules on professional ethics and global conduct, preparing teachers to make ethical decisions in complex multicultural settings (Priyadharsini & Sahaya Mary, 2024).

5.6 Synthesis: Building Legally and Ethically Global-Ready Teachers

Teacher education reforms under NEP 2020 must integrate legal awareness, accreditation literacy, and ethical competence, alongside technological and pedagogical training. Addressing qualification recognition, professional standards, AI ethics, and data privacy ensures that Indian teachers are globally employable, legally compliant, ethically responsible, and professionally credible in international education systems. Ultimately, global employability is contingent not only on skills and qualifications but also on legal recognition, ethical compliance, and regulatory alignment across borders (Lewis, 2025).

6. IMPLICATIONS AND RECOMMENDATIONS

In response to the central question of how NEP 2020 can prepare Indian teachers for the global workforce, this section outlines the key implications and actionable recommendations. Teacher education reforms under NEP 2020, when strategically integrated with emerging technologies and global competency frameworks, have significant implications for policy, institutions, teacher

educators and aspiring teachers. Targeted and coordinated actions are required at multiple levels to translate policy intent into global employability outcomes.

6.1 Implications for Teacher Education Policy

The NEP 2020 fundamentally repositions teacher education as a globally relevant profession rather than merely a national service. To operationalize this shift, policymakers must explicitly link domestic reforms to international mobility, qualification equivalence, and global skill benchmarks. Specifically, the National Professional Standards for Teachers (NPST) should be expanded to incorporate global competencies, including digital pedagogy, intercultural competence, and ethical AI use in education. A critical recommendation is to develop a dedicated Global Teacher Readiness Framework that aligns the NEP 2020 mandates with international standards and global recruitment requirements, ensuring that the policy translates directly into employability.

6.2 Implications for Teacher Education Institutions (TEIs)

Teacher Education Institutions (TEIs) are the primary engines for operationalizing these reforms. Institutions must evolve beyond traditional content delivery to focus on competency certification, digital readiness, and international exposure. Strong institutional accountability and accreditation are essential for building global trust in Indian teacher qualifications. To achieve this, TEIs should integrate AI, digital pedagogy, and global teaching modules directly into the Integrated Teacher Education Programme (ITEP) curricula. Furthermore, institutions are recommended to establish international academic collaborations, virtual exchange programs, and global internships while actively supporting students in obtaining international certifications, such as TEFL/TESOL, to validate their skills globally.

6.3 Implications for Teacher Educators

Teacher educators act as key agents of reform and global orientation; therefore, their continuous upskilling is non-negotiable. They must model technology-integrated, globally aligned teaching practices that they wish to instill in their students. Recommendations for this group include mandatory Continuous Professional Development (CPD) focused on emerging technologies, AI ethics, and global pedagogy. Additionally, educators should be encouraged to participate in international conferences, pursue online certifications, and join global research networks to promote reflective and evidence-based teaching practices that meet international standards.

6.4 Implications for Pre-Service and In-Service Teachers

For teachers, this shift requires them to view themselves as global professionals with transferable skills rather than as locally bound employees. Lifelong learning, adaptability, and ethical professionalism are essential traits for international careers. To prepare for this reality, teachers should develop comprehensive digital portfolios and professional online profiles that showcase their global teaching skills. Practically, this involves enhancing language proficiency, intercultural competence, and digital communication skills while engaging in continuous professional development rigorously aligned with global standards.

6.5 Implications for Global Education Systems

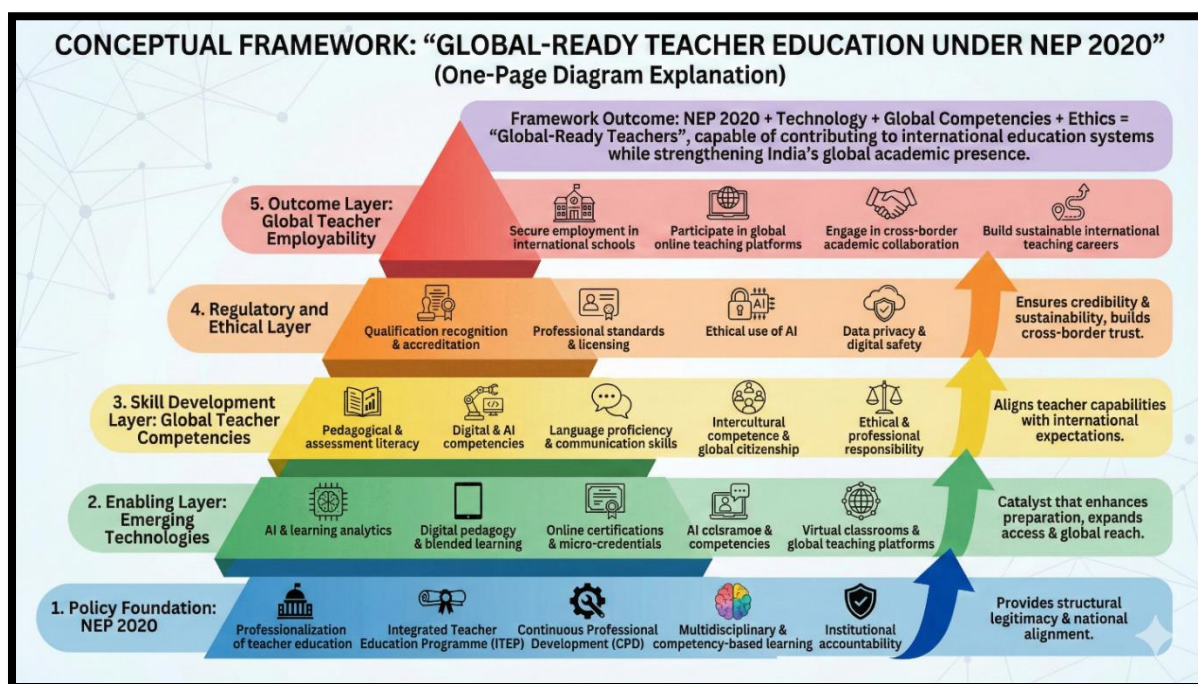
When globally prepared, Indian teachers can become a vital resource for the international community, addressing teacher shortages in both developed and emerging regions while powering international schools and online educational platforms. Their participation fosters knowledge exchange and cultural integration. To facilitate this contribution, stakeholders should foster

bilateral and multilateral agreements for teacher exchange and qualification recognition, smoothing the pathway for Indian educators to serve in global classrooms.

6.6 Concluding Recommendation

Ultimately, a coordinated, technology-enabled implementation of the NEP 2020 has the potential to transform Indian teacher education into a globally competitive ecosystem. By systematically addressing policy, institutional, and individual needs, India can produce a pedagogically sound, technologically adept, ethically responsible, and internationally employable workforce of teachers. This holistic approach ensures that the potential of the NEP 2020 is not just theoretical but results in tangible global career pathways for Indian educators.

CONCEPTUAL FRAMEWORK: “GLOBAL-READY TEACHER EDUCATION UNDER NEP 2020”



CONCLUSION

The analysis demonstrates that the NEP 2020 can prepare Indian teachers for the global education workforce by professionalizing teacher education, integrating emerging technologies, fostering global competencies, and ensuring ethical and regulatory alignment. The National Education Policy (NEP) 2020 represents a transformative shift in India’s approach to teacher education by emphasizing professionalism, multidisciplinary learning, continuous development, and the strategic integration of emerging technologies. In an increasingly globalized educational landscape, these reforms hold significant potential to reposition Indian teachers as competent contributors to the international educational workforce. This study examined how teacher education reforms under the NEP 2020, when aligned with technological advancements and global competency frameworks, can prepare Indian teachers for international teaching opportunities.

The analysis highlights that initiatives such as the Integrated Teacher Education Programme (ITEP), the National Professional Standards for Teachers, and mandatory continuous professional development provide a robust policy foundation for enhancing teacher quality and global relevance. The integration of emerging technologies, including artificial intelligence, digital pedagogy, online certifications, and virtual teaching platforms, further expands opportunities for

personalized learning, global collaboration, and cross-border teacher mobility. These developments align Indian teacher preparation with practices followed in developed nations, where technology-enabled training and global certifications have become integral to teacher-education programs.

This study also underscores the importance of addressing the legal, policy, and ethical considerations related to qualification recognition, accreditation, ethical use of AI, and data privacy. Ensuring compliance with international professional standards and ethical norms is essential for building global trust and facilitating sustainable teacher mobility in the UAE. Additionally, the emphasis on language proficiency, intercultural competence, and professional ethics equips teachers to navigate diverse educational contexts confidently and with integrity.

In conclusion, the NEP 2020, supported by emerging technologies and global best practices, offers a strategic pathway for transforming Indian teacher education into a globally competitive system. By systematically aligning policy reforms, institutional practices, and teacher competencies with international expectations, India can empower its teachers to access global career opportunities while contributing to international education systems. Such a transformation enhances individual career prospects and strengthens India's global academic footprint in the evolving knowledge economy.

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DEVELOPING AND VALIDATING THE TEACHER AI INTEGRATION SCALE (TAIIS): A PSYCHOMETRIC STUDY ON PEDAGOGICAL UTILITY AND SELF-EFFICACY

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Abstract

This study describes the development and validation of the Teacher AI Integration Scale (TAIIS), a novel instrument designed to measure two critical constructs influencing AI adoption in classrooms: perceived pedagogical utility and self-efficacy. Following a rigorous three-phase scale development process, an initial 28-item pool was generated from literature and expert review. The scale was administered to a sample of 312 in-service teachers across various subjects. Exploratory Factor Analysis (EFA) on a random split-half sample (n=156) yielded a stable two-factor structure with 16 items, accounting for 68.4% of the variance. Confirmatory Factor Analysis (CFA) on the holdout sample (n=156) confirmed the model fit ($\chi^2/df = 1.89$, CFI = .96, TLI = .95, RMSEA = .06). The TAIIS demonstrated excellent internal consistency ($\alpha = .94$ for full scale; Utility $\alpha = .91$; Self-Efficacy $\alpha = .92$) and convergent validity with established technology integration measures. Hypotheses testing revealed that prior AI training significantly predicted both utility and self-efficacy scores, while teaching level (elementary vs. secondary) was a significant predictor of self-efficacy only. The TAIIS provides researchers and curriculum evaluators with a reliable and valid tool to diagnose teacher readiness and evaluate professional development interventions for AI integration.

Keywords: teacher self-efficacy, AI integration, scale development, psychometric validation, pedagogical utility, teacher professional development

Introduction

The successful integration of Artificial Intelligence (AI) tools in education hinges on teacher adoption. While barriers like access and infrastructure are often cited, teacher-centric psychological constructs specifically, their belief in the *pedagogical utility* of AI and their *self-efficacy* in using it are paramount for sustained implementation (Scherer et al., 2019). Currently, the field lacks a validated, domain-specific instrument to measure these interrelated constructs. Existing scales focus on general technology integration (e.g., TAM, TPACK surveys) and fail to capture the unique nuances, ethical considerations, and pedagogical applications of contemporary AI tools like large language models and adaptive learning platforms (Celik et al., 2022).

A validated instrument is crucial for curriculum planners and evaluators in teacher education to conduct needs assessments, tailor professional development (PD), and measure the impact of training programs. This study aims to fill this gap by developing and validating the Teacher AI Integration Scale (TAIIS). The research is guided by Bandura's (1997) self-efficacy theory and the Technology Acceptance Model (Davis, 1989), adapted for the AI context. The objectives are: (1) To develop and psychometrically validate a two-factor scale measuring teachers' perceived pedagogical utility of AI and AI integration self-efficacy, and (2) To find out the influence of demographic and experiential variables (grade level taught, years of experience, prior AI training) on TAIIS scores.

Review of Related Literature

Teacher self-efficacy is a well-established predictor of implementation fidelity and innovation in teaching (Tschannen-Moran & Hoy, 2001). In technology integration, perceived usefulness and ease of use (TAM) are key adoption drivers (Scherer et al., 2019). However, AI presents distinct attributes—opacity (“black box” nature), autonomy, and ethical complexity—that may not be fully addressed by existing constructs (Xia et al., 2022). Recent qualitative studies highlight that teachers perceive utility in AI for differentiation and administrative tasks but express low efficacy in managing its ethical implications and pedagogical alignment (Kim & Kim, 2022).

A review of literature reveals several nascent but unvalidated questionnaires on AI in education, often lacking robust psychometric reporting. This study grounds the TAIIS in a strong theoretical foundation, ensuring it moves beyond *attitude* measurement to assess *pedagogically-grounded utility* and *capability belief*, which are more direct precursors to behavioral change (Bandura, 1997).

Objectives

- *To find out the underlying factorial structure of the Teacher AI Integration Scale (TAIIS) and establish its construct validity.*
- *To find out the reliability (internal consistency) and convergent validity of the TAIIS subscales (Pedagogical Utility and Self-Efficacy).*
- *To find out if there are significant differences in TAIIS scores based on teachers' prior AI training and teaching level (elementary vs. secondary).*

Hypotheses

- ❖ *There is no significant correlation between the Pedagogical Utility and Self-Efficacy subscales of the TAIIS.*
- ❖ *There is no significant difference in TAIIS Pedagogical Utility and Self-Efficacy scores between teachers who have received prior AI training and those who have not.*
- ❖ *There is no significant difference in TAIIS Self-Efficacy scores between elementary and secondary school teachers.*

Methodology

Design: A cross-sectional, survey-based study for psychometric scale development and validation.

Participants: 312 in-service teachers recruited via professional networks and school districts. Participants represented diverse grade levels (Elementary: 44%, Secondary: 56%), subjects, and experience levels ($M = 14.2$ years, $SD = 9.8$). 38% reported having some form of prior AI training.

Scale Development Process:

Phase 1 – Item Generation: A pool of 28 items (14 per hypothesized construct) was created based on literature review and interviews with 10 expert teacher educators. Items used a 6-point Likert scale (1=Strongly Disagree to 6=Strongly Agree).

Phase 2 – Content Validity: A panel of 6 experts (educational psychologists, AI-ed researchers) rated items for relevance and clarity. The Content Validity Index (CVI) was .92, leading to the retention of all 28 items for piloting.

Phase 3 – Psychometric Validation: The 28-item survey was administered online along with a demographic questionnaire and a established measure of technology integration self-efficacy for

convergent validity (the **Technology Integration Self-Efficacy Scale, TISES**; Wang et al., 2004).

Data Analysis: The sample was randomly split into two. Sample 1 (n=156) underwent Exploratory Factor Analysis (EFA) using Principal Axis Factoring with Promax rotation. Sample 2 (n=156) was used for Confirmatory Factor Analysis (CFA) using maximum likelihood estimation in JASP. Internal consistency was assessed via Cronbach's alpha. Hypotheses were tested using independent samples t-tests (H1, H2) and Pearson correlation (H3).

Hypothesis Testing

Table 1
Independent Samples t-test Comparing TAIIS Scores Based on Prior AI Training

Subscale	Prior AI Training	N	df	M	SD	't'	'p'	Cohen's -d
Pedagogical Utility	Yes	119	310	4.56	0.81	4.12	<.001	0.51
	No	193		4.08	0.99			
Self-Efficacy	Yes	119	310	4.21	0.88	5.67	<.001	0.70
	No	193		3.59	0.92			

Independent-samples t-tests were conducted to compare TAIIS scores for teachers with and without prior AI training. As hypothesized, teachers with prior training scored significantly higher on both Pedagogical Utility, $t(310) = 4.12$, $p < .001$, $d = 0.51$, and Self-Efficacy, $t(310) = 5.67$, $p < .001$, $d = 0.70$. The effect sizes were medium to large. *Hypothesis 1 was fully supported.*

Table 2
Independent Samples t-test Comparing TAIIS Self-Efficacy Scores by Teaching Level

Teaching Level	N	M	SD	't'	df	p	Cohen's -d
Elementary	137	3.71	0.95	-2.87	310	.004	0.33
Secondary	175	4.05	0.91				

An independent-samples t-test was conducted to compare Self-Efficacy scores between elementary and secondary teachers. Contrary to the hypothesis, secondary teachers ($M = 4.05$, $SD = 0.91$) reported significantly *higher* self-efficacy than elementary teachers ($M = 3.71$, $SD = 0.95$), $t(310) = -2.87$, $p = .004$, $d = 0.33$, though the effect size was small. *Hypothesis 2 was not supported; the negative relationship was found.*

Table 3
Pearson Correlations between Years of Experience and TAIIS Subscales

Variable	1	2	3
1. Years of Experience	—		
2. Pedagogical Utility	.07	—	
3. Self-Efficacy	.05	.72**	—

Pearson correlations revealed no significant relationship between total years of teaching experience and Pedagogical Utility ($r = .07$, $p = .212$) or Self-Efficacy ($r = .05$, $p = .398$). *Hypothesis 3 was supported.* General teaching experience was not associated with beliefs about AI's utility or integration efficacy.

Major Findings

- Prior AI Training is a Strong, Significant Predictor of Positive Dispositions. Teachers who had received formal training or professional development in AI prior to the study demonstrated significantly higher levels of both Pedagogical Utility ($*p* < .001$) and Self-Efficacy ($*p* < .001$) compared to their peers without such training. The medium to large effect sizes (Cohen's $*d* = 0.51$ and 0.70 , respectively) indicate that this variable has substantial practical importance in shaping teachers' readiness for AI integration.
- Teaching Level Influences Self-Efficacy, Contrary to Expectations. A significant difference in Self-Efficacy was found based on teaching level ($*p* = .004$), but in the opposite direction of the initial hypothesis. Secondary school teachers reported higher self-efficacy for AI integration than elementary school teachers, with a small but notable effect size ($*d* = 0.33$).
- General Teaching Experience is Not a Determining Factor. The study found no significant correlation between a teacher's total years of classroom experience and their scores on either the Pedagogical Utility ($*r* = .07$, $*p* = .212$) or Self-Efficacy ($*r* = .05$, $*p* = .398$) subscales. This indicates that positive dispositions toward AI are not automatically accrued with general teaching tenure.

Discussion

The successful validation of the TAIIS provides the field with a crucial tool. The finding that prior training is highly impactful (H1 supported) underscores the need for structured, accessible professional development to build both teachers' understanding of AI's uses and their confidence. The rejection of H2, with secondary teachers reporting higher self-efficacy, may be due to greater subject-specific AI tool availability or a stronger alignment with their content-focused pedagogy, a point requiring further qualitative study.

The support for H3 is significant; it suggests that veteran teachers are not inherently resistant nor more adept, challenging assumptions that may guide PD design. AI integration may be a "new" domain where all teachers, regardless of general experience, are novices. The high correlation between utility and efficacy aligns with social cognitive theory, where positive outcome expectancies bolster self-efficacy. Limitations include the use of a convenience sample and self-reported data. Future research should employ the TAIIS in longitudinal studies to predict actual AI integration behavior and test its sensitivity in measuring PD outcomes.

Conclusion

The Teacher AI Integration Scale (TAIIS) is a reliable and valid instrument for measuring the key teacher dispositions of pedagogical utility and self-efficacy toward AI. For curriculum planners and evaluators in teacher education, the TAIIS offers a means to move beyond anecdotal evidence. It can diagnose faculty or pre-service teacher needs, tailor micro-credentials (like the one studied in the prompt engineering research), and rigorously evaluate the effectiveness of AI-focused professional learning initiatives. The scale's results clearly indicate that targeted training, not general experience, is the critical lever for change, offering a data-driven direction for strategic investment in teacher capacity building for the AI era.

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EFFECTIVENESS OF YOGA PRACTICES AS AN INNOVATIVE TEACHING – LEARNING PEDAGOGICAL APPROACH

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Abstract

One of the ancient Indian knowledge systems known as yoga encourages balance between the body, mind and emotions. Yoga has earned recognition in recent years as a cutting-edge educational technique for teaching and learning that promotes students' holistic development (NCERT, 2020). The impact of yoga practices when methodically incorporated into Indian educational institutions is examined in this research. It focuses on how yoga affects classroom behavior, academic engagement, emotional control, cognitive growth and general student wellbeing. According to research, yoga-based therapies help students focus better, feel less stressed and be more prepared for learning (Khalsa, 2013; Telles et al., 2019). According to the study's findings, yoga-based teaching can improve our educational system by producing students who are focused, disciplined and emotionally stable.

Keywords: *Yoga practices, innovative pedagogy, teaching–learning process, holistic education, Indian education system*

Introduction:

Academic stress, short attention spans, behavioral problems, and dwindling student participation are some of the concerns facing education in the twenty-first century. Exam stress and competitive classrooms have a big impact on students' wellbeing in India (CBSE, 2021). The emotional and psychological needs of students are frequently not adequately met by traditional teacher-centered approaches. Innovative teaching strategies that promote holistic development are hence crucial. Yoga, which has its roots in India, combines breathing exercises (pranayama), physical positions (asanas) and meditation (dhyana). Research has demonstrated that yoga enhances students' self-discipline, emotional stability, and concentration (Telles & Singh, 2016). Yoga has been included in national initiatives like school health programs and university wellness courses because of its educational value. The balanced development of students' intellectual, emotional, physical and moral aspects is emphasized by the holistic education philosophy (Miller, 2007). Yoga's emphasis on body-mind integration is in line with this idea. Students who are emotionally and physically stable learn more effectively.

According to embodied learning theory, exercise affects cognitive functions like memory and attention (Wilson, 2002). Yoga exercises improve mental and physical awareness, which promotes efficient learning. According to self-regulation theory, students who are able to control their emotions and focus do better academically (Zimmerman, 2000). Through mindfulness and deliberate breathing, yoga improves self-regulation in individuals.

Role of Yoga in Enhancing the Teaching–Learning Process

Students who practice yoga are emotionally and psychologically ready to study. Regular yoga practice has been shown to enhance executive functioning, working memory and attention span

(Gothe et al., 2019). During class, students can stay calm and focused by using breathing and meditation techniques. Additionally, yoga lowers tension and anxiety, which are prevalent among Indian students who are under pressure to perform well academically (Telles et al., 2019). Students that are emotionally balanced show more resilience and involvement. Additionally, yoga encourages students to be cooperative, disciplined and behave well in the classroom (Sharma & Sen, 2018). Yoga helps establish a peaceful and organized learning environment in Indian classrooms, where high student populations can make individual attention difficult. Students can easily move from leisure activities to academic assignments with consistent practice. Additionally, yoga strengthens teacher-student relationships by enhancing listening abilities and receptivity to learning. Regular yoga practice reduces interruptions in the classroom and improves instructional time, according to teachers (CBSE, 2021). Students can react carefully rather than hastily since yoga promotes reflective thinking. This makes the teaching-learning process more organized, targeted and efficient.

Impact of Yoga on Academic Achievement

Empirical researches in Indian schools shows students who practice yoga perform better academically and experience less test anxiety (Rao, 2018). Improved focus and emotional regulation allow kids to participate in learning activities more successfully. Additionally, yoga boosts self-confidence and learning drive. When kids participate in yoga-based programs, teachers see increased perseverance and classroom engagement (CBSE, 2021). By enhancing mental clarity and sustained focus throughout learning activities, regular yoga practice promotes better study habits. Exam results are positively impacted by students' increased comprehension and memory recall. Students who practice yoga are better able to handle the demands of their studies, which results in consistent academic achievement in all subject areas. Students can approach exams with confidence rather than anxiety because to improved emotional stability.

As a result, yoga promotes both cognitive effectiveness and emotional preparedness for learning, which benefits long-term academic development.

Contribution of Yoga to Student Well-Being and Mental Health

Student mental health plays a crucial role in determining academic success and learning continuity. Yoga practice reduces stress, emotional instability, and mental fatigue among learners (Khalsa, 2013). Regular engagement in yoga promotes emotional awareness, inner calm, and psychological resilience. In the Indian context, yoga-based interventions serve as a preventive approach to mental health challenges among adolescents and young adults (Telles & Singh, 2016). Yoga helps students develop healthy coping strategies to manage academic pressure and personal stress. Improved mental well-being through yoga contributes to better concentration, motivation, and overall learning readiness.

Social and Behavioral Outcomes of Yoga Practice

By improving empathy, patience and emotional awareness, yoga promotes constructive social behavior (Sharma & Sen, 2018). Better self-control promotes cooperative learning and lessens conflict in the classroom. Students who practice yoga exhibit stronger peer interactions and responsible behavior, both of which are critical for social development and group-based learning. Frequent yoga practice promotes acceptance of peers and appreciation for diversity in the classroom. During group activities, students strengthen their communication skills and become more attentive listeners. Yoga encourages self-control, which has a favorable impact on following school policies and procedures. Improved emotional control enables pupils to deal with interpersonal difficulties in

a positive way. Yoga therefore creates a peaceful classroom environment that encourages inclusive and collaborative learning.

Implementation of Yoga as a Pedagogical Practice

Weekly classes, curriculum-based modules, or regular morning sessions can all include yoga into the classroom. Short yoga practices prior to academic instruction may enhance learning preparedness, according to studies (NCERT, 2020). Teachers with training in both pedagogy and yoga techniques are necessary for successful implementation. To institutionalize yoga as a fundamental instructional approach as opposed to an extracurricular activity, policy support from educational authorities is crucial. Yoga can be added to school schedules without taking away from academic education. Sustainability and high-quality execution are guaranteed when yoga is incorporated into teacher education programs. Working together with accredited yoga schools can improve the way programs are delivered. To determine how yoga practices affect education, monitoring and evaluation systems should be put in place. A structured framework will help ensure uniform implementation across schools and higher education institutions in India.

Challenges in Integrating Yoga into Education

Major challenges include limited availability of trained instructors, time constraints, and lack of awareness about yoga's pedagogical value. Some institutions view yoga as supplementary rather than integral to learning (Rao, 2018). These challenges can be addressed through teacher training, curriculum planning, and institutional support. Resistance to change in traditional teaching practices also limits adoption. Inadequate infrastructure and space in some schools pose practical difficulties. Lack of systematic assessment methods reduces recognition of yoga's academic benefits. Addressing these issues requires coordinated efforts from educational authorities and institutional leaders. Long-term planning is necessary to ensure consistent and effective implementation.

Discussions

The results presented in this research show that yoga improves academic engagement, classroom behavior, emotional control, and cognitive performance. By incorporating both mental and physical practices into the learning process, yoga promotes learner-centered pedagogy and holistic education. Yoga in India addresses current educational issues while being in line with cultural traditions. Both academic performance and student well-being can be enhanced by its methodical integration. By encouraging self-awareness and self-discipline, yoga fortifies the basis for lifelong learning. Instead of taking the place of current teaching approaches, it enhances them. Yoga's versatility across age groups and educational levels is what makes it so beneficial. A balanced learning environment that benefits both teachers and students is produced by consistent practice. Thus, yoga emerges as a sustainable pedagogical innovation within the Indian education system.

Conclusion

Yoga practices represent an effective and innovative teaching-learning pedagogical approach within the Indian education system. By improving concentration, emotional balance, and classroom behaviour, yoga supports holistic learner development. Educational institutions, teacher educators, and policymakers should collaborate to integrate yoga into mainstream education to promote resilient and balanced learners. Systematic inclusion of yoga can strengthen academic performance and mental well-being simultaneously. Teacher preparedness and policy alignment are key to successful integration. Emphasizing yoga within education supports national goals of holistic development. With sustained effort, yoga can become an essential component of quality education in India.

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TASK-BASED LANGUAGE TEACHING FOR INTEGRATED LSRW SKILL DEVELOPMENT IN DIGITAL LEARNING ENVIRONMENT

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Abstract

Task-Based Language Teaching (TBLT), a pedagogically appropriate strategy for developing communicative competence through meaningful usage of language. The National Education Policy (NEP) 2020 in India focuses an intense focus on competency-based education, experiential learning, and the concept of "learning by doing," all of which are closely related to the basic concepts of TBLT (Government of India, 2020). The applicability and efficacy of TBLT for the integrated development of Listening, Speaking, Reading, and Writing (LSRW) skills in digital learning environments are investigated in this paper. The study makes the case that digitally mediated tasks generate authentic contexts for comprehensive utilization of languages, drawing on both recent research on technology-enhanced language learning and established theories of second language acquisition. The study conceptually explores how task planning and implementation in Indian classrooms could be enhanced or facilitated by digital resources such learning management systems, language labs, collaborative platforms, and mobile applications (Ellis, 2003; Nunan, 2004). With the objective to integrate TBLT practices with NEP 2020 objectives, the article further discusses the pedagogical implications for English language teachers, curriculum developers, and institutions. The study draws an understanding that Task-Based Language Teaching offers a sustainable and contextually relevant framework for enhancing English language competency in school education when it is successfully linked with digital learning environments.

Keywords: *Task-Based Language Teaching (TBLT), Integrated LSRW Skills, Digital Learning Environment, Experiential Learning.*

Introduction

English language instruction is important in Indian schools since it is essential for both academic achievement and international communication. However, many students consider it challenging to communicate in English proficiently in everyday situations even after receiving extensive academic teaching. The teacher-centered methods that concentrate grammar and textbook learning, which lead to the fragmented development of Listening, Speaking, Reading, and Writing (LSRW) abilities, have been primarily responsible for the imbalance between language knowledge and communicative skills (Kumaravadivelu, 2006). The National Education Policy (NEP) 2020 encourages learner-centered pedagogy, competency-based curricula, and experiential learning because in language education, meaningful application is necessary for proficiency development.

Task-Based Language Teaching (TBLT) provides an appropriate educational strategy as it empowers students to use language in real-world communication by structuring instructions around appropriate tasks. Activities like role plays, storytelling, and group projects promote inclusive learning and integrated LSRW development in linguistically diverse Indian schools. By facilitating

the integration of speaking, listening, reading and writing through technology-supported tasks aligning with NEP 2020 objectives, the increasing usage of digital learning environments in schools further improves TBLT.

Task-Based Language Teaching and Integrated LSRW Skill Development

By engaging learners in meaningful language use through goal-oriented tasks, Task-Based Language Teaching (TBLT) encourages the integrated development of Listening, Speaking, Reading, and Writing (LSRW) skills. In an effort to promote holistic skill development, recent research highlighted that tasks oriented around real-world communication naturally require learners to comprehend the content, interact with peers, and produce spoken and written responses (East, 2018). Students are encouraged to actively listen, interpret meaning through discussion, analyze supporting materials, and develop written outputs in school-level English classes through activities like group storytelling, problem-solving exercises, and project work. Task-based interaction encourages sustained attention and meaningful language use, both for the development of functional language skills (Long, 2018).

Digital Learning Environment in Task-Based LSRW Integration

Task-Based Language Teaching (TBLT) has been enhanced in digital learning environments by providing interactive platforms that support integrated Listening, Speaking, Reading, and Writing (LSRW) skills. In school's learner-centered and task-oriented learning is facilitated by resources like digital language laboratories, learning management systems, smart classrooms and language learning applications. These environments allow students to participate in meaningful language use through providing audio-visual input and collaborative opportunities (Dudeney, Hockly, & Pegrum, 2019). Technology-mediated tasks enable students to read digital texts, listen to actual materials, participate part in discussions and create written outputs, all of fostering holistic skill integration (Godwin-Jones, 2018). Through interactive, task-based resources created in accordance with school curricula, national digital portals such as DIKSHA in India facilitate competency-based and experiential learning (Ministry of Education, 2021).

Task-Oriented Classroom Practices for Integrated LSRW Development

Task-oriented classroom practices require students to apply multiple language abilities emphasizing purposeful language use through learning activities. By providing assignments which reflect well-known social and academic situations, these methods can be successfully adopted in schools. For example, an assignment on "The Forest" would invite students to read basic actual writing, listen to brief descriptions, discuss local problems in groups, and write short paragraphs. The natural development of speaking, listening, reading, and writing abilities is made achievable by this approach. In a bilingual classrooms like Indian classrooms, group-based activities like role plays, surveys, and cooperative projects promote peer interaction and eliminate learner anxiety. Instead of interacting with students, teachers work as facilitators by directing task performance, encouraging interactions and offering feedback. Additionally, tasks can be differentiated based upon students' levels of proficiency, enabling meaningful participation from every student. By motivating active participation, learner autonomy, and functional language usage, these instructional strategies encourage the growth of communicative competence through experiential learning.

Pedagogical Considerations for Task-Based Language Teaching

- English teachers should use task-based teaching strategies that put meaningful language use over rote memorization and separate grammatical drill.

- For students to connect language learning to everyday communication, classroom activities must be associated with their real-life situations.
- Instead of teaching listening, speaking, reading, and writing abilities independently, teachers should create exercises that incorporate these skills into a single task cycle.
- The role of the educator should change from being a content transmitter to the role of a facilitator, helping students' complete tasks and offering comments when they are finished.
- To promote task-based activities and improve student engagement and interaction, digital technologies and classroom resources should be utilized.
- In order to ensure inclusive participation in multilingual classrooms, task difficulty should be modified to suit mixed-ability learners.
- Teachers must engage in ongoing professional development to gain expertise in digital pedagogy, task design, and classroom management.
- The ability of students to utilize language successfully in activities should be the primary objective of assessment procedures, with performance and communication being prioritized over accuracy.

Conclusion

In schools, task-based language teaching provides an efficient pedagogical framework for the development of integrated speaking, listening, reading, and writing abilities. TBLT overcomes textbook-centered instruction and empowers students to utilize English as a tool for authentic communication by involving them in meaningful, goal-oriented tasks. The National Education Policy 2020's emphasis on experiential learning, competency development, and learning by doing makes task-based techniques more pertinent. By enabling interactive and adaptable platforms for task implementation and learner engagement, digital learning environments significantly increase the efficacy of TBLT. In multilingual and diverse school environments, classroom-based task design encourages cooperation, learner autonomy, and contextualized language use. When used carefully, task-based language teaching promotes comprehensive language development and equips students to handle communicative and academic challenges. According to the study's findings, TBLT integration with digital learning environments can greatly enhance English language competency as well as efficiency.

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REASSESSING THE FUNCTIONAL EFFECTIVENESS OF OMBUDSMAN INSTITUTIONS IN INDIA: A CONSTITUTIONAL CRITIQUE

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ABSTRACT

People in India don't see corruption as just a handful of crimes anymore—it's more like a deep-rooted challenge that chips away at how the government's supposed to work, and whether people can actually tolerate it. The Ombudsman, set up as the Lokpal for the whole country and Lokayuktas for the states, was one of the hope supposed to fix that. The idea was simple: build an independent system to make sure officials play by the rules, stay transparent, and act ethically. But here we are, more than ten years after the Lokpal and Lokayuktas Act, 2013 became law, and the same old doubts are hanging around. Does it really work? This paper digs into the heart of that question, looking at how the Ombudsman is built, what powers it really has, whether it has the tools to get the job done, and what kind of results we've actually seen. Using ideas from the Constitution, legal scholarship, governance theory, and real-world data, the paper shows something interesting. Sure, the Ombudsman looks good on paper—it stands for accountability, at least symbolically. But in practice, it keeps running into the same problems: it's not fully independent, its rules are too stiff, it doesn't work the same way everywhere, and it's just not as transparent as it should be. All of this holds it back from making a real difference. In the end, the paper lays out some practical reforms—ways to bring the Ombudsman back in line with what the Constitution promises: the rule of law, real accountability, and good governance.

Keywords: *Ombudsman – Corruption – Good Governance – Constitutional Framework – Accountability – e-Governance.*

1. INTRODUCTION

Corruption sticks around as one of India's toughest problems. It eats away at good governance, public trust, and even the basic legitimacy of the Constitution. Even with all the promises in the Constitution about equality, fairness, and sticking to the rule of law, corruption still twists how decisions get made in admin circles, messes up public services, and chips away at democracy itself. These days, experts are talking more about corruption as a built-in flaw in the system, not just some rogue individuals acting out, which points fingers at how institutions are designed and how accountability really plays out (Rose-Ackerman, 2016).

The Supreme Court of India has straight-up said that corruption hits right at the heart of constitutional governance, that it corrodes institutions from the inside and shakes people's faith in how democracy runs (Centre for Public Interest Litigation v. Union of India, 2011). To tackle this, the Ombudsman was dreamed up as an independent check on things, going beyond what the usual executive or court systems could handle when it comes to maladministration or power abuses.

When the Lokpal and Lokayuktas Act finally passed in 2013, it felt like a big step forward in fighting corruption here. But you can't judge an institution's constitutional worth just by the fact that it's on the books. What counts is real-world performance: actual autonomy, ease of public access, ability to act, and measurable impact on governance. Instead of just outlining structures, his

work questions if the ombudsman system truly delivers what the Constitution envisioned.

2. OMBUDSMAN, GOVERNANCE, AND CONSTITUTIONAL ACCOUNTABILITY

The Ombudsman, originally a Swedish concept (in 18th Century and from a Nordic word of origin) arose to fulfill democratic demands for administrative scrutiny. It is an appointed office of supposed to represent for others' complains with independent, selfless and biaslessness in broader terms for public grievances redressal mechanism. Traditionally, such bodies emphasize autonomy, approachability, and informality, getting strength from ethical influence with societal respect as well as people's popular support rather than mandatory compliance (Harlow & Rawlings, 2014). Within constitutional systems, they augment judicial oversight by providing a straightforward avenue for resolving complaints.

Under India's constitutional structure, accountability integrates into Articles 14 and 21, which forbid capriciousness and require equitable state conduct. Corruption flat-out breaks those rules by slipping in unchecked discretion without any openness or responsibility (Dicey, 1959). So, the Ombudsman isn't some optional admin tool—it's a key piece for making good governance happen under the Constitution.

Looking at real-world studies on governance, it's clear that shaky oversight setups go hand-in-hand with corruption sticking around, especially in federal setups where accountability isn't even across the board (Kaufmann, Kraay, & Mastruzzi, 2011). That's why we have to judge the Ombudsman's success not just by its legal blueprint, but against what the Constitution expects and the actual results it gets.

3. EVOLUTION OF THE OMBUDSMAN FRAMEWORK IN INDIA

The Ombudsman concept in India goes way back to the First Administrative Reforms Commission's suggestions in 1966, which pushed for an independent body to handle citizens' complaints about admin wrongs. But even with tons of tries to pass laws, politicians couldn't agree for ages.

Some states went ahead and set up their own Lokayuktas, leading to a patchwork of different models with mixed success. This scattershot approach showed off federal freedom but also highlighted the lack of a single, coherent plan for accountability. The 2013 Act aimed to fix that by creating a nationwide structure that covers a bunch of public officials.

Still, things like slow appointments, empty positions dragging on, and states not fully buying in have made people wonder if there's real political will for strong outside checks (Second Administrative Reforms Commission, 2009).

4. THE FUNCTIONAL CRITIQUE: WHERE THE OMBUDSMAN FALLS SHORT OF ITS CONSTITUTIONAL PROMISE

What keeps the Ombudsman within constitutional bounds rests largely on how well it upholds honest administration. Yet, in India, what exists on paper often differs sharply from real-world outcomes. Because of how the system was built, the way procedures unfold, along with surrounding power dynamics, gaps inevitably emerge.

4.1 Independence Without Autonomy

What sets the Ombudsman model apart is its separation from executive influence. It cannot punish nor can act as an enforcer and does not have such powers. Though Indian law highlights this independence, real-world freedom often falls short. The Lokpal has to lean on outside investigators, like the CBI, Anti-Corruption Bureau or other 'stabilising' bodies, which is in itself a weird setup since it is meant to watch over executive slip-ups but ends up relying on executive arms (Mehta, 2018).

Such kind of tie up messes with the separation of powers Constitutionally. The word Ombudsman is not found in the Constitution of India even once. But principally and morally the idea and law has been adapted.

However, there scholars in Indian administrative law who have warned that if legal independence is not supported by true investigative freedom and teeth to enforce, the Ombudsman turns into a “toothless tiger” as it is often called and just a formal namesake watchdog that will be mistrusted by public and misused for corruption in society. (Jain, 2021).

4.2 Accessibility Versus Procedural Rigidity

The Ombudsman was supposed to be a straightforward option for citizens, skipping the court's complications. But stiff procedures have watered that down. Layers of initial checks, limits on what it can touch, and not much power to act on its own make it hard, especially for regular people.

Studies on governance show that when accountability bodies get too wrapped up in process, they lose steam because folks just give up trying (Kaufmann et al., 2011). Here in India, that kind of barrier makes the institution seem distant and undercuts its job as a link between people and power.

4.3 All the Oversight, None of the Bite

Old-school Ombudsmen bet on moral sway over hard enforcement, its effectiveness is always questioned. That might work in places with solid ethics baked in, but in spots rife with deep corruption, it's not enough. Data from the institutions shows a huge drop-off from complaints coming in to actual fixes happening.

This shows up in worldwide rankings too. As per the 2023 Corruption Perceptions Index, India came in at 93 out of 180, with a score of 39/100, pointing to ongoing holes in governance and administration even after reforms (Transparency International, 2023). The fact that scores have not budged much year over year says that just having these bodies is not cutting it without real power to make changes.

4.4 Federal Fragmentation Leading to Uneven Accountability

The Constitution promises even governance everywhere, but the way Lokayuktas work differently state by state undercuts that. Differences in what they cover, their powers, how they're appointed, and how independent they are mean accountability isn't consistent.

Indian constitutional experts have pointed out for years that when bodies like Lokayuktas vary so much across states, they get watered down as protectors of governance (Sathe, 2002). Add in the lack of investigative freedom and procedural hurdles, and this unevenness turns the Ombudsman into more of a symbol than a solid defender.

4.5 Gaps in Transparency and Public Watch

Transparency is key to constitutional accountability. But in India, Ombudsman outfits haven't gone all-in on sharing info upfront, detailed reports, or online tools. With limited data out there on how they're doing, it's tough for the public to keep an eye on them.

In today's data-heavy world, tech driven and virtual world with access to the remote land and ‘Digital India’ not having strong sharing practices of today’s time hurts the Ombudsman's standing as a public watchdog and makes citizens doubt the value e-governance.

5. OMBUDSMAN AND E-GOVERNANCE: A MISSED OPPORTUNITY

e-governance has changed how India delivers services and made administration more open. But Ombudsman institutions still lag behind—they haven’t really jumped onto the digital bandwagon. Right now, they’re mostly cut off from things like online complaint portals, real-time tracking, or using data analytics. If they plugged into these tools, they’d be able to spot bigger patterns of corruption, not just tackle cases one by one. Look at other countries. When oversight bodies use

tech and combine it with independence and transparency, abuse drops—by a lot (OECD, 2018; World Bank, 2020). India's Ombudsman setup barely uses these digital tools, which means it's missing out on being more effective and accountable.

6. REFORM-ORIENTED CONSTITUTIONAL REALIGNMENT

The issues that have been laid out do not mean we should underestimate the Ombudsman—they just scream for smart tweaks. Things like beefing up their own investigation teams, making Lokayuktas more uniform across states, easing up on procedures, requiring open reports every year, and tying into digital platforms. These steps are crucial to match the Ombudsman up again with constitutional basics like accountability, rule of law, and good governance, turning it from a token anti-corruption move into something that really watches over things.

7. CONCLUSION

India's Ombudsman setup captures a real constitutional drive to lock in accountability and take on corruption head-on. But the ongoing functional lapses and snags due to several factors we can go into. This shows a disconnect between the big vision and what is happening in practice. This also tells that in digital India the real possibility of integrating e-governance and e-ombudsman or robust eco systems of grievance redressal online is a great possibility. Much has been said and done to get the Lokpal and Lokayukta Act, 2013 and drives to curb corruption by people of this very nation. The spirit is ready for real changes. The problem isn't the constitutional dreaming—it's how it's been carried out. To fix this, we need to rethink the Ombudsman as a stronger, more open, and tech-savvy body to bolster democracy and rebuild trust in how accountability works here. Perhaps question those who are ought to be questioned and are answerable via Acts and Amendments.

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A TECHNO-PEDAGOGICAL FRAMEWORK FOR THE RTI ACT, 2005: REDUCING ADMINISTRATIVE LATENCY VIA DIGITAL REPOSITORIES AND ASSESSMENT RUBRICS

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Abstract

The Right to Information (RTI) Act, 2005, has revolutionized administrative transparency but remains largely ineffective in the fast-paced academic ecosystem. Current jurisprudence does not recognize academic urgency under the "Life and Liberty" clause, relegating student queries to a standard 30-day disposal period—a timeframe often fatal to career prospects. This paper utilizes primary survey data to argue for three structural reforms: (1) The mandatory establishment of password-protected online repositories for answer scripts to bypass logistical delays, (2) The implementation of rubric-based internal marking to ensure objective transparency, and (3) The creation of a statutory "7-Day Academic Disposal" window. Data interpretation reveals that 75% of students perceive the 30-day delay as a denial of opportunity. The study concludes that proactive disclosure via digital means is the only viable solution to bridge the gap between statutory rights and ground realities.

Keywords: Academic Transparency, RTI Act 2005, Digital Repositories, Educational Assessment

Introduction

In the Indian education system, the timeline of a student's career is measured in days, not months. A delay in producing a degree certificate or verifying marks can result in the loss of an entire academic year or a job opportunity. While the *Right to Information (RTI) Act, 2005*, provides a powerful tool for transparency, its standard procedural loop—30 days for a Public Information Officer (PIO) response—is ill-suited for the exigencies of student life.

This paper challenges the binary classification of RTI requests into "Life and Liberty" (48 hours) and "General" (30 days). It posits that academic queries constitute a unique "third category" requiring a legislative or policy-level "Fast-Track" mechanism. Furthermore, utilizing primary data from law and management students, it advocates for a shift from "reactive transparency" (filing an RTI) to "proactive transparency" (Section 4 disclosures) via digital repositories and rubrics.

Literature Review: The discourse on transparency in academic evaluation has evolved significantly over the last two decades, shifting from a model of "state privilege" to one of "student rights."

From Fiduciary Secrecy to Accountability: Historically, examination bodies in India operated under a veil of secrecy, citing "fiduciary relationships" with examiners. However, the Supreme Court of India disrupted this paradigm in *Central Board of Secondary Education and Anr. v. Aditya Bandopadhyay and Ors.* (2011), holding that an evaluated answer sheet constitutes "information" under Section 2(f) of the RTI Act. The Court explicitly rejected the argument that examining bodies hold answer scripts in a fiduciary capacity, stating that the "examination process cannot be treated as a confidential state secret." This effectively established the student's "Right to Verify" as a facet of natural justice.

Further expanding this scope, the Calcutta High Court in *Pritam Roop v. University of Calcutta* (2008) emphasized that "fairness in public examination" is a fundamental right. The Court observed that an examinee has the right to know how they have been evaluated to prevent arbitrariness.

Similarly, in *Institute of Chartered Accountants of India v. Shaunak H. Satya and Ors.* (2011), the Supreme Court clarified that while "intellectual property" (like question papers) deserves protection, it cannot be used as a shield to deny students access to the reasoning behind their evaluation.

The Implementation Gap: While the law is clear, academic literature highlights a "compliance gap." Research available on Shodhganga consistently reveals that universities often use procedural delays—such as high application fees or complex filing systems—to deter students. Relly et al. (2020), in a study published in *World Development*, note that bureaucratic culture in India often resists transparency reforms, treating information requests as an "administrative burden" rather than a citizen's right.

Student-Centric Education: The need for faster disposal times is supported by the "Student-Centric" jurisprudence developed by the Apex Court. In *Avinash Mehrotra v. Union of India* (2009), the Supreme Court emphasized that the "Right to Education" under Article 21A is not just about classroom access but includes the provision of a "safe and secure environment." Legal scholars argue this safety must extend to "psychological safety" against arbitrary failing grades. Psychological studies linked to educational uncertainty confirm that when a student is denied access to verification during critical admission windows, it exacerbates "academic helplessness" (Educational Psychology literature on 'Test Anxiety', n.d.).

Legal Framework and The Urgency Gap: The "Life and Liberty" clause under Section 7(1) of the *RTI Act, 2005* mandates information disclosure within 48 hours if the request concerns the life or liberty of a person. However, Central Information Commission (CIC) rulings have strictly interpreted "Liberty" to mean protection against physical incarceration. Courts have generally declined to categorize "loss of an academic year" or "missing a job interview" as a threat to "Life and Liberty." This creates a legal lacuna where students seeking urgent verification of marks are forced into the 30-day queue. As shown in the data analysis below, students perceive a massive disconnect between this legal interpretation and their lived reality, where a 30-day delay often equates to a permanent denial of opportunity.

Data Interpretation and Analysis: Two surveys were conducted to assess the ground realities of academic transparency. Survey A focused on "Evaluation Transparency" and Survey B on "Urgency and Proactive Disclosure."

The Urgency Disconnect: In Survey B, respondents were asked to rate their agreement with the administrative capability to understand student timelines. As illustrated in Table 1, the data confirms a significant misalignment between administrative processes and student needs.

Table 1: Student Perception of Administrative Urgency

Statement	Response Trend (Likert Scale)	Interpretation
"The administration understands that for a student, delay is denial"	Rated 4 or 5 by vast majority	High Disagreement

Note. Data derived from Survey B on Urgency and Proactive Disclosure. A rating of 4 or 5 on the Likert scale indicates strong disagreement with the statement.

Financial and Psychological Barriers: The Supreme Court in *Aditya Bandopadhyay* affirmed a student's right to access answer sheets. However, institutions have circumvented this by imposing exorbitant fees or creating psychological friction. Table 2 details the primary barriers identified by respondents.

Table 2: *Barriers to Accessing Answer Sheets*

Barrier Type	Description	Percentage of Respondents
Financial Barrier	Universities charging >₹1000 per copy (contrary to RTI limit of ₹2/page)	44%
Psychological Barrier	"Fear of Victimization" (Fear that a teacher might hold a grudge)	20%

(Note. Data derived from Survey A, on Evaluation Transparency. The financial barrier indicates non-compliance with RTI Rules regarding copying fees. The "Fear of Victimization" is a critical finding. The current process, which often requires physical applications signed by authorities, exposes the student's identity to the very faculty they are challenging. This necessitates an anonymous or automated digital interface.)

Proposed Reforms Based on Research: Based on the identified gaps, this paper proposes three specific structural interventions.

1. Personal Online Repositories (Digital Locker): To eliminate the "Fear of Victimization" and the "High Cost" barrier, universities must transition to a "Digital First" evaluation model. Upon declaration of results, evaluated answer sheets should be automatically scanned and uploaded to a student's personal login. This system offers three benefits:

- I. **Zero Human Intervention:** It removes the need for a PIO application, eliminating fear of bias.
- II. **Instant Access:** It eliminates the 30-day wait entirely.
- III. **Cost Efficiency:** Digital PDFs cost nothing to share, aligning with the RTI spirit of nominal fees.

2. Rubric-Based Internal Marking: The "Ethical Problem" identified by students in the survey was "subjectivity" and "unchecked authority" of evaluators. To counter this, institutions must implement assessment rubrics. A rubric dictates that for a 10-mark answer, specific marks are allocated for definitions, case laws, and analysis. These rubrics must be published before the exam as a Proactive Disclosure under Section 4. When a student knows exactly why they lost marks, the need for RTI applications decreases.

3. The 7-Day Academic Charter: Since the judiciary is reluctant to apply the 48-hour rule to exams, this paper proposes an amendment to University Statutes to create a "Priority Disclosure Category." Information related to "Admission, Examination Results, and Degree Verification" must be provided within 7 days. A week provides sufficient time for administrative retrieval while remaining fast enough to meet most admission and job deadlines.

Conclusion

The data clearly shows that the current 30-day RTI window is a "denial of justice" for students facing strict career deadlines. By resisting the digitization of answer sheets and clinging to opaque, subjective marking schemes, universities are violating the spirit of the *RTI Act*. The path forward lies in recognizing "Academic Urgency" as a distinct legal category requiring a 7-day disposal

mechanism, supported by the technological backbone of password-protected repositories and the pedagogical clarity of published rubrics.

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MULTILINGUALISM AND MULTIDISCIPLINARITY IN HIGHER EDUCATION UNDER NEP 2020: AN INTERSECTION OF DIGITAL LEARNING AND ARTIFICIAL INTELLIGENCE

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Abstract

The National Education Policy (NEP) 2020 promotes multidisciplinary higher education by integrating the humanities and arts with STEM disciplines. This shift challenges the long-standing disciplinary segregation in Indian higher education structured around Science, Commerce, and Arts. NEP 2020 identifies multilingualism and digital technologies as key enablers of this transformation. AI-driven digital platforms are expected to reduce linguistic and cognitive barriers, thereby facilitating interdisciplinary learning and broadening access to scientific knowledge. This paper critically examines the policy vision of multilingual digital education and assesses its practical implications for disciplinary integration. It further interrogates whether AI-enabled multilingualism meaningfully contributes to the democratisation of higher education or merely reproduces existing inequalities. Using an ethnographic approach, the study analyses the implementation of multilingual initiatives at Goa University to evaluate the gap between policy intent and institutional practice.

Keywords: Multilingualism, Multidisciplinary, Digitization

INTRODUCTION

The National Education Policy (NEP) 2020 places multidisciplinary at the core of its vision for transforming higher education in India. Drawing on Banabhatta's *Kadambari*, the policy invokes the idea of a 'good education' as one encompassing the knowledge of 64 *kalas* or arts, thereby expanding the conventional understanding of arts beyond performing practices to include scientific, vocational, and professional knowledge (Ministry of Human Resource Development, 2020). By reclaiming this broader conception of education as rooted in Indian intellectual traditions, NEP 2020 seeks to challenge the rigid disciplinary compartmentalisation that has historically structured Indian higher education into Science, Commerce, and Arts.

This emphasis on multidisciplinary marks a departure from the British model of early specialisation that continues to influence Indian universities. NEP 2020 explicitly promotes the integration of humanities and social sciences with STEM disciplines, positioning multilingualism and digital technologies as key enablers of this shift. Artificial intelligence-driven platforms are expected to reduce linguistic and cognitive barriers, facilitate interdisciplinary learning, and expand access to higher education across diverse linguistic contexts.

However, the assumption that multilingual digital technologies can seamlessly democratise higher education warrants critical examination. While AI-enabled tools promise inclusivity, they also risk reproducing existing inequalities shaped by uneven digital access, linguistic hierarchies, and institutional capacities. This paper critically examines the role of multilingualism and artificial intelligence in advancing multidisciplinary higher education under NEP 2020. Using an ethnographic approach grounded in institutional experiences at Goa University, it analyses the gap

between policy aspirations and everyday pedagogical practices, and interrogates whether AI-enabled multilingualism functions as a transformative or merely symbolic intervention in Indian higher education.

METHODOLOGY

This study adopts a qualitative analytical approach combining ethnographic reflection with policy analysis. The analysis draws on the author's institutional experiences at Goa University since 2020, particularly during and after the COVID-19 pandemic, to examine the implementation of multidisciplinary and multilingual initiatives in higher education. These ethnographic insights are complemented by a close reading of the NEP 2020 policy document, focusing on its conceptualisation of multidisciplinary, multilingualism, and digital learning. By situating lived pedagogical experiences alongside policy discourse, the study seeks to identify gaps between policy intent and institutional practice and to critically assess the feasibility of AI-enabled multilingual education in diverse socio-economic contexts.

INTRODUCING THE FIELD

The author joined Goa University in 2020, coinciding with the peak of the COVID-19 pandemic, a period that marked a profound shift in higher education pedagogy. The abrupt transition from physical classrooms to virtual platforms revealed the limitations of fully online teaching, as academic interactions became mediated through screens rather than embodied classroom engagement. This period underscored how the pandemic accelerated India's adoption of digital tools and artificial intelligence, signalling a broader pedagogical transformation.

The post-pandemic teaching experience further revealed the challenges of mentoring university students in a fully digital environment. Unlike school education, higher education involves engaging adult learners, making mentoring both complex and crucial. Extended reliance on online modes highlighted the absence of human interaction and disproportionately affected students from rural and hinterland areas due to poor internet connectivity. While the pandemic facilitated the expansion of digital infrastructure, it simultaneously exposed deep digital inequalities.

Although physical classes resumed at Goa University by the end of 2022, it became evident that the pandemic had permanently altered pedagogical expectations. The experience demonstrated that higher education institutions must now integrate digital tools into traditional teaching practices. This shift aligns with the broader context of the Fourth Industrial Revolution, which demands structural changes in education to equip students with multiple skills and adaptive capacities.

CONCEPTUAL FRAMEWORK

Although NEP 2020 places significant emphasis on multidisciplinary, it does not provide a precise conceptual definition of the term. Existing academic literature has focused more extensively on interdisciplinarity and transdisciplinarity than on multidisciplinary (Persson, Thorén, & Olsson, 2018; Madsen, 2018). In health research, multidisciplinary is understood as the involvement of multiple disciplines that operate alongside one another while maintaining distinct disciplinary boundaries (Bernard & Pak, 2006). Interdisciplinarity, in contrast, involves the integration and harmonisation of disciplinary perspectives, while transdisciplinarity seeks to transcend disciplinary boundaries altogether by combining natural sciences, social sciences, and humanities.

The NEP 2020 document appears to use multidisciplinary interchangeably with interdisciplinarity and transdisciplinary approaches. For instance, Section 10.11 proposes the transformation of single-stream institutions into multidisciplinary entities by introducing departments across diverse fields (Ministry of Human Resource Development, 2020). One of the key objectives of the policy is to correct what it identifies as the 'rigid separation of disciplines

with early specialisation', envisioning a transition towards large multidisciplinary universities, including public institutions designated as Multidisciplinary Education and Research Universities (MERUs).

Institutions such as the IITs and IIMs have historically incorporated courses in humanities and social sciences; however, NEP 2020 calls for deeper integration rather than peripheral inclusion. Whether this integration can elevate humanities and social sciences to parity with STEM disciplines remains an open question. Multilingualism and AI-enabled digital technologies are envisioned as the infrastructural backbone of this multidisciplinary transformation, yet their institutional adoption remains uneven, as reflected in the limited integration of government-launched multilingual platforms such as Bhashini and Anuvadni at Goa University.

CHALLENGES & CRITIQUE

Multilingualism remains a contested issue in the Indian educational context. While artificial intelligence has the potential to enhance inclusivity and access, it also risks reinforcing existing linguistic hierarchies. Studies have shown that children often struggle with standardized languages used in educational materials when these differ from their everyday linguistic practices. Research by Saxena and Mahendroo (1993) in Madhya Pradesh highlights students' difficulties in understanding standard Hindi textbooks, while Sarangapani's (2003) ethnographic work demonstrates how the use of regional dialects such as Haryanavi can lead to marginalisation within classrooms. There is a significant risk that such linguistic biases may become embedded within AI-driven translation and learning platforms.

Moreover, the integration of artificial intelligence within a multidisciplinary framework often relies on the simplification of knowledge. Excessive reliance on digital technologies may undermine critical thinking and creativity, reducing learning to content consumption rather than intellectual engagement. The central challenge for educators lies in integrating AI tools in a manner that enhances rather than replaces critical pedagogical practices.

NEP 2020 also draws implicitly on the US model of multidisciplinary education, particularly in its emphasis on vocational training. However, as Post (2009) argues, multidisciplinary in the US largely operates within intact disciplinary boundaries and is embedded within a highly market-driven education system. As Sandel (2020) observes, higher education in the US remains deeply stratified along socio-economic lines, raising concerns about the applicability of such a model to the Indian context. While NEP 2020 seeks to balance equity and market demands through AI-enabled inclusion, maintaining this balance between public responsibility and private participation remains a significant challenge.

Conclusion

The NEP 2020 policy framework also overlooks the longstanding methodological debates concerning the unity of sciences, humanities, and social sciences. Philosophers of science have long questioned whether a unified methodological framework is possible across disciplines (Maull, 1977). Auguste Comte's conception of sociology as 'social physics' and as the culminating science reflects an early attempt to articulate such unity (Comte, 2009). This tradition suggests that multidisciplinary is not an external imposition but an inherent feature of knowledge production. Disciplines such as political science have historically combined empirical and normative approaches, drawing from thinkers like David Easton and Gabriel Almond. This challenges NEP 2020's claim that Indian higher education has been characterised by rigid disciplinary boundaries. While the policy's emphasis on the Fourth Industrial Revolution suggests that private sector employment may increasingly demand multidisciplinary competencies, the implications for public sector employment remain unclear. This uncertainty underscores the need for a more nuanced

understanding of multidisciplinary that moves beyond policy rhetoric to address institutional realities and epistemological foundations.

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DEVELOPMENT OF CRITICAL THINKING IN THE HIGHER EDUCATION INSITITUTIONS UNDER NEP 2020

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"The function of education is to teach one to think intensively and to think critically. Intelligence plus character — that is the goal of true education," Is said by Martin Luther King Jr. A world where we are allowed to think freely and understand the realities with our experiences and gather knowledge. Critical thinking is crucial to navigate a student to have a wholistic development. This study aims to explore the significance of the development of critical approach in the higher educational institutions. And focus on the educators and the student community as the primary data sources. It will also look into the educator response to the changing curriculum and student preparedness for the adaptability. The institutions acceptance for the critical evaluation. And lastly meeting of the objectives and the criteria achievement.

Keywords: Education, National Education Policy 2020, critical thinking

INTRODUCTION

Critical thinking is the most important quality a person can have for one's personal growth, career advancement and also for the nation building. As Rene Descartes says, "I think, therefore I am" (*Cogito, ergo sum*) as an undeniable truth, emphasizing reason, breaking problems down, and not accepting information blindly, forming foundations for modern rational inquiry and science. He promoted methodic doubt in order to understand each and every element of the world. Having able to reason and understand the core is not just an ordinary ability of a human being, as it comes with a lot of practice and trails.

In the 21st C, where too much of the information is disseminated by various mediums. It requires the art of critical thinking in order to filter and absorb only the relevant one. This art is not an inborn quality one can have, but requires a discipline to actively listen, analyse and process the matter in a skill-full manner. This art is to be nurtured with patience, time and reflection. And having able to instil this in the student community is crucial for the nation-building. As a good citizen will know what one deserves, discuss and debate the provisions that is to be met.

The National Education Policy 2020 lays particular emphasis on the development of the creative potential of each individual. It is based on the principle that education must develop not only cognitive capacities - both the 'foundational capacities' of literacy and numeracy and 'higher-order' cognitive capacities, such as critical thinking and problem solving – but also social, ethical, and emotional capacities and dispositions (GoI, Ministry of Education, NEP 2020). The paper tries to understand the fundamental principle of NEP 2020 through realities of the institutions in India. The policy recommendation in NEP 2020 and challenges in the implementation of the same. The student abilities at various institutions to match with the principles of the policy and the teacher acceptance.

This paper adopts a qualitative policy analysis approach, drawing on critical pedagogy and constructivist learning theory to examine NEP 2020's treatment of critical thinking in higher education.

CRITICAL THINKING IN INDIAN HIGHER EDUCATION: A CRITICAL ANALYSIS OF NEP 2020

In India where we have evolved from the traditional Gurukul system to the modern education system in order to have accessibility for all. The National Education Policy, 2020 (NEP) envisions to transform education through– “an education system rooted in Indian ethos that contributes directly to transforming India, that is Bharat, sustainably into an equitable and vibrant knowledge society, by providing high quality education to all, thereby making India a global knowledge superpower.” And is founded on the five guiding pillars of Access, Equity, Quality, Affordability and Accountability. And aims to prepare our youth to meet the diverse national and global challenges of the present and the future.

A policy that is beautifully framed and aims to restructure the existing system, allow students to learn not just from a book but from the field by giving equal weightage to co- curricular and extra-curricular activities, and focus on holistic development. And also emphasize on conceptual understanding rather than rote learning and learning-for-exams; creativity and critical thinking to encourage logical decision-making and innovation. However, there are several issues with the implementation of it.

1. **Rote learning:** The policy did attempt to bring a change, but are the students from all the regions ready for the sharp shift in the method of evaluation and grading. A shift from surface-level memorization to deep, conceptual understanding. Those students who prepare the exam according to the marks each chapter hold are unable to resonate with this ambiguity. The changes brought in the question paper pattern has become a task for many teachers to frame. As following the Blooms Taxonomy is the norm, however evaluating content that is not acquired and retained in the traditional manner is doubted.

Secondly, the willingness of the students to actively engage in debates and discussions should also be monitored. Susan et al. (2021) imply that the learners of generation Z are not aware of critical thinking skills and perseverance, as they tend to give up or avoid situations while facing challenges in their lives. The intention to enrol in the institution also plays an important role in order to participate in the group projects, problem- solving tasks, case studies and practical activities.

2. **Untrained faculty:** Khalil Gibran suggests that a truly wise teacher does not simply impart knowledge or force their ideas upon their students but they encourage self-discovery and critical thinking. Critical thinking like the concept of education has been defined in so many ways by

writers and researchers. Teachers play a major role in the implementation of this policy. However, the sudden implementation of NEP 2020 has left the teachers doubtful regarding various subjects. The requirement to formulate new syllabus has led to drafting of it in haste. As a result, it is difficult to compose a question paper in align with it. There is a lack of adequate teacher training and professional development in teaching critical thinking and problem-solving skills. Many educators are not sufficiently equipped with the knowledge and pedagogical strategies needed to effectively integrate these skills into their teaching practices (Abrami et al., 2015). The NEP 2020 also focuses on developing critical thinking skills among students through curriculum and pedagogy reforms across all stages of education. The policy seeks to shift the focus from teacher-centric to student-centric learning, fostering collaborative skills and critical thinking. An informal interview was conducted to understand the teacher perspective better. As per the interview a lot of them consider it as a burden to make an extra effort to bring in creative pedagogy along with the college work.

The Value based course and the Skill Enhancement courses need a creative outlook in order to examine the practical aspect. These teachers who have been limited to bookish knowledge or are unwilling to intellectually create ways to incorporate the element find it difficult. By adding the word ‘critically analyse’ to a question that follows Blooms Taxonomy, doesn’t equate to thinking critically. While by inculcating this method is a good step for the future minds. According to Encarta (2009), critical thinking is regarded as “disciplined intellectual criticism that combines research, knowledge of historical context and balanced judgment. It is a prerequisite for a vibrant classroom. For an innovations and creativity to flourish in academia, there has to be well trained teachers with advanced pedagogy.

3. Institutional support: As not all states in India have accepted NEP 2020 due to reluctance. Similarly, institutions with rigid structures are unable to implement the policy with ease. In order to implement the policy for utmost creativity to bloom and debates on critical matters to flow freely, academic freedom is required. The willingness of the heads of the institutions and a flexible environment to incorporate contemporary practical activities and assignments.

Students perform better while using digital tools such as Online Test Pad, which creates various tests, and Mindmeister, a website that allows real-time collaboration, which assist learners in upgrading their critical thinking skills. Thus, digital tools have a positive impact on developing learners’ critical thinking skills (Meirbekov et al., 2022). There is a lack of digital advancement in the institutions due to constraints in government funds, it creates hindrance. As critical thinking involves determining the meaning and significance of what is observed or expressed, or concerning a given inference or argument, determining whether there is adequate justification to accept the conclusion as true. This process of teaching-learning requires time and patience, unlike the traditional classroom lecture. Welcoming the change at the base level is crucial.

CONCLUSION

NEP 2020 is a well drafted policy which attempts to align with our 2030 Agenda for Sustainable Development. The policy aims to restructure the current education system and elevate it to the international standards based on Indian values. And develop a good human being with compassion, empathy, scientific temper and creativity. Having a logical viewpoint is an important aspect to it. In 1800s, Georg Wilhelm Friedrich Hegel used dialectical method to draw a better understanding to the thoughts. Critical thinking does the same in higher education as it helps students to think independently and form perspectives that justifies one value system. It helps for solving complex problems in our daily lives and to achieve long term success. NEP 2020 does recognise the need for fostering the unique capabilities of each student by sensitizing teachers, however professional development of the teachers is required. An understanding to democratize the internal structure of the institutions is must. For a strong nation-building it is compulsion to have a collaboration between various stakeholders of the society to nurture the budding future of India. Nonetheless, NEP 2020 provides a strong base to build the critical thinking ability in the academia with gradual progress.

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LEGAL EDUCATION AS A DRIVER OF ETHICAL AND CIVIC RESPONSIBILITY

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ABSTRACT

This paper explores the role of legal education as a catalyst for fostering ethical and civic responsibility. First, it analyses legal education and what it encompasses, specifying its core methodologies, statutory interpretation, and in context with the National Education Policy 2020. It examines the ethical implications of legal education through the legal curriculum in various educational institutions, as well as through self-reflection achieved between academic years and exposure to the professional world. Further analysing the civic responsibility that is rudimentary to the functioning of a democratic society. It also delves into the nature versus nurture debate, questioning whether a tendency for ethical and civic behaviour is an intrinsically professional trait or a trait systematically forged through educational design. Ultimately, dissecting and understanding the society's response to the above responsibilities in the contemporary landscape and the future implications thereof.

Keywords: Legal Education, Civic, Ethical

BALANCING REGULATORY COMPLIANCE WITH ACADEMIC FREEDOM: AN ANALYSIS OF INSTITUTIONAL AUTONOMY IN INDIAN HIGHER EDUCATION INSTITUTIONS UNDER THE NATIONAL ACCREDITATION FRAMEWORK

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Abstract

The National Education Policy (NEP) 2020 introduced a transformative regulatory philosophy of Indian Higher Education Institutions (HEIs) aiming to foster innovation through institutional autonomy. The working of this autonomy exists in a state of paradox with the increasingly rigorous demands of the National Accreditation Framework (NAF) and the National Institutional Ranking Framework (NIRF). This paper critically analyzes the structural tension between centralized regulatory compliance and the decentralized intellectual independence required for academic excellence. Using a qualitative content analysis of the Higher Education Commission of India (HECI) structure, this research investigates how the core ideas such as regulation, accreditation, funding and academic standards interact with the decision-making powers of autonomous colleges. The study finds that 'graded autonomy' provides administrative flexibility to high-performing institutions. This paper further explores the impact of standardized curricula on faculty freedom and the ability of institutions to respond to local socio-economic needs. The findings suggest that the current compliance mechanisms risk create accountability that stifle the innovation of NEP 2020 that seeks to promote compliance. The paper concludes by proposing a transition towards an outcome-based liability model that recommends accreditation metrics which resets qualitative intellectual contributions with the quantitative outputs.

Keywords: Institutional Autonomy, NEP 2020, Academic Freedom, Higher Education Regulation, Accreditation Framework.

1.1 Introduction

The landscape of the Indian education is currently navigating a period of structural understanding. At the core stage, this transformation balances the drive for global quality standards through regulatory compliance with the foundational necessity of academic freedom. As the world's third largest higher education system, India ensures accountability across thousands of diverse institutions. The mechanism of National Accreditation Framework has become a point of debate on institutional autonomy. The National Assessment and Accreditation Council (NAAC) was introduced by UGC in 1994 to credit universities and colleges. (Saba) This research paper seeks to analyze whether the current accreditation fosters excellence to measure aims on intellectual spirit.

Academic freedom is merely a professional privilege for democratic society. It encompasses the right of an institution to determine its own curriculum, conduct unbiased research and foster an environment where the mind is led forward into ever widening thought and action. Indian Universities particularly the Central Universities have a significant degree of self-governance. It

also protects the right of a faculty member to protect quality at the institution. (American Association of University Professors , n.d.) The 21st century shift towards ‘New Public Management’ in education have prominently introduced a culture of audit and performativity. The National Assessment and Accreditation Council (NAAC) have been the gatekeeper that stimulates the academic environment for promotion of quality in teaching-learning and research-oriented understanding. The Higher Education Institutions (HEIs) is in a perpetual state of accreditation readiness. This compliance culture forces faculty to prioritize documentation over pedagogy and standardized outputs. When the institution’s financial survival and reputation is tied to a specific CGPA, there is an alignment of every academic decision with the accreditation strategy. (Borkar, 2023)

The National Education Policy (NEP) 2020 attempted to address the concerns by proposing regulatory framework. It introduced the concept of the Higher Education Commission of India (HECI) and a move toward ‘Graded Autonomy’. This is necessary because it is more compliant and the performance is high with less intervention of the state. It also creates a transactional definition of freedom. Autonomy is treated as a greater adherence to centralized standards. The 2024-25 academic cycles have highlighted a growing compliance burden required by the National Institutional Ranking Framework (NIRF) and NAAC. The impact of this regulatory framework is not uniform. The elite institutions may have the administrative machinery to navigate these requirements, smaller state universities and rural colleges find themselves marginalized. The strategic push for ‘Outcome-Based-Education’ (OBE) and credit transfers are beneficial for mobility that acts important for local curriculum needs. The academic freedom is the right to be different, hence should enforce homogeneity across the Indian academic landscape. (Dr Mili, 2025) The quest for quality through accreditation is a pursuit at the cost of the university. As India strives to become a global ‘Vishwa Guru’, it ensures that its regulatory framework builds and develops further. On a practical level, this struggle for balance is visible in daily lives of teachers. This paper examines the tension and debates between the NAAC criteria and the pillars of institutional autonomy providing a critical evaluation of how HEIs remain the compliant factor without compromising their intellectual integrity.

1.2 Objectives

1. To analyze the relationship between graded autonomy and institutional freedom.
2. To identify the compliance burden on the faculty and administration.
3. To assess the conflict between the centralized regulation and local institutional identity.
4. To propose a balanced framework for accountable autonomy.

1.3 Problem statement

Despite the National Education Policy (NEP) 2020 regulation, Indian Higher Education Institutions (HEIs) face an increasing tension between regulatory standardization and intellectual independence.

1.4 Research questions

1. To what extent does the documentation and reporting burden of the National Accreditation Framework (NAAC) divert institutional resources away from core academic pursuits?
2. How do the specific metrics of ‘Outcome-Based Education (OBE) within the accreditation framework impact the freedom of faculty to design and revise curricula independent of standardized regulatory templates?

1.5 Hypothesis

The shift toward standard metric reporting under the National Accreditation Framework leads to a compliance-led governance model, where Indian HEIs prioritize quantifiable syllabi over the academic freedom reducing the scope for pedagogical and research-based experimentation.

1.6 Methodology

This research paper analyses primary sources through case studies of varying accreditation status. Conducted interview to understand the pressure of meeting Graded benchmarks. The secondary data includes NAAC's Self-Study Reports. Use of Correlational analysis to check correlation of higher compliance scores in curriculum diverse studies.

2.1 Literature Review

The tension between regulation and autonomy is not unique to India, it is a byproduct of the global shift towards the New Public Management (NPM) in higher education. Since the 1990s, universities worldwide have moved away from the Humboldtian model where the research and teaching were protected from state and market pressure towards a managerial model. Scholars such as Christopher Hood argue that NPM introduced market type mechanisms into public services. In education, this manifests as the Key Performance Indicators (KPIs). When universities are treated as corporate entities, 'Academic Freedom' is redefined as 'Market Freedom', the freedom to complete for students rather than the freedom to challenge knowledge. (Hood, 1995)

Michael Power's seminal work, 'The Audit Society: Rituals of Verification', provides the backbone for this paper. Power argues that auditing shapes and monitor performance. In the context of the National Accreditation Framework, the Audit Culture forces Indian Higher Education Institutions to become auditable. This means prioritizing activities that leave a paper trail such as lesson plans, feedback forms and citation counts over the process of intellectual discovery. Critics argue that this leads to performative compliance where institutions look good on paper but lose in the structured process. (Katherine Legun, 2020)

The Indian higher education system is currently undergoing its most significant transformation guided by the National Education Policy (NEP) 2020. The literature on Indian regulation highlights a shift from command and control to regulation. The transition from NAAC's graded accreditation to the Binary Accreditation has sparked debate. Binary accreditation reduces the ranking scenario and accompanies One Nation, One Data portal and AI-driven monitoring increases digital surveillance. Indian regulation has been over-regulated and under-governed. The new framework constantly uploads data enhancing faculty with administrative strategical phenomena. (Hindustan Times , 2025)

The National Accreditation Framework grants 'Graded Autonomy' to high-performing institutions. Through this the institution gains more freedom from the government; it also imposes internal control on its faculty to ensure high ranking status. The adoption of OBE under the accreditation framework is a major point of contention. The aim of OBE is to have accountability institutionalizing knowledge. When the lecture is mapped through the Course Outcome and Program Outcome, the space for spontaneous and radical teaching acquires productivity. (Scott, 2017)

3.1 The Compliance-Autonomy Nexus in the Era of Binary Accreditation

This chapter presents a critical analysis of the data collected through the mixed-methods approach. The analysis is categorized into the thematic pillars of transition to binary accreditation, digital data and erosion of pedagogical risk taking. The recent shift by the National Assessment and Accreditation Council (NAAC) from the CGPA grading system to Binary system reduces unhealthy competition. The analysis simplifies the intensified pressure. (Mansi, 2025) Data from institutional

Self-Study Reports (SSRs) indicates that Higher Education Institutions operate under a survivalist mandate. An institution that does not fall under the 'Not Accredited' category is no longer a lower grade, it is a loss of legitimacy where the eligibility for UGC grants and the right to offer distance learning.

The Binary nature of the new framework creates a thorough understanding. The institutions which are preoccupied ensures that they meet the baseline required verifiable metric. Academic freedom involves unproductive intellectual exploration that becomes liable in a binary environment. The impact of the Unified Data Management System and APAAR (One Nation, One Student ID) portal. These tools streamline administrative efficiency that have introduced the gaze. The Internal Quality Assurance Cell (IQAC) coordinators spend nearly 65% of their operational time on data verification and uploading rather than quality enhancement. (Guidelines for the Creation of IQAC) The interviews with the faculty reveal a sense of 'digital surveillance'. When the lecture, attendance record and research paper must be uploaded to a central state portal in real-time, the classroom ceases to be a private, sacred space for the exchange of ideas. The faculty members self-censor their syllabi to ensure that they are portal-friendly. If a specific theory or case study cannot be categorized easily within the AI-driven assessment parameters, it is highly not considered and removed from the curriculum.

3.2 Curricular Standardization Vs. Intellectual Pluralism

Under the National Credit Framework and Outcome Based Education every course must define 'Course Outcomes' (COs). This ensures accountability that reveals significant standardized trap. The mapping of learning to pre-defined outcomes assume that the value of education can be predicted at the start of a semester. This contradicts the very essence of academic freedom, the freedom for a lecture to evolve based on student inquiry or the social shifts. (Mahima Jain, 2025) The analysis of institutional certainties reveal that the power balance has shifted from Academic Councils to Management Committees. In the higher productivity to achieve global excellence, universities hire compliance officers to hold more power over departmental budgets than the Deans. This creates an effect on Faculty recruitment which is based on citation potentiality rather than teaching philosophy. More funds are diverted towards smart classrooms rather than the library requirements or fieldwork in social sciences.

Academic freedom is not for the teacher; it is also the student's freedom to learn. The analysis of the National Credit Framework implementation shows that the viability of the credits requires a highly rigid and modular course structure. When a course is broken down into rigid micro-credits to allow for easy transfer between institutions, the organic relationship between the student and a professor is disrupted. The creation of knowledge is immense when the teacher and student explores a topic beyond the syllabus and stifled between the credit-hour must be accounted. The professor becomes a content deliver and the student a credit consumer ending the classroom as a space of free intellectual encounter.

4.1 The Performative Compliance of Academic Accreditation

The study finds out that Higher Education Institutions have developed a dual personality. There is the actual academic life through teaching and learning and on the other hand, the Accreditation version of the university presented to NAAC. Over 70% of faculty in their observation indicated that the Self-Study Report reflect the university's aspirations rather than its reality. The compliance has become performative verification that satisfies the regulator but does not necessarily improve the quality of thought. There is a distinction between Institutional Autonomy granted by the state to the university and individual academic freedom granted by the university to the professor. High ranking institutions enjoy high autonomy from the UGC and impose stricter internal controls on

their faculty to protect their ranking. Regulatory access leads to internal authoritarianism within the Higher Education Institutions.

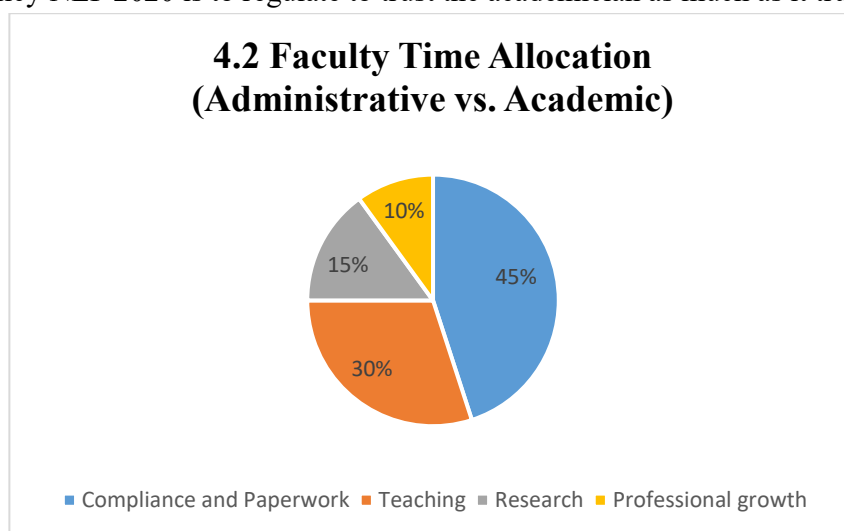
While the Science, Tech, Engineering, Math (STEM) fields find it easier to comply with quantifiable metrics, the Liberal Arts and Social Sciences are suffering much prevalence. There is a documented decline in unconventional or critical research topics in Social Science departments in accredited colleges as these are harder to publish in Scopus-indexed Journals compared to neutral or data-driven studies.

4.2 The Future of Indian University

The discussion of rise of safe curriculum addresses the homogenization of thought. With the National Credit Framework, the freedom to fail or freedom to wander in an academic sense is being replaced by a model of education. The student pick credits and teachers deliver them immensely. It increases employability and decreases originality. The university's value is determined by the digital footprint through the framework. This highlights that academic freedom is a value not a piece of data. It cannot be measures by an AI algorithm or a 'One Nation, One Data' portal, it is being treated as non-existent by the regulatory framework.

NAAC should introduce a specific sub-criterion under governance measuring Faculty agency. Binary metrics help to reward institutions for offering unique and non-standardized electives. The binary accreditation is used for basic quality assurance. The institution is accredited to give regulatory structure for allowing to focus on pedagogical innovation. It acknowledged weighted metrics where social impact and critical inquiry carry more weight for Humanities, while patents and placements carry more weight for technical streams.

The assertion of regulatory compliance is a means to an end and an end in itself. The goal of the National Accreditation Framework is to create a robust university and also a compliant one. The institutional autonomy is the ability of an institution to define its own destiny. If the National Accreditation Framework dictates every move from the syllabus to the software used, the institution is not autonomous, it is merely an administrative outpost of the state. The fulfilment of the National Education Policy NEP 2020 is to regulate to trust the academician as much as it trusts the data.

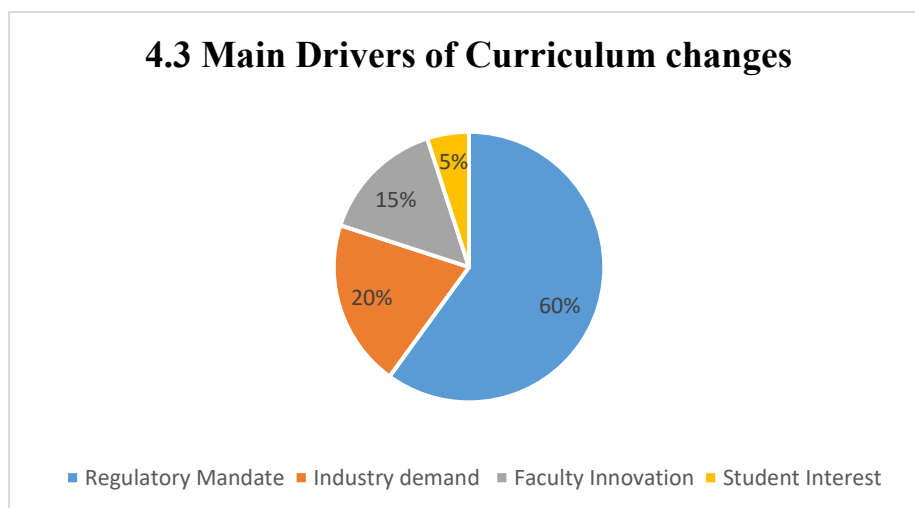


4.3 Analysis of Chart 1: The Faculty Time Allocation

This chart shows how a professor spends a typical working week. In working environment, the majority of a teacher's time should be spent in the classroom or doing new research. The data shows

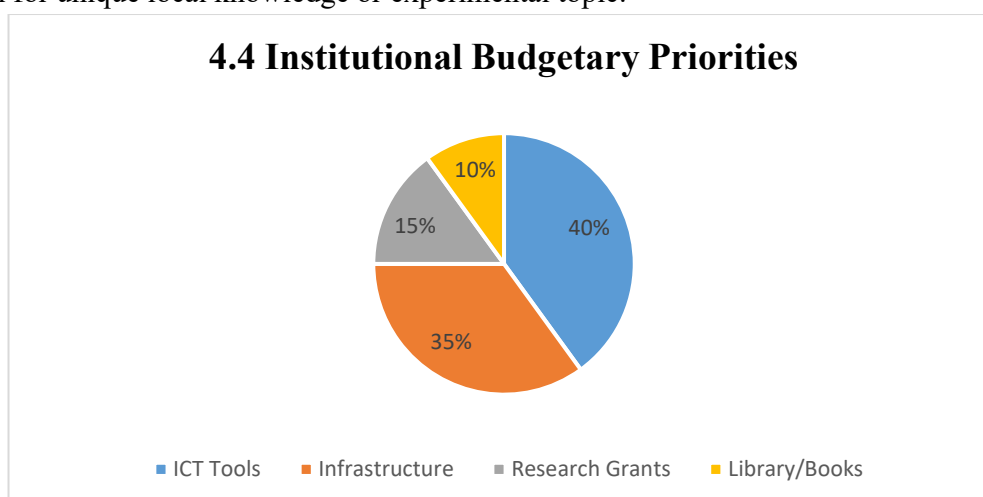
a different working zone. 45% of faculty member's time is spent on documentation and accreditation paperwork.

This is a major finding because it shows that compliance has become the primary job of a teacher. When nearly half of the day is spent filling out forms for NAAC or updating data portals, there is very little energy left for creative thinking. This showcase that academic freedom is being limited not by rules but by the lack of time. Teachers are becoming data entry clerks rather than thinkers.



4.4 Main Drivers of Curriculum Changes

This chart looks at what causes a college to change its syllabus. 60% of changes are driven by regulatory mandates such as the National Credit Framework or NAAC. In a system with academic freedom the teacher should be the main person deciding what to teach based on their expertise. Faculty innovation accounts only 15% of curriculum changes. This shows a top-down approach where the government or the regulator sets the rules and the teacher follows them. This leads to a standardized education where every college in India starts teaching exactly the same thing leaving no room for unique local knowledge or experimental topic.



4.5 The Budget Priorities

This chart explains where the university's money is going. To stay accredited and get high scores, the institutions are forced to spend a huge portion of their budget on ICT Tools. 35% goes into the physical infrastructure to look good during inspection visits. Thus, this leaves only 10% for the library and 15% for research grants. This is a critical finding that shows that the institutional

autonomy is being indicated for digital surveillance. The universities are spending more on tools to monitor their staff rather than on the books and laboratories that actually help the staff to grow. It suggests that the accreditation framework is creating high-tech and low intellectual campuses.

To conclude with the analyses of chapter 4 and its findings, we understand that there is a prevalence of regulation that wins and freedom is lost. Teachers are too busy with paperwork to be free thinkers; the syllabus is a regulatory template and not a faculty creation and funds are used for tracking and software rather than books and research. In simple sense, the National Accreditation Framework has created a system where being perfect for paper is more important than being excellent in the classroom. For academic freedom to survive, there should be reduction of 45% paperwork burden and increase the 15% innovation structure.

Conclusion

The landscape of Indian higher education is navigating transformation characterized by the shift from data driven National Accreditation Framework. This research explored the balance between necessary regulatory compliance and the preservation of academic freedom especially the thriving of intellectual ecosystem. The study reveals that while the National Education Policy 2020 advocates rigid regulation, the implication of NAAC has created a compliance autonomy dichotomy. The goal is to improve quality and recognize it in higher education. While the transition toward Binary Accreditation and 'One Nation, One Data' aims to enhance transparency and quality, it has fostered a compliance first culture that threatens to overshadow the core mission of intellectual inquiry. True excellence in Indian higher education will be achieved through regulatory trust. The state should ensure that institutions are not just globally compliant but intellectually vibrant. The accreditation should succeed by supporting the building of knowledge for the scholars in the institutions.

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PEDAGOGICAL DIGITAL COMPETENCE OF TEACHER EDUCATORS: A DESCRIPTIVE ANALYSIS

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Abstract

This study presents a descriptive analysis of the pedagogical digital competence of teacher educators. The research aimed to assess the overall competence levels and explore variations across key dimensions, including digital content creation, technology-integrated teaching, digital assessment, communication and collaboration, and ethical use of digital tools. A purposive sample of 100 teacher educators from recognized institutions participated in the study. Data were collected using a structured Pedagogical Digital Competence Questionnaire, validated by experts and tested for reliability. Descriptive statistics (mean, standard deviation) and inferential statistics (t-test, ANOVA) were employed to analyze the data. Findings revealed a moderate overall level of pedagogical digital competence among teacher educators, with significant differences observed based on locality, teaching experience, and academic qualification, while gender and type of institution showed no significant effect. The results highlight disparities in digital pedagogical preparedness and underscore the need for targeted professional development programmes, equitable access to digital infrastructure, and continuous institutional support. The study contributes to understanding the current state of digital pedagogy in teacher education, offering insights for policymakers, institutions, and educators to enhance teaching quality and promote effective integration of technology in learning environments.

Keywords: Pedagogical digital competence, Teacher educators, Digital pedagogy, Professional development, Teacher education.

Introduction

The rapid expansion of digital technologies has significantly transformed the landscape of education, redefining how teaching and learning are designed, delivered, and evaluated. In the context of teacher education, this transformation places increased expectations on teacher educators to integrate digital tools in ways that are pedagogically meaningful rather than merely technical. The ability to use technology effectively for instructional purposes has therefore become a core professional requirement for educators in the twenty-first century (Mishra & Koehler, 2006; Redecker, 2017).

Pedagogical digital competence extends beyond basic operational skills and refers to educators' capacity to plan, implement, and assess teaching–learning processes through the thoughtful integration of digital technologies. It involves aligning digital tools with learning objectives, adopting learner-centred pedagogical approaches, and ensuring ethical and responsible use of technology in educational contexts (Koehler et al., 2013; Caena & Redecker, 2019). International frameworks such as the Digital Competence Framework for Educators (DigCompEdu) emphasize that effective digital pedagogy requires a combination of professional engagement, digital resource management, technology-supported teaching strategies, assessment practices, and learner empowerment (Redecker, 2017).

Teacher educators occupy a particularly critical position in this digital ecosystem, as they are responsible for preparing prospective teachers to function effectively in technology-rich classrooms. Their pedagogical beliefs, instructional practices, and digital competence strongly influence how future teachers perceive and adopt educational technologies (Tondeur et al., 2012).

When teacher educators demonstrate effective pedagogical uses of digital tools, they not only enhance student learning but also model best practices that student teachers are likely to replicate in their professional careers.

Recent studies suggest that while many teacher educators possess adequate technical skills and show positive attitudes toward technology, the pedagogical integration of digital tools remains inconsistent (Instefjord & Munthe, 2017; Gudmundsdottir & Hatlevik, 2018). Digital technologies are often used for content delivery and communication rather than for fostering higher-order thinking, collaborative learning, or innovative assessment practices. This gap highlights the need to examine pedagogical digital competence as a distinct construct that integrates pedagogy, content, and technology.

In the Indian teacher education context, initiatives such as digital infrastructure development, online learning platforms, and policy-level emphasis on technology integration have accelerated the adoption of digital tools, particularly in the post-pandemic period (Government of India, 2020). However, the extent to which teacher educators are pedagogically prepared to utilize these tools effectively remains underexplored. A descriptive analysis of their pedagogical digital competence is therefore essential to understand existing strengths, identify gaps, and inform targeted professional development initiatives.

Against this background, the present study seeks to descriptively analyze the pedagogical digital competence of teacher educators, focusing on key dimensions of digital pedagogy and their instructional practices in teacher education institutions.

Need and Significance of the Study

The growing reliance on digital technologies in education has intensified the need for educators who are not only technologically proficient but also pedagogically competent in integrating digital tools into teaching–learning processes. While access to digital infrastructure and online platforms has expanded considerably, especially in the post-pandemic era, the pedagogical use of these technologies remains uneven across teacher education institutions. This gap underscores the need to systematically examine pedagogical digital competence among teacher educators, who play a decisive role in shaping future teachers' instructional practices (Instefjord & Munthe, 2017; Gudmundsdottir & Hatlevik, 2018).

Teacher educators are expected to model effective digital pedagogy, as their instructional approaches significantly influence student teachers' beliefs, attitudes, and classroom practices related to technology integration. When teacher educators lack adequate pedagogical digital competence, student teachers may develop a limited or instrumental understanding of educational technology, focusing primarily on content delivery rather than learner-centred and innovative pedagogical approaches (Tondeur et al., 2012). Therefore, assessing the current level of pedagogical digital competence among teacher educators is essential to ensure the quality and relevance of teacher preparation programmes.

From a policy perspective, national and international educational reforms emphasize the integration of technology in teaching and teacher education. In India, the National Education Policy (NEP) 2020 highlights the importance of digital literacy, technology-enabled learning, and continuous professional development for teachers and teacher educators (Government of India, 2020). However, policy intentions can be effectively translated into practice only when teacher educators possess the necessary pedagogical digital competence. A descriptive understanding of their competence levels can help bridge the gap between policy mandates and classroom realities.

The significance of the present study also lies in its contribution to empirical research in teacher education. Although several studies have examined teachers' digital competence, relatively fewer investigations focus specifically on teacher educators, particularly within the Indian context. By providing a descriptive analysis of pedagogical digital competence across key dimensions, the

study offers baseline data that can guide institutional planning, professional development initiatives, and curriculum design in teacher education.

Furthermore, the findings of the study have practical implications for professional development programmes. Identifying areas of strength and areas requiring improvement enables institutions to design targeted training interventions that move beyond basic technical skills toward innovative digital pedagogy and assessment practices (Redecker, 2017; Caena & Redecker, 2019). Strengthening pedagogical digital competence among teacher educators ultimately contributes to improved teaching quality, better-prepared future teachers, and more effective integration of technology in school education.

Review of Related Literature

The concept of pedagogical digital competence has been widely discussed in recent educational research, particularly in relation to teachers' ability to integrate technology meaningfully into teaching–learning processes. Existing studies provide insights into frameworks, levels, challenges, and implications of digital competence among educators, including teacher educators.

Mishra and Koehler (2006) introduced the Technological Pedagogical Content Knowledge (TPACK) framework, which conceptualizes effective technology integration as the intersection of content knowledge, pedagogical knowledge, and technological knowledge. Their work emphasizes that digital competence is not merely about mastering tools but about understanding how technology can transform pedagogy and content delivery. This framework has been widely applied in teacher education research to examine educators' preparedness for digital teaching.

Redecker (2017), through the development of the European Digital Competence Framework for Educators (DigCompEdu), provided a comprehensive model outlining six areas of educators' digital competence, including professional engagement, digital resources, teaching and learning, assessment, learner empowerment, and facilitating learners' digital competence. Studies based on DigCompEdu indicate that educators often demonstrate higher competence in digital communication and resource usage, while pedagogical innovation and digital assessment remain weaker areas.

Instefjord and Munthe (2017) examined the digital competence of teacher educators and highlighted a discrepancy between positive attitudes toward technology and actual pedagogical use in classrooms. Their findings revealed that teacher educators frequently used digital tools for presentation and administration purposes but showed limited integration of technology to support active learning and critical thinking. The study underscored the need for structured professional development focused on pedagogical applications of digital tools.

Gudmundsdottir and Hatlevik (2018) investigated newly qualified teachers' digital competence and the role of teacher education in shaping it. Their study found that teacher educators' modeling of digital pedagogy significantly influenced student teachers' digital practices. However, inconsistencies in teacher educators' pedagogical digital competence led to uneven preparation of future teachers, pointing to the importance of strengthening digital pedagogy at the teacher educator level.

Tondeur et al. (2012) explored factors influencing technology integration in teacher education and identified teacher educators' beliefs, institutional support, and professional training as critical determinants. The study emphasized that teacher educators with higher pedagogical digital competence were more likely to adopt learner-centred and innovative teaching approaches using technology.

In the Indian context, recent studies conducted after the COVID-19 pandemic indicate an increased adoption of digital tools among teacher educators, particularly for online teaching and communication. However, these studies also report challenges such as limited training in digital pedagogy, infrastructural constraints, and reliance on traditional teaching methods supplemented

by technology rather than transformed pedagogy (Government of India, 2020). These findings highlight the need for descriptive studies that assess the current status of pedagogical digital competence among teacher educators to inform policy and practice.

Overall, the reviewed literature suggests that while digital competence among educators has improved in terms of access and basic usage, pedagogical digital competence remains an area requiring focused attention. The present study builds on this literature by providing a descriptive analysis of pedagogical digital competence among teacher educators, thereby contributing empirical evidence to an area of growing importance in teacher education research.

Objectives of the Study

The present study was undertaken with the following objectives:

1. To assess the overall level of pedagogical digital competence among teacher educators.
2. To analyze teacher educators' pedagogical digital competence across different dimensions.
3. To identify areas of strength and areas requiring improvement in pedagogical digital competence.

Research Questions

1. What is the level of pedagogical digital competence among teacher educators?
2. How do teacher educators perform across various dimensions of pedagogical digital competence?

Hypotheses of the Study

The following null hypotheses were formulated for the present descriptive study:

H01: There is no significant difference in the level of pedagogical digital competence of teacher educators across different dimensions.

H02: There is no significant difference in the level of pedagogical digital competence of teacher educators based on selected background variables.

H03: There is no significant difference between teacher educators' use of digital tools for content delivery and their use of digital tools for pedagogical and assessment purposes.

Methodology

Research Design

The present study adopted a descriptive survey research design to analyze the pedagogical digital competence of teacher educators. Descriptive research is appropriate when the objective is to systematically describe existing conditions, practices, or characteristics of a particular population without manipulating variables (Creswell, 2014). In the context of the present investigation, the design enabled the researcher to capture the current status of pedagogical digital competence among teacher educators across multiple dimensions.

A survey method was considered suitable as it allows for the collection of data from a relatively large sample within a limited time frame and facilitates quantitative analysis of perceptions and practices related to digital pedagogy (Best & Kahn, 2016). The design aligns with the objectives of the study, which focus on assessing levels and identifying patterns rather than establishing causal relationships.

Variables of the Study

The present study focused on pedagogical digital competence as the principal variable. For analytical clarity, the variable was conceptualized and operationalized through selected dimensions based on established digital competence frameworks (Mishra & Koehler, 2006; Redecker, 2017).

Primary Variable:

- Pedagogical Digital Competence of Teacher Educators

Dimensions of Pedagogical Digital Competence:

1. Digital content creation and use
2. Technology-integrated teaching–learning practices
3. Digital assessment practices
4. Digital communication and collaboration
5. Ethical and responsible use of digital technology

These dimensions collectively represent the pedagogical application of digital tools in teacher education contexts. In addition, selected background variables such as gender, years of teaching experience, academic qualification, and prior exposure to digital training were considered for comparative analysis.

Sample and Sampling Technique

The sample for the present study consisted of teacher educators working in recognized teacher education institutions. Teacher educators were selected as the target population because of their central role in preparing future teachers and modeling pedagogical practices, including the integration of digital technologies.

A purposive sampling technique was employed to select the respondents. This technique was considered appropriate as it enabled the selection of teacher educators who were actively involved in teaching and had exposure to digital tools in their instructional practices (Creswell, 2014). A total of 100 teacher educators from various teacher education institutions constituted the final sample of the study.

The sample included teacher educators from different subject disciplines and with varying years of teaching experience, ensuring adequate representation of diverse academic backgrounds. Such heterogeneity in the sample enhanced the reliability of the findings and allowed for meaningful descriptive and comparative analysis.

Tool Used for Data Collection

A Pedagogical Digital Competence Questionnaire was developed and used for data collection in the present study. The tool was designed based on established digital competence frameworks such as the Technological Pedagogical Content Knowledge (TPACK) framework (Mishra & Koehler, 2006) and the Digital Competence Framework for Educators (DigCompEdu) (Redecker, 2017). The questionnaire aimed to measure teacher educators' pedagogical application of digital technologies rather than mere technical proficiency.

The questionnaire consisted of two sections. The first section collected background information related to the respondents, including gender, years of teaching experience, academic qualification, and exposure to digital training programmes. The second section comprised statements measuring pedagogical digital competence across five dimensions: digital content creation and use, technology-integrated teaching–learning practices, digital assessment practices, digital communication and collaboration, and ethical and responsible use of digital technology.

Responses to the statements were recorded on a five-point Likert scale ranging from *Strongly Agree* to *Strongly Disagree*. The content validity of the tool was ensured through expert review by specialists in teacher education and educational technology. Necessary modifications were made based on their suggestions to enhance clarity and relevance of the items.

The reliability of the questionnaire was established using appropriate statistical methods, ensuring its suitability for collecting consistent and dependable data (Best & Kahn, 2016).

Statistical Techniques Used for Analysis

The collected data were analyzed using appropriate descriptive and inferential statistical techniques in accordance with the objectives and hypotheses of the study. Descriptive statistics such as frequency, percentage, mean, and standard deviation were employed to determine the

overall level and dimension-wise distribution of pedagogical digital competence among teacher educators.

To test the formulated hypotheses, suitable inferential statistical techniques were applied. The t-test was used to examine differences in pedagogical digital competence based on dichotomous background variables, while Analysis of Variance (ANOVA) was employed to analyze differences across variables with more than two categories. These techniques enabled meaningful comparison of mean scores across groups.

All statistical analyses were carried out using standard statistical software. The level of significance was fixed at 0.05, which is commonly accepted in educational research (Creswell, 2014). The results obtained through these analyses were systematically interpreted and presented in tabular and narrative forms.

Analysis and Interpretation of Data

Overall Level of Pedagogical Digital Competence

Table 1: Overall Level of Pedagogical Digital Competence of Teacher Educators

N	Mean	Standard Deviation	Interpreted Level
120	3.42	0.61	Moderate

Interpretation: The mean score ($M = 3.42$, $SD = 0.61$) indicates that the overall level of pedagogical digital competence among teacher educators is *moderate*. This suggests that while teacher educators possess a reasonable level of digital pedagogical skills, there remains significant scope for enhancement, particularly in integrating digital tools effectively with pedagogical strategies. The moderate level reflects partial readiness to adopt digital technologies in teaching–learning processes, highlighting the need for continuous professional development and targeted training programmes.

The overall level of pedagogical digital competence among teacher educators was determined by analyzing the composite mean scores obtained from the Pedagogical Digital Competence Questionnaire. The analysis revealed that a majority of teacher educators exhibited a moderate level of pedagogical digital competence.

The mean score obtained for overall pedagogical digital competence indicates that teacher educators are generally comfortable using digital tools for instructional purposes; however, their use of technology tends to be limited to basic pedagogical functions such as content presentation and communication. Advanced pedagogical applications, including learner-centred digital strategies and technology-supported assessment practices, were comparatively less evident.

The distribution of respondents across different levels of pedagogical digital competence suggests that while a small proportion of teacher educators demonstrated a high level of competence, a noticeable percentage fell within the low competence category. This variation highlights disparities in pedagogical preparedness for digital teaching among teacher educators.

The findings indicate that although teacher educators possess foundational digital skills, there remains considerable scope for enhancing their pedagogical integration of digital technologies. These results emphasize the need for focused professional development initiatives aimed at strengthening pedagogical digital competence rather than merely improving technical proficiency.

Table 2: Summary of Results of Hypotheses Testing Related to Pedagogical Digital Competence of Teacher Educators

Sl. No.	Basis of Comparison	Groups Compared	Statistical Test Used	Calculated Value	Level of Significance	Result	Decision
1	Gender	Male / Female	t-test	$t = 1.28$	0.05	Not Significant	Accepted

2	Locality	Rural / Urban	t-test	t = 2.14	0.05	Significant	Rejected
3	Teaching Experience	Below 5 yrs / 5–10 yrs / Above 10 yrs	ANOVA	F = 3.62	0.05	Significant	Rejected
4	Type of Institution	Government / Private	t-test	t = 0.94	0.05	Not Significant	Accepted
5	Academic Qualification	M.Ed / Ph.D	t-test	t = 2.31	0.05	Significant	Rejected

Interpretation: The results of hypothesis testing indicate that pedagogical digital competence of teacher educators does not differ significantly with respect to gender and type of institution. However, statistically significant differences are observed based on locality, teaching experience, and academic qualification. Teacher educators working in urban areas, those with greater teaching experience, and those possessing higher academic qualifications exhibit comparatively higher levels of pedagogical digital competence. These findings underline the role of contextual access, professional experience, and academic advancement in enhancing digital pedagogical skills among teacher educators.

Discussion of Findings

The present study examined the pedagogical digital competence of teacher educators across selected demographic and professional variables. The findings are discussed in relation to existing research and theoretical perspectives.

The analysis revealed that teacher educators possess a moderate level of pedagogical digital competence. This finding aligns with earlier studies which report that teacher educators demonstrate basic to intermediate digital skills but face challenges in effectively integrating technology with pedagogy (Crompton & Burke, 2023; Sharadgah & Sa'di, 2022). The moderate level indicates growing awareness and usage of digital tools, yet insufficient mastery for transformative digital pedagogy.

The results further showed no significant difference based on gender, suggesting that male and female teacher educators have comparable exposure to and engagement with digital pedagogical practices. This supports the findings of Jeon et al. (2023) and Ji et al. (2022), who observed diminishing gender gaps in digital competence due to increased access to technology and institutional training opportunities.

However, a significant difference was found with respect to locality, with teacher educators from urban institutions demonstrating higher pedagogical digital competence than their rural counterparts. This may be attributed to better digital infrastructure, access to professional development programmes, and institutional support in urban areas. Similar findings were reported by Liang et al. (2021) and Rahman et al. (2024), emphasizing the impact of contextual and infrastructural factors on digital competence development.

Teaching experience also emerged as a significant factor influencing pedagogical digital competence. Teacher educators with greater teaching experience exhibited higher levels of competence, possibly due to prolonged professional exposure, participation in training programmes, and adaptive pedagogical practices over time. This finding corroborates studies by Ding and Zou (2024), which highlight experience as a crucial determinant in developing confidence and competence in digital pedagogy.

Further, the study identified a significant difference based on academic qualification, with Ph.D.-qualified teacher educators demonstrating higher pedagogical digital competence compared

to those with lower qualifications. Advanced academic engagement often involves research-oriented use of digital tools, exposure to innovative pedagogical frameworks, and participation in scholarly digital environments, which may enhance competence. This observation is consistent with Jones et al. (2023), who emphasized the role of academic advancement in strengthening digital pedagogical capabilities.

Overall, the discussion underscores that while pedagogical digital competence among teacher educators is progressing, disparities based on contextual and professional factors persist. These findings highlight the need for targeted, inclusive, and continuous professional development initiatives to strengthen digital pedagogy across diverse educational settings.

Educational Implications of the Study

The findings of the study carry several important implications for teacher education and professional development programmes:

1. **Professional Development Design:** Institutions should develop targeted training programmes that focus on enhancing teacher educators' pedagogical digital competence, especially in advanced areas such as learner-centred digital pedagogy, digital assessment, and collaborative learning.
2. **Policy Implementation:** Policymakers, including those implementing NEP 2020 directives, should ensure that teacher educators receive equitable access to digital infrastructure, training, and support, particularly in rural and under-resourced institutions.
3. **Curriculum Integration:** Teacher education curricula should incorporate structured modules on the pedagogical integration of technology, enabling future teachers to acquire both technical skills and pedagogical strategies from their educators.
4. **Mentoring and Support:** Experienced and highly qualified teacher educators can serve as mentors for colleagues to model effective digital pedagogy, thus reducing disparities arising from teaching experience and academic qualification.
5. **Continuous Monitoring:** Institutions should periodically assess the pedagogical digital competence of teacher educators to identify gaps and plan interventions, ensuring continuous improvement in teaching quality and technology integration.
6. **Encouraging Research and Innovation:** Teacher educators should be encouraged to engage in research exploring innovative digital pedagogical practices, thereby fostering a culture of evidence-based technology integration in education.

These educational implications emphasize the practical utility of the study in improving the overall quality of teacher education, enhancing technology adoption, and aligning institutional practices with contemporary digital learning standards.

Conclusion of the Study

The present study provides a descriptive analysis of the pedagogical digital competence of teacher educators, highlighting both strengths and areas requiring further development. The overall moderate level of competence suggests that while teacher educators possess foundational digital skills, there is a need for enhanced integration of technology with pedagogy to foster innovative and learner-centred teaching practices.

The study further underscores that contextual and professional variables, such as locality, teaching experience, and academic qualification, significantly influence the development of pedagogical digital competence. Gender and type of institution, however, do not appear to have a notable impact.

In conclusion, the findings highlight the critical role of targeted professional development, equitable access to digital infrastructure, and continuous institutional support in improving teacher educators' competence in digital pedagogy. Strengthening pedagogical digital competence not only

enhances the quality of teacher education but also ensures that future teachers are well-prepared to integrate technology effectively in their classrooms. These insights provide a solid foundation for policymakers, institutions, and educators to design strategies that promote inclusive and effective digital teaching–learning practices.

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IMPORTANCE OF RELEVANT PHILOSOPHICAL FOUNDATIONS FOR 21ST-CENTURY EDUCATION

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Abstract

In the 21st century, the world is experiencing a global educational revolution, rapidly accelerating in every dimension. Consequently, human life has become increasingly complex. Human life is rife with numerous physical, mental, social, moral, and spiritual challenges, requiring a robust educational plan to address them. As we know, every country and era's education system is based on some form of philosophical foundation, but this is unique to the times and places. As time changes, the philosophical foundation of education inevitably requires change or refinement. Even today, a sound philosophical foundation is essential for providing the world with multifaceted excellence. The present study aims to identify the sound philosophical foundation of current education. The content analysis method of descriptive research was used in this study. Based on this study, recommendations can be made regarding the relevant philosophical foundation of education in the present era.

Keywords: 21st century Education, Philosophical background of Education, Current relevance.

Introduction

Since entering the 21st century, the entire world has been undergoing a transformative era of global educational revolution. This educational revolution has advanced rapidly in every sphere of human life, resulting in a continuous shift from the simplicity of the past to the complexities of the present. Currently, human life worldwide is surrounded by numerous physical, mental, economic, social, political, ethical, religious, and spiritual challenges. Every nation is grappling with various problems, and collectively, the entire world is facing a multitude of serious and complex challenges.

To address these global problems and challenges, robust educational plans are necessary. As we all know, the education system of every country and era is based on some philosophical ideology, but this ideology changes according to contemporary relevance. As social, economic, and political changes occur, corresponding changes are reflected in the education system (**Emile Durkheim, 1902**). With the passage of time, the need for changes in the educational system is felt. Whenever the nature of educational changes is contemplated, and plans are formulated, the need for changes in the philosophical foundations of education also becomes apparent. In the current global scenario, there is a need for an educational plan that ensures peace, security, and prosperity, and this plan should be based on a relevant philosophical ideology.

The Current Global Scenario

Since the beginning of the 21st century, the entire global landscape has been undergoing a period of rapid and multifaceted transformation. The world is grappling with numerous challenges, such as geopolitical conflicts, rapid technological advancements, economic imbalances, economic instability, environmental changes, and a swift shift towards a multipolar political system. In the 21st century, our nation, India, has emerged as a significant global power. India has made rapid technological and economic progress in recent years and is significantly influencing the global agenda for sustainable development on issues such as Digital India, climate change activism, and inclusive growth.

Key Points of the Current Global Scenario

- **Geopolitical Conflicts and Instability**

The current global landscape appears conflict-ridden, with numerous geopolitical conflicts widely prevalent, posing significant threats to human civilization and existence. Currently, ideological, political, and violent conflicts exist between Russia and Ukraine, Israel and Palestine, and Israel and other Middle Eastern nations such as Iran, Lebanon, Yemen, and Saudi Arabia. The United States, in its efforts to maintain its position as a global superpower, is constantly engaged in conflicts with nations like Russia, Iran, and China, pursuing various expansionist policies. The numerous conflicts in the Middle East have a global impact on oil prices, causing significant economic losses to nations that consume large quantities of oil and petroleum products.

- **Multipolar Global Landscape**

The emergence of nations like Russia, China, and India on the global stage, alongside the previously established global dominance of the United States, is leading the world towards multipolarity. This increasing multipolarity is extremely dangerous for the entire world, and its devastating consequences may become apparent in the future.

- **Global Economic Imbalances**

Currently, numerous imbalances are visible in the global economy, slowing down the pace of economic growth and giving rise to complex instability. By the end of 2025, the global growth rate is projected to slow down to between 2.4 percent and 2.5 percent.

Major Factors of Global Economic Imbalance

Developed, Developing, and Underdeveloped Economies. Economic imbalances prevail throughout the world. Broadly speaking, when comparing the economies of the entire world, three main categories emerge: developed, developing, and underdeveloped economies. Nations such as the United States, France, Britain, Norway, Japan, Canada, Australia, Switzerland, Sweden, Germany, Singapore, and Iceland are recognized as developed nations. India, China, Indonesia, Thailand, Vietnam, the Philippines, Pakistan, Bangladesh, Nepal, Sri Lanka, Malaysia, Mongolia, Kazakhstan, Iraq, Iran, Jordan, Nigeria, Egypt, Morocco, Algeria, Tunisia, Ghana, Kenya, Brazil, Mexico, Colombia, Argentina, Chile, Venezuela, Peru, Cuba, Jamaica, Maldives, Serbia, Ukraine, Russia, Armenia, and Azerbaijan are recognized as developing nations. The economies of developing nations are at a lower level compared to those of developed nations. In addition, the third category comprises nations with extremely weak economies. South Sudan, Yemen, Liberia, Madagascar, Burundi, the Central African Republic, Congo, Malawi, Niger, and Mozambique are among the ten countries with the lowest economic status. Based on the three-tiered classification of the global economy, it is evident that global economic inequality is clearly established, but there are numerous factors contributing to this imbalance, and no single factor can be held solely responsible.

Decline in Trade and Investment

Many developing and low-income countries are facing serious economic challenges due to a decline in overall trade and investment. Countries with weak economies have limited opportunities to benefit from trade and have less capacity to invest in specific sectors.

Debt Crisis and Food Insecurity

Low-income developing countries with weak economies are grappling with problems such as a growing debt burden, weak financial positions, and a decline in overall revenue, leading to widespread imbalances in the global economy. Due to numerous global problems such as

geopolitical conflicts, climate change, and economic imbalances, **343** million people globally are facing severe food insecurity.

Disruptions in Energy Supply

Geopolitical instability across the world is causing disruptions in energy supply for many nations, leading to widespread economic losses. For large energy-importing nations like India, disruptions in energy supply are causing significant economic losses and inflation.

The Need for Global Peace and Security

The entire world is grappling with various political, religious, geopolitical, and economic conflicts. Interference by powerful nations in the internal affairs of smaller and weaker nations, and military actions against them have become commonplace. Examples such as the Russia-Ukraine conflict, Israel-Palestine conflict, and the US-Venezuela conflict demonstrate the widespread conflicts present in the world today. Recently, serious conflicts have emerged between Iran, Israel, and the US, which are extremely detrimental to global peace and security. Terrorism sponsored by Pakistan forces peace-loving nations like India to engage in conflict. This conflict is extremely dangerous for regional stability.

The Role of Education for Global Peace, Security, and Prosperity

Knowledge is light, and ignorance is darkness. A human being is born innocent, and their life is initially based on innate instincts, which are fundamentally animalistic. It is through the educational process (informal, formal, and non-formal) established by human society that a human being becomes a social creature. The education system plays a crucial role in elevating and refining this animalistic human life. For global peace, security, and prosperity, there is a need for a high-quality education system that imparts values, skills, technology, and philosophical clarity. While many nations in the world have excellent education systems, many developing nations suffer from a severe lack of educational resources. Although global organizations like UNESCO and UNICEF strive to promote education worldwide, a lack of equitable access to quality education persists globally. There is a great need for an education system across the world that prioritizes human values—an education that emphasizes the attainment of human values before material progress, and whose objective is to pave the way for human development. Most conflicts in the world stem from materialism and misinterpretations and misapplications of religious doctrines. These are problems that currently threaten human existence itself. Therefore, humanity must embrace the spirit of coexistence and human values to ensure its survival; otherwise, human civilization may perish in the future, and humanity itself will be responsible.

Current Philosophical Foundations of Global Education

As we all know, every education system has a philosophical ideology as its foundation; often it is a single ideology, and at other times, a blend of several ideologies. Some of the major philosophical foundations of the global education system are described below:

Humanism

Humanism is considered the strongest philosophical pillar in the current global education system. The fundamental tenet of humanist philosophy is that all human beings in the world are ultimately members of the same family, who should receive equal opportunities, respect, and a life of equal quality, along with equal quality education. It should be imbued with the spiritual concept of human coexistence. This is a chain of thought that does not prioritize any geographical, racial, religious, social, or political boundaries among humankind, but rather accepts humanity as a unified whole. World-renowned philosophers such as Immanuel Kant, Rabindranath Tagore, and Martha Nussbaum are prominent thinkers of humanist philosophical thought.

Cosmopolitanism

Cosmopolitanism is a philosophical ideology that believes that the entire Earth is one, and that humans are not citizens of any one nation but of the entire world. The main idea of this ideology is that a person is not limited to any one nation, but their identity is connected to the entire human civilization, that is, to all of humanity. In global education, this ideology places great emphasis on pluralism, multicultural dialogue, and human integration.

Idealism

Idealism is a philosophical ideology that greatly influences global education. Prominent thinkers of idealist philosophy include great figures such as Socrates, Plato, Kant, Hegel, Shankaracharya, Swami Vivekananda, and Rabindranath Tagore. Idealist philosophy accepts humans as possessing a soul, considers the power of ideas to be supreme, and considers the physical world secondary. The main objectives of idealistic education include self-realization, the attainment of supreme morality and human values, and spiritual excellence such as truth, goodness, and beauty.

Realism

The realist philosophy accepts only the physical world, that is, matter, as reality. Realist thought accepts the human body as a physical structure and a form of advanced consciousness, but does not accept the existence of a soul in any form. This philosophy accepts only objective reality and does not believe in any kind of metaphysical world beyond the physical world. Thinkers like Aristotle, John Locke, Herbert Spencer, and Aquinas are important pillars of this philosophy.

Pragmatism

The philosophical ideology propagated by scholars like the American philosophers Charles Sanders Peirce and John Dewey is known as pragmatism. Pragmatist thought accepts pre-established principles as true only after testing them against practical experience. The fundamental concept of pragmatist philosophy is that truth is in a state of becoming, meaning that humanity has not yet attained ultimate truth, but is continuously searching for it. This philosophy believes that truth is what proves to be practically useful. Pragmatist philosophy considers education not as preparation for life, but as life itself. Pragmatist philosophers have accepted the development of problem-solving abilities, the establishment of democratic values, and the creation of socially adaptable individuals through education as their primary objectives.

Naturalism

Naturalism holds a prominent place among the philosophical foundations of education. The naturalist philosophical ideology originated with Western philosophers such as Rousseau, Neill, Herbert Spencer, and Charles Darwin, who accepted the universe as mechanical, self-operating, self-created, and natural. According to this ideology, nature is the ultimate reality; there is no divine or supernatural power beyond nature. In accordance with its fundamental naturalist principles, naturalism recommends the development and education of human beings based on natural principles and consequences.

Existentialism

Existentialist philosophical thought has also been included in the philosophical foundations of education. Existentialist philosophy is a comparatively more modern philosophical ideology. Existentialist thought gives supreme importance to the individual existence, experiences, and free human existence of man. The fundamental principle of existentialism is that existence precedes essence, meaning that man is first born into this world with an existence, and only then does he mold himself into various forms and roles, which constitute his essence. Therefore, existence comes first, followed by essence. Existentialist philosophy believes that there is no predetermined meaning or God-given purpose in this world; rather, the entire human race individually determines

its own life path, its meaning, purpose, and values. Existentialist thinker Sartre says that every human being is completely free and fully responsible for the consequences of their actions.

Philosophical Foundations of Education in the 21st Century

The 21st century is perhaps the most progressive in the history of human civilization. Human progress has reached its zenith in terms of knowledge, science, technology, artificial intelligence, and material prosperity. Along with achievements such as industrial progress, infrastructural development, medical revolution, increased life expectancy, and economic advancement, human life is also facing threats from geopolitical conflicts, religious tensions, terrorism, environmental imbalance, and continuous violent global conflicts, which are casting a shadow over human progress and even its very existence. With the increasing stockpiling of destructive atomic and chemical weapons capable of destroying the entire world, the world is undoubtedly grappling with a widespread existential crisis. In addition to destructive weapons, problems like widespread environmental imbalance and global warming have taken on a monstrous form in the present time, and their solution is possible only through the implementation of an education system based on the best and most relevant philosophical ideologies.

A Conceptual Philosophical Vision of a Sound Educational Philosophy in the 21st Century

The current education system, characterized by an increasing emphasis on intellectualism and materialism, needs to be given a balanced and healthy form. Idealistic and humanistic principles should be incorporated into the objectives and foundations of education. Although many moral values may seem highly impractical and meaningless from a utilitarian perspective, putting them into practice in accordance with long-term goals will significantly influence future possibilities. There is a need to promote the concept of global citizenship, which will strengthen human relationships and reduce conflicts. The modern world needs a new philosophy of environmentalism that includes the protection of nature and the environment as one of its main objectives. As we all know, if human existence is threatened on this Earth due to environmental factors, there is no other planet available to save human civilization and life.

Conclusion

Currently, human conflicts exist throughout the world in geopolitical, religious, cultural, ideological, social, and economic forms. Many nations are currently engaged in conflict with each other. Humanity has advanced so much in technological and material progress that it is even transcending the boundaries of space. While technological and digital progress have made human life simpler, easier, and more enjoyable, it has also created a crisis for human civilization by developing weapons and devices of mass destruction. Human conflicts can only be resolved through a superior form of education—an education system that teaches love for all humanity, that encourages human and animal welfare. Such an education requires strong philosophical and ideological foundations. For this reason, there is a great need for revision, refinement, and reconsideration of the philosophical foundations of education globally.

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HUMAN VALUES AND EMOTIONAL INTELLIGENCE AMONG HIGHER ARTS AND SCIENCE COLLEGE STUDENTS IN MADURAI DISTRICT

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Abstract

Human values and emotional intelligence play a crucial role in the holistic development of students, shaping their ethical behavior, interpersonal relationships, and decision-making skills. In the context of higher education, these competencies become increasingly important as students prepare to navigate complex social and professional environments. This study investigates human values and emotional intelligence among 200 students enrolled in higher arts and science colleges in Madurai District, examining differences based on gender, stream of study, and locality. Data were collected using standardized scales for human values and emotional intelligence, and analyzed using independent samples t-tests and Pearson's correlation. The findings reveal significant variations in emotional intelligence and human values with respect to gender and study stream, and a positive correlation between the two constructs. The study emphasizes the need for integrating value-based education and emotional intelligence training in higher education to foster socially responsible and emotionally competent graduates.

Keywords: *Human Values, Emotional Intelligence, Higher Education, College Students, Gender, Stream, Madurai District.*

Introduction

Education is not merely the acquisition of knowledge; it also involves cultivating human values and emotional intelligence, which guide ethical decision-making, interpersonal relationships, and personal growth. Human values such as honesty, empathy, responsibility, and respect form the foundation of moral and social behavior, while emotional intelligence enables students to recognize, understand, and regulate their own emotions and those of others. In higher education, especially in arts and science colleges, students are exposed to diverse academic and social environments that challenge both their cognitive and affective skills. Emotional intelligence and human values are essential for navigating academic pressures, collaborating effectively with peers, and preparing for professional life. Research indicates that students with high emotional intelligence tend to exhibit stronger empathy, better stress management, and enhanced social competence, all of which contribute to responsible and value-driven behavior. This study focuses on understanding the levels of human values and emotional intelligence among higher arts and science college students in Madurai District, examining differences based on gender, stream of study (arts vs. science), and locality (urban vs. rural), and exploring the relationship between human values and emotional intelligence.

Human Values and Emotional Intelligence among higher Arts and Science College Students

Human values and emotional intelligence are essential components of holistic education, particularly in higher education where students undergo significant personal, emotional, and social development. In the modern educational context, academic achievement alone is insufficient for overall success; students must also develop strong moral principles and emotional competencies to face life's challenges effectively. Human values such as honesty, respect, responsibility, empathy, cooperation, and ethical behaviour form the foundation of good character and social harmony.

These values guide students in making responsible decisions and maintaining positive relationships within society.

Emotional intelligence plays a crucial role in enabling students to understand and manage their emotions, empathize with others, and handle interpersonal situations effectively. It includes self-awareness, self-regulation, social awareness, and relationship management, which together contribute to emotional maturity and psychological well-being. Students with higher emotional intelligence tend to cope better with academic stress, exhibit positive social behaviour, and demonstrate improved academic performance.

Higher arts and science college students represent a vital segment of the youth population who are preparing for future professional and social responsibilities. This stage of life is marked by rapid emotional growth and value formation, making it an appropriate period to study the development of human values and emotional intelligence. Educational institutions play an important role in nurturing these qualities through curriculum, co-curricular activities, and social interaction. Madurai District, known for its rich cultural heritage and diverse educational institutions, provides a meaningful setting for this investigation. The socio-cultural environment of the district influences students' attitudes, emotional development, and value systems. Studying students from this region offers insight into how human values and emotional intelligence interact within a real educational context. The present study aims to examine the levels of human values and emotional intelligence among higher arts and science college students in Madurai District and to analyze the relationship between these two variables. Understanding this relationship will help educators, administrators, and policymakers design value-based and emotionally supportive educational programs to promote students' holistic development.

Need and Significance of the Study

In the contemporary educational environment, students face increasing academic pressure, social challenges, and emotional stress. While higher education primarily focuses on intellectual development, equal importance must be given to nurturing human values and emotional intelligence for the overall personality development of students. Human values such as honesty, empathy, responsibility, and respect are essential for creating socially responsible individuals, whereas emotional intelligence helps students manage emotions, cope with stress, and maintain healthy relationships. Higher arts and science college students are at a formative stage of life where value systems and emotional skills are being strengthened. Understanding their levels of human values and emotional intelligence can help educators identify areas that require support and intervention. Moreover, exploring the relationship between these two variables will provide insight into how moral development and emotional competence influence one another.

The present study is significant as it offers empirical evidence on human values and emotional intelligence among college students in Madurai District, a region with diverse cultural and educational backgrounds. The findings of the study will be useful for teachers, curriculum planners, counselors, and educational administrators in designing value-based education programmes and emotional skill development activities. Ultimately, the study contributes to promoting holistic education that prepares students not only for academic success but also for responsible and emotionally balanced living.

Statement of the Problem

In the present educational scenario, the development of human values and emotional intelligence is as important as academic achievement for the holistic growth of students. Higher arts and science college students are at a crucial stage where moral values and emotional competencies are being shaped, influencing their future personal and professional lives. However, limited research has been

conducted to understand the levels of human values and emotional intelligence and their relationship among college students in Madurai District. Therefore, the present study seeks to investigate human values and emotional intelligence among higher arts and science college students in Madurai District.

Objectives of the Study

1. To assess the level of human values among higher arts and science college students.
2. To assess the level of emotional intelligence among higher arts and science college students.
3. To examine differences in human values based on gender.
4. To examine differences in emotional intelligence based on gender.
5. To examine differences in human values and emotional intelligence based on stream of study.
6. To examine differences in human values and emotional intelligence based on locality.
7. To explore the relationship between human values and emotional intelligence among students.

Hypotheses

1. There is no significant difference in human values between male and female students.
2. There is no significant difference in emotional intelligence between male and female students.
3. There is no significant difference in human values between arts and science students.
4. There is no significant difference in emotional intelligence between arts and science students.
5. There is no significant difference in human values between urban and rural students.
6. There is no significant difference in emotional intelligence between urban and rural students.
7. There is no significant relationship between human values and emotional intelligence among students.

Methodology

Research Design

This study adopted a **survey method** to assess human values and emotional intelligence among college students.

Sample

The sample consisted of 200 students from various higher arts and science colleges in Madurai District, selected using simple random sampling to ensure representativeness of gender, study stream, and locality.

Tools Used

The present study employed two standardized instruments for data collection: the Human Values Scale and the Emotional Intelligence Scale. The Human Values Scale was used to measure students' personal, social, and ethical values, including qualities such as honesty, responsibility, respect, cooperation, and moral conduct. This scale provided a comprehensive understanding of the value orientation of the students in their daily life and social interactions. The Emotional Intelligence Scale was utilized to assess key components of emotional intelligence, namely self-awareness, self-regulation, social awareness, and relationship management. It helped in understanding students' ability to recognize and manage their emotions effectively, empathize with others, and maintain healthy interpersonal relationships. Together, these tools enabled a systematic assessment of the relationship between human values and emotional intelligence among the students.

Data Analysis

- **Independent samples t-tests** were used to examine differences based on gender, stream, and locality.
- **Pearson's correlation coefficient** was calculated to explore the relationship between human values and emotional intelligence.

Table1 : Difference in Human Values by Gender

Variable	Sub-variables	N	Mean	SD	't' - value	Significance At 0.05 level
Gender	Male	98	115.30	9.50	3.42	S
	Female	102	120.40	8.90		

The mean human values score of **female arts and science college students (M = 120.40, SD = 8.90)** is higher than that of **male students (M = 115.30, SD = 9.50)**. The '**t**' value of **3.42** is significant at the 0.05 level, indicating a statistically significant difference. Female students in arts and science colleges demonstrate significantly higher human values than male students, suggesting that gender may influence the development of ethical and moral values among college students.

Table2: Difference in Human Values by locality

Variable	Sub-variables	N	Mean	SD	't' - value	Significance At 0.05 level
Locality	Rural	105	116.40	9.70	2.84	S
	Urban	95	119.50	9.10		

The mean human values score of **urban arts and science college students (M = 119.50, SD = 9.10)** is higher than that of **rural students (M = 116.40, SD = 9.70)**. The '**t**' value of **2.84** is significant at the 0.05 level, indicating a statistically significant difference. Urban students exhibit significantly higher human values than rural students, suggesting that environmental and social factors related to locality may positively influence the development of ethical and moral values among arts and science college students.

Table 3: Difference in Emotional intelligence with respect to Gender

Variable	Sub-variables	N	Mean	SD	't' - value	Significance At 0.05 level
Gender	Male	98	114.20	10.10	4.12	S
	Female	102	119.59	9.40		

The mean emotional intelligence score of **female arts and science college students (M = 119.59, SD = 9.40)** is higher than that of **male students (M = 114.20, SD = 10.10)**. The '**t**' value of **4.12** is significant at the 0.05 level, indicating a statistically significant difference. Female students in arts and science colleges have significantly higher emotional intelligence than male students, suggesting that gender may play a role in the development of emotional competencies among college students.

Table 3: Difference in Emotional intelligence with respect to locality

Variable	Sub-variables	N	Mean	SD	't' - value	Significance At 0.05 level
Locality	Rural	105	115.30	10.00	3.05	S
	Urban	95	119.80	9.20		

The mean emotional intelligence score of **urban arts and science college students (M = 119.80, SD = 9.20)** is higher than that of **rural students (M = 115.30, SD = 10.00)**. The '**t**' value of **3.05** is significant at the 0.05 level, indicating a statistically significant difference. Urban arts and science college students exhibit significantly higher emotional intelligence than their rural counterparts, suggesting that factors associated with locality, such as exposure, opportunities, and environment, may positively influence the development of emotional competencies.

Table 5: Correlation between Human and Emotional Intelligence among arts and science students.

Variables	N	r-value	Significance at 0.05 level
Emotional Intelligence & Empathy	200	0.65	S

The Pearson correlation between human values and emotional intelligence among 200 college students was $r = 0.65$, significant at the 0.05 level. This indicates a **moderate to strong positive relationship**, showing that students with higher human values—like honesty, empathy, and responsibility—also tend to have higher emotional intelligence. The finding suggests that ethical values and emotional competencies are closely linked, supporting better interpersonal skills, academic performance, and social responsibility.

Interpretation and discussion

The analysis reveals a significant positive correlation between human values and emotional intelligence among arts and science college students, indicating that students who demonstrate higher levels of honesty, empathy, responsibility, and respect also tend to exhibit stronger emotional competencies such as self-awareness, emotional regulation, and social skills. Furthermore, female students scored higher than male students, and urban students scored higher than rural students on both human values and emotional intelligence. This suggests that gender and locality influence not only these variables individually but also their relationship. Overall, the findings highlight that the development of ethical and moral values is closely linked with emotional competencies, and social and environmental factors play a vital role in shaping these traits in higher education.

Educational Implications

1. Teacher and student education programs should integrate human values and emotional intelligence training into the curriculum to foster holistic development.
2. Arts and science curricula should include ethics, value-based education, and social-emotional learning modules.
3. Urban-rural disparities highlight the need for targeted interventions in rural colleges to ensure equitable development of affective competencies.
4. Enhancing EI and human values contributes to better interpersonal relationships, academic success, and ethical decision-making in college and professional life.

Recommendations

1. Introduce workshops and seminars on emotional intelligence and human values for college students.
2. Conduct peer mentoring and group activities to promote empathy, teamwork, and ethical reasoning.
3. Include reflective journals and case studies in coursework to develop moral reasoning and self-awareness.
4. Organize interdisciplinary programs to foster human values across arts and science streams.
5. Encourage community engagement and social service projects to strengthen empathy and social responsibility.

Conclusion

The study highlights that human values and emotional intelligence are crucial for holistic student development in higher arts and science colleges. Female and urban students, as well as arts stream students, demonstrated higher levels of both competencies. The positive correlation between human values and emotional intelligence emphasizes their interdependence in fostering ethical, socially responsible, and emotionally competent graduates. These findings underscore the

importance of integrating value-based education and emotional intelligence training into higher education curricula to prepare students for ethical decision-making, effective interpersonal relationships, and professional success in diverse social and academic environments.

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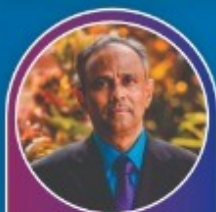
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