



Transformative Capacity Building for a Sustainable Future



Chief Editor

Dr. Bhagwan Balani

Associate Editors

Prof. Mandeep Kaur Kochar

Prof. Priya Pillai, Dr. Neelu Verma

Dr. Raju Talreja

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Preface

The present volume brings together the scholarly papers presented at the International Conference on “Transformative Capacity Building for a Sustainable Future” organized by Bombay Teachers’ Training College, a constituent college of HSNC University, Mumbai, on 25th April 2025. The conference provided a global platform for academicians, researchers, educators, policymakers, and students to deliberate on innovative practices, policies, and frameworks that can strengthen the capacities of individuals and institutions toward achieving sustainable and equitable futures.

In an age marked by rapid technological progress, environmental concerns, and complex socio-economic transitions, education assumes a pivotal role in shaping human potential and social resilience. The conference was conceptualized with the belief that transformative capacity building - rooted in critical thinking, collaboration, and innovation - can enable educational institutions to act as catalysts for sustainable development.

The papers compiled in this book reflect a diverse range of perspectives across multiple sub-themes such as integrating sustainability into curricula, fostering global citizenship, promoting inclusive and equitable education, strengthening teacher training and professional development, enhancing environmental literacy, and leveraging digital technologies for sustainable education. Each paper contributes valuable insights and empirical evidence that advance our collective understanding of how education can be both a means and an end in achieving the United Nations’ Sustainable Development Goals.

This publication stands as a testament to the collaborative spirit and academic rigor demonstrated by all contributors. The editorial team acknowledges the sincere efforts of the Organizing Committee, the Peer Review Panel, and all authors whose commitment ensured the successful realization of this academic endeavor. Gratitude is also extended to Col. (Prof.) Hemlata Bagla, Vice Chancellor, HSNC University; Adv. Anil Harish, Provost; and Dr. Bhagwan Balani, Conference Convenor, for their visionary leadership and constant encouragement.

It is our hope that this compendium will serve as a resource and inspiration for educators, researchers, and policymakers striving to create educational ecosystems that are future-ready, inclusive, and sustainable.

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**BLENDED SUPPORT, REAL IMPACT: EVALUATING VIRTUAL TRAINING AND
HYBRID MENTORSHIP MODELS FOR COMMUNITY-LED TB RESEARCH
IMPLEMENTED BY CIVIL SOCIETY SECTOR FORUM IN SOUTH AFRICA**

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Ntando Yola, Msizi Khumalo, Ndumiso Tshuma**

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Abstract:

Background:

Community-led research is essential for ensuring that TB interventions are responsive, ethical, and grounded in the lived experiences of affected populations. However, many civil society actors lack the training and support required to lead such research effectively. This study examines the outcomes of a blended training and mentorship model implemented in South Africa during Phase 2 of a national TB research capacity-strengthening initiative.

Objectives:

To evaluate the effectiveness of virtual training and hybrid mentorship strategies in preparing civil society sector leaders to conduct ethical, context-specific TB research, and to explore the enabling conditions and limitations of this approach.

Methods:

A qualitative descriptive study was conducted with participants from six SANAC Civil Society Forum sectors across five provinces. Data were collected through mentor field notes, WhatsApp interactions, reflection sessions, and training feedback forms. The intervention included interactive Zoom-based training, asynchronous recordings, WhatsApp-based peer learning, and targeted in-person mentoring. Thematic analysis was used to identify key outcomes and learning themes.

Results:

The intervention led to increased research confidence, improved facilitation skills, and ethical awareness among participants, even where formal ethics certification posed challenges. Key enablers included the use of interactive digital tools, mentorship grounded in cultural humility, and the strategic use of WhatsApp for ongoing communication and peer support. Sector leaders highlighted the flexibility of the

model and its relevance to community realities, while also noting the need for ethics training in local languages and more onsite supervision.

Conclusion:

A blended training and mentorship approach can effectively equip civil society actors with the skills and confidence to lead participatory TB research. Future efforts should institutionalize hybrid mentorship models, expand multilingual ethics training, and leverage community-based communication platforms to sustain momentum and inclusion.

Keywords: *Community-led research, TB, civil society, mentorship, virtual training, ethics, South Africa, capacity building.*

Introduction:

The global fight against tuberculosis (TB) continues to demand innovative, inclusive, and community-centered approaches to research, prevention, and care (Ajudua & Mash, 2022; Curran et al., 2023; Donessouné et al., 2023). Despite significant investments in biomedical research and programmatic interventions, many TB-affected populations remain underserved due to structural inequities, socio-cultural barriers, and the persistent marginalization of community voices in the design and evaluation of interventions (Myburgh et al., 2023). In South Africa—a country with one of the highest TB burdens globally—the need to engage communities not merely as beneficiaries but as research partners is particularly urgent (DeSanto et al., 2023). Community-led research (CLR) has emerged as a powerful model for democratizing knowledge production and ensuring that research processes and outputs are relevant, ethical, and grounded in the lived experiences of those most affected by TB (Kerkhoff et al., 2023; Versfeld et al., 2022). The approach aligns with broader commitments to equity, participation, and health systems strengthening, and is increasingly recognized by national and international frameworks (Ullah et al., 2022). However, the operationalization of CLR remains limited, particularly within civil society structures that lack the technical and institutional capacity to undertake formal research activities (Tshuma et al., 2024).

Recognizing this gap, the South African National AIDS Council (SANAC) Civil Society Forum (CSF), in partnership with a national technical support team, launched a multi-phase initiative to build research capacity across its diverse sectoral membership. The aim was to equip CSF sectors with the knowledge, tools, and mentorship needed to design and implement TB-focused research projects that reflect community needs, amplify marginalized voices, and contribute to the evidence base informing policy and practice.

Phase 1 of the initiative focused on foundational research literacy, introducing CSF members to the principles and practices of community-led inquiry. Phase 2, which is the focus of this article, was designed to advance this foundation by providing intensive training on research ethics, data collection methodologies, and tool development, as well as direct mentorship and coaching support to enable sectors to prepare for data collection.

A key innovation of Phase 2 was the adoption of a blended capacity-building model that combined virtual training (via Zoom), interactive platforms (such as Mentimeter), asynchronous learning (through session recordings), and hybrid mentorship support delivered through WhatsApp, calls, and in some cases, in-person visits. This model was developed in response to the logistical, linguistic, and technological realities faced by CSF members, many of whom work in under-resourced settings and juggle multiple roles.

This paper presents an evaluation of the blended training and mentorship methodology used during Phase 2. It explores how civil society sector leaders experienced and applied the training, the extent to which the support model enhanced ethical readiness and technical competency, and the emerging practices that can inform future models of participatory research training in similar contexts. In doing so, it contributes to the growing body of literature on capacity building for community-engaged research in the Global South and highlights the importance of relational, responsive, and locally adapted support strategies for enabling grassroots leadership in health research.

Methods:

Study Design and Approach:

This study employed a qualitative descriptive design embedded within a broader community-based participatory research (CBPR) framework. The aim was to assess the effectiveness of virtual training and hybrid mentorship methodologies in preparing civil society sectors to conduct ethical and context-relevant TB research. The approach was iterative and participatory, aligning with the values of inclusivity, contextual responsiveness, and capacity strengthening.

Setting and Participants:

The study was conducted across six civil society sectors under the South African National AIDS Council (SANAC) Civil Society Forum. These included the Faith-Based Sector, Men's Sector, Traditional Health Practitioners, Research Sector, Sports, Arts and Culture Sector, and the Law and Human Rights Sector. Participants were drawn from diverse provinces including Gauteng, Eastern Cape, Free State, KwaZulu-Natal, and Limpopo. Each sector nominated a team of five to eight individuals, including

sector leaders, co-investigators, and facilitators, to participate in the training and mentorship program.

Training and Mentorship Intervention:

The intervention spanned six weeks and combined multiple learning formats to accommodate varying capacities and contexts. Virtual training sessions were conducted on Zoom, featuring interactive components such as Mentimeter to foster real-time engagement and peer learning. Recordings of each session were shared to allow asynchronous learning for those who could not attend live or who wished to revisit content. A hybrid mentorship model complemented these sessions, blending structured virtual coaching with continuous WhatsApp-based communication and targeted in-person visits in sectors requiring more hands-on guidance. The training curriculum covered ethical research principles, tool development and piloting, facilitation of community dialogues, and use of digital tools to disseminate and manage data.

Data Collection:

Data collection for the evaluation of this intervention drew on a range of qualitative sources to capture the depth of sector experiences. Facilitator and mentor field notes were compiled throughout the training and mentorship phases, with additional insights drawn from WhatsApp group conversations, post-training feedback forms, and one-on-one reflections with sector leaders. Observations from pilot sessions, especially those following retraining on dialogue facilitation, were documented in structured debriefing reports. Direct quotes were also recorded and transcribed from reflection sessions and WhatsApp voice notes, with informed consent.

Data Analysis:

Thematic analysis was used to interpret the data, applying an inductive coding process aligned with the training objectives and sector-specific outcomes. The research team manually coded the data and triangulated themes across the different sources, including field notes, WhatsApp interactions, and follow-up interviews. Care was taken to ensure representation of perspectives across all participating sectors and provinces, with illustrative quotes selected to highlight variation in experience by gender, location, and sector role.

Ethical Considerations:

The study followed ethical standards as set out in national and institutional guidelines for research involving human participants. Consent was obtained from all participants for use of quotes and reflections, with assurances of confidentiality and voluntary participation. Identifiable information was anonymized during reporting.

Results:

The analysis of participant experiences revealed five key themes that underscore the effectiveness of the virtual training and hybrid mentorship model used to support civil society sector engagement in TB research. These themes highlight gains in knowledge, confidence, adaptability, and community relevance that emerged through the implementation of a blended capacity-building approach.

Strengthened Research Confidence and Competency:

Participants consistently reported increased confidence in their ability to understand and lead research processes. The interactive use of Zoom and Mentimeter enabled dynamic knowledge exchange, while recordings allowed participants to learn at their own pace.

"At first, I was nervous to even use the word 'research' in front of my community. But after the training and the one-on-one follow-up, I can now explain what data collection is, what consent means, and why our work matters. I've become a guide to others in my team."

(Faith-Based Sector, KwaZulu-Natal, Female)

"The training was very informative. I really liked how we could see each other's answers on Mentimeter—it made me feel heard, even online. It was like being in a real room with people who share the same goal."

(Sports, Arts & Culture Sector, Gauteng, Male)

Accessibility through Asynchronous Learning and Tailored Support:

The availability of recorded sessions was noted as a vital tool, particularly for those with scheduling conflicts or connectivity limitations. Sector leaders also emphasized the value of tailored mentoring, which was delivered flexibly—sometimes after hours or through informal platforms.

"The recordings helped a lot, especially because I have other commitments during the day. I would listen to the session again at night with a notebook, and then contact the mentor on WhatsApp the next day with questions."

(Men's Sector, Eastern Cape, Male)

"What worked best was the way support felt casual but helpful. Sometimes they'd say, 'We're in the area' even if it was just a call. It kept us on our toes without feeling judged. That balance really helped us move forward."

(Traditional Health Practitioners Sector, Eastern Cape, Female)

Ethical Awareness Despite Certification Challenges:

While not all participants completed the formal TRREE research ethics certification due to language and digital barriers, the mentorship model ensured that ethical

principles were internalized and practiced. Sector leaders reported increased understanding of consent, confidentiality, and responsible data handling.

"I struggled with the online ethics course because of the English. It was too technical. But through the mentoring, I learned what ethics means in practice. We now start every dialogue by explaining people's rights in their own language."

(Law and Human Rights Sector, Free State, Female)

"Our team didn't all get certificates, but we can confidently say we know how to protect the dignity of our participants. That's what matters."

(Research Sector, Free State, Male)

Enhanced Facilitation of Community Dialogues through Iterative Learning:

Early implementation revealed missteps in dialogue facilitation—such as organizing overly large groups. This was addressed through rapid feedback, retraining, and the use of demonstration videos. Sector leaders adapted and reported better engagement in smaller, more intimate settings.

"We started off with a big group—40 people in one hall. It didn't work. After the feedback and watching the video, we broke people into smaller circles. It changed everything. People opened up more. It felt personal and safe."

(Faith-Based Sector, Limpopo, Female)

"I'll never forget the second round of dialogues. That's when I really saw what it means to listen. We learned by doing, and by doing better."

(Men's Sector, OR Tambo, Male)

Peer Learning and Use of WhatsApp as a Research Enabler:

WhatsApp emerged as a central hub for communication, encouragement, and shared learning. Sector leaders used it to share tools, survey links, photos, and motivational messages.

"WhatsApp was our office. We shared wins, asked for help, and reminded each other to keep going. It was more than a group chat—it was our research family."

(Sports, Arts & Culture Sector, Gauteng, Female)

"Seeing other sectors post their progress pushed us to keep up. We didn't want to be left behind. It became a space for healthy pressure and support."

(Traditional Health Practitioners Sector, Eastern Cape, Male)

These findings illustrate how a blended support model combining virtual tools, mentorship, and community-rooted approaches can successfully prepare civil society actors to conduct ethical, contextually grounded, and participant-led health research.

Discussion:

The findings from this study demonstrate that a blended virtual and mentorship-based training model can effectively build the research capacity of civil society actors

in low-resource settings. Key insights highlight the adaptability, relevance, and relational dynamics that made this approach successful, despite challenges related to language, technology, and certification.

One of the most significant outcomes was the increased confidence of participants in understanding and applying research principles. The use of interactive tools like Mentimeter within Zoom created an engaging environment that simulated in-person learning and fostered shared reflections among sector leaders. This interactivity was essential in demystifying technical content, enabling participants—many of whom did not have formal research backgrounds—to feel more comfortable and competent in applying research skills within their sectors.

The use of asynchronous learning materials, particularly the recordings of training sessions, addressed barriers related to connectivity and time constraints. Participants were able to revisit sessions in their own time, and this flexibility was especially important for sector leaders balancing multiple responsibilities. It also enabled more equitable access for those who may have been intimidated in live discussions but found confidence through individual review and later engagement with mentors.

The mentorship component was equally critical. The informal yet consistent nature of mentorship, including evening WhatsApp check-ins and the strategic use of messages like “we’re in the area,” helped maintain motivation without introducing pressure. This human-centered, culturally attuned approach built trust, normalized learning curves, and created space for honest reflection and adaptation. It also created horizontal peer networks, as sector leaders often shared lessons and motivated each other through group chats and social media.

Despite the overall success of the blended model, the ethics certification process revealed structural barriers. The TRREE course, while comprehensive, was inaccessible to many due to language complexity and the academic framing of its content. Nonetheless, ethical practices were widely understood and implemented thanks to mentorship that contextualized principles into practical scenarios. This suggests that ethical training for civil society may be more effective when offered in simplified, multilingual, and discussion-driven formats.

Furthermore, the iterative nature of learning was reflected in how sector teams responded to initial challenges in dialogue facilitation. Retraining, feedback loops, and the development of demonstration videos led to a tangible shift in field practice—moving from large, less effective gatherings to more intimate group discussions that encouraged participation and depth. This responsiveness illustrates the importance of real-time support, reflection, and flexibility in community-based research training.

Finally, the widespread use of WhatsApp and social media for both logistical coordination and research dissemination represents an innovative model for resource-constrained environments. These platforms were not only tools of communication but became informal learning spaces where civil society actors co-created knowledge and accountability.

Taken together, the findings point to the importance of a relational, responsive, and technologically blended approach to capacity building. Future initiatives seeking to strengthen civil society-led research in public health can benefit from embedding mentorship, leveraging accessible digital platforms, and tailoring ethics training to community realities.

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**ENHANCING TEACHER EDUCATION THROUGH A CULTURE
OF INQUIRY AND RESEARCH
CURRICULAR REFORMS, CURRICULUM TRANSACTION MODALITIES,
OUTCOMES, CHALLENGES, AND OPPORTUNITIES**

Dr. Bhagwan Balani

Abstract:

"Teachers must be researchers, always inquiring into what works, for whom, and under what conditions." -

John Dewey

BTTC offers teacher training programs from KG to PG. Enhancing teacher education through a sustained culture of inquiry and research has become a central imperative in contemporary educational reform.

From the post-pandemic and academic year 2020-2021, BTTC became a constituent college of HSNC University, Mumbai. One of the earliest priorities was revising the curriculum by introducing reforms that integrated inquiry and educational research, academic writing, and advanced educational statistics into courses in the curriculum of BEd and M A in Education teacher training programs, school engagements, practice teaching and internships, and assessment processes.

This research paper describes the efforts undertaken by Bombay Teachers' Training College (BTTC), a constituent college of HSNC University, Mumbai, to cultivate a sustained culture of research and inquiry among faculty and student teachers. Campbell, Sargent, and Rosenberg (2024) also argue that cultivating a strong research culture is essential for the overall health and vitality of higher education institutions. The article also highlights the participating institutions may face in balancing scholarly pursuits with mission-oriented commitments, yet research remains an enriching component of institutional identity and educational excellence. BTTC is consistently emerging as a pioneering college in teacher education, promoting research as the foundation of professional growth and reflective practice.

Objectives of the Research Culture Initiative:

The primary objectives driving BTTC's research-oriented transformation include:

1. Fostering critical and analytical thinking in pre-service teachers.
2. Integrating research-based courses and projects into the B.Ed. and M.A. Education programs.
3. Preparing teachers as knowledge creators and reflective practitioners.
4. Promoting evidence-based teaching and lifelong learning.

Curricular Reforms for Research-Based Learning

Devesh and Nanjundaswamy (2025) investigated how higher education institutions (HEIs) can cultivate a culture of inquiry by strengthening the research-teaching nexus. The authors examine institutional, faculty-level, and student-level factors that influence the integration of research into teaching practices. They suggested framework that enables HEIs to cultivate a strong culture of inquiry, enhance teaching quality, and ultimately contribute to the development of a skilled, research-oriented national human resource.

During internships and practice teaching, student teachers at BTTC undertake classroom-based action research projects, allowing them to investigate real teaching-learning situations. Their research is supported through the use of ICT tools such as Mendeley, Microsoft Excel, online data analysis tools like Vassarstats for data management, analysis, and reflective review.

Faculty as Research Mentors :

At BTTC, faculty serve as powerful mentors who cultivate a strong culture of inquiry and research among student teachers. Guided by Lee Shulman's belief that inquiry drives deep learning, faculty act as facilitators and co-learners, fostering curiosity, reflective thinking, and evidence-based practice. Mentorship spans both B.Ed. and M.A. Education programmes—supporting action research at the undergraduate level and supervising advanced research at the postgraduate level.

Impact of Faculty Mentorship:

Faculty mentorship at BTTC has led to significant measurable outcomes, including increased participation of student teachers in national and international research conferences and the publication of co-authored papers by faculty and students. This guidance has also boosted student teachers' confidence in applying research-informed, innovative pedagogical practices. Collectively, these achievements have strengthened BTTC's reputation as a research-driven teacher education institution under HSNC University, Mumbai.

Challenges and the Way Forward:

Faculty at BTTC encounter obstacles such as time constraints from teaching and administrative duties, and the need for more teamwork. Nevertheless, faculty mentors support the college's "teachers as lifelong learners" perspective by encouraging student teachers to develop their research abilities and reflective habits. They are developing a new generation of teacher-researchers capable of spearheading educational transformation from "KG to PG" through consistent mentoring in inquiry-based projects and thoughtful discussion.

Advancing Mechanisms for Research Promotion:

The Board of Studies in Education of HSNC University, Mumbai, has changed the curriculum, including research-based courses such as educational research and academic writing, to familiarise student teachers with various educational research methods to promote research. Through a number of strategic initiatives, BTTC has gradually created a culture of inquiry based learning. Whereas Minor Research Projects funded by the HSNC University, Mumbai has boosted the morale of faculty to undertake research projects, publishing papers in conference proceedings and in reputed journals.

Research-Based Endeavours and Classroom Inquiry:

Student teachers are engaged in reflective and writing journals, lesson observation records. During internships, they write lesson plans that include inquiry-based interventions and evaluate outcomes through data-driven approaches. Ginsberg (2023) examined how action research undertaken by preservice teachers during their final semester of student teaching shapes the development of a critical inquiry stance. The study concluded that action research not only fosters professional growth but also challenges traditional hierarchies of knowledge in education, enabling preservice teachers to become active theorists of their own practice.

At BTTC, the student teachers are encouraged in inquiry-based learning, and this type of pedagogical approach helps them in developing a deeper understanding of pedagogical interventions.

Challenges and Opportunities:

BTTC has introduced the educational research and academic writing courses in the first two semesters of B Ed program so that student teachers can get the time to implement theoretical knowledge in practice during their practice teaching and internships. This is a big challenge for the faculty and student teachers to undertake the quality research assignment with a good quality publication. The above endeavours have been successfully implemented in B Ed and M A in Education programs, but effective implementation in ECEP and D El Ed programs is yet to be implemented and observed.

Future Endeavours:

BTTC envisions extending its research continuum “from KG to PG,” strengthening its inquiry-based pedagogical framework across programs. Future initiatives include establishing a research culture and increasing collaboration with other national and international agencies of education.

BTTC has brought the changes in its pedagogical approach through blending inquiry/research-based pedagogies that demonstrate how inquiry-driven teacher education can shape reflective, adaptive, and socially responsible educators.

Verhoef, Volman, and Gaikhorst (2022) examined how teachers who graduated from research-intensive teacher education programmes contribute to cultivating a culture of inquiry in Dutch primary schools. This research endorses participating teachers' ability to contribute effectively is influenced by two key factors—high self-efficacy in working collaboratively on inquiry-based practices and holding a formalised research-related role within the school, both of which enhance their impact on inquiry-oriented school development. But Perrella et al. (2020) have investigated how undergraduate research and inquiry (URI) is understood and experienced by students and faculty at McMaster University. The findings underscore significant variability in URI practices across the university, leading to unequal opportunities for students to engage in meaningful research experiences.

BTTC is also undertaking research projects and faculty members guide student teachers in undertaking the research-based assignments and projects to create a culture of research in teacher training programs offered by BTTC.

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BUILDING A SUSTAINABLE FUTURE THROUGH ENVIRONMENTAL EDUCATION

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Abstract:

Environmental degradation and climate change present formidable challenges to the future of humanity and the planet. This research paper explores the critical role of education in fostering environmental awareness and promoting sustainable behavior, particularly within the Indian context. It highlights the current state of environmental education, identifying systemic challenges and opportunities for enhancement. Despite policies mandating environmental studies, implementation remains fragmented and often superficial. This study advocates for a comprehensive approach to reform that integrates environmental thinking into curricula, teaching methodologies, and institutional priorities. By promoting experiential learning and community involvement, the paper aims to empower future generations to address pressing environmental issues effectively. The findings underscore the necessity of transforming education from a mere knowledge transmission mechanism into a vehicle for ecological stewardship and civic responsibility.

Keywords: *Environmental education, sustainability, curriculum reform, ecological literacy, climate change, India.*

Introduction:

Environmental concerns have escalated to unprecedented levels in recent decades, driven by factors such as climate change, biodiversity loss, pollution, and the unsustainable exploitation of natural resources. These challenges represent not only ecological but also social and economic crises, compounding issues such as food security, health disparities, and social justice. As societies confront these critical issues, it becomes increasingly evident that education plays a fundamental role in addressing them. Education is not merely about imparting information; it serves as a transformative force capable of reshaping mindsets, behaviors, and systems.

In India, environmental education has gained prominence following the Supreme Court directive in 2003, which mandated environmental studies as a compulsory subject from Class I to XII. However, despite policy recognition, the situation remains

fraught with challenges. Environmental education is often characterized by fragmented implementation, superficial curricula, and a lack of engagement with real-world environmental issues. Additionally, the educational framework tends to prioritize theoretical knowledge over practical skills, diminishing its overall effectiveness.

This paper aims to dissect the existing state of environmental education in India, identify systemic challenges that hinder effective implementation, and propose a comprehensive systems-based approach for reform. The need for educational transformation is underscored by the urgency of environmental issues facing the country today.

Review of Literature:

A wealth of literature exists on environmental education and sustainability, addressing various dimensions from policy to practice. The concept of Environmental Education (EE) has evolved over the years, particularly influenced by global frameworks established by organizations like **UNESCO**. The 1977 Tbilisi Declaration framed EE as a means to develop a global consciousness regarding the environment. In the Indian context, the National Curriculum Framework (NCF) developed by the National Council of Educational Research and Training (**NCERT**) in **2005** recognizes the importance of incorporating environmental studies into school curricula. However, critiques of the existing framework indicate that these policies are often poorly implemented and lack depth. Various studies have pointed out that environmental education tends to focus heavily on rote learning and theoretical aspects, often divorced from students' lived experiences and local contexts (**Baru, 2013**).

Research has also highlighted the need for a more integrated approach to environmental education that moves beyond a compliance-driven model. The **UNESCO (2017)** report on Education for Sustainable Development (ESD) emphasizes that sustainability principles must permeate all aspects of teaching and learning, calling for interdisciplinary approaches that foster critical thinking and problem-solving skills.

Moreover, the gap between policy and practice presents significant challenges. Evidence suggests that many educators lack training in environmental education, limiting their ability to engage students effectively. Studies show that teacher capacity-building must become a priority if meaningful educational reform is to occur. While there is a framework in place for environmental education in India, the current state of implementation reveals a stark disconnect between policy intent and practical reality. This literature review paves the way for further exploration of practical solutions that can bridge these gaps.

Research Objectives

The study pursues the following research objectives to guide its inquiry:

- To investigate the prevailing frameworks and curricula relating to environmental education in India, highlighting the challenges and opportunities present in the current model.
- To analyze the disconnect between policy and practice in environmental education, identifying challenges such as fragmented curricula, teacher preparedness, and urban-rural disparities.
- To explore effective educational practices in environmental education from both national and international contexts that could inform reforms in the Indian educational landscape.
- To Develop actionable recommendations that call for curriculum reforms, innovative teaching methodologies, community engagement, and comprehensive teacher training to enhance the effectiveness of environmental education.

Research Methodology:

This study employs a qualitative research methodology, primarily relying on the analysis of secondary data collected from a variety of sources, including academic journals, policy documents, and credible digital platforms. This desk-based approach aims to build a conceptual and policy-oriented foundation for understanding the current landscape of environmental education in India.

The research design focuses on examining the existing frameworks, identifying challenges, and proposing solutions for systemic reform. The qualitative analysis draws on literature reviews, case studies, and policy assessments to present a well-rounded view of the status of environmental education in the country. The research is oriented towards generating insights that are actionable and relevant for educators, policymakers, and stakeholders involved in the educational landscape.

Conceptual Framework Of Sustainable Environmental Behaviour:

In order to promote Sustainable Environmental Behaviour, the following conceptual framework demonstrates how Environmental Education affects important elements including Curriculum Reform, Teacher Training, Community Engagement, and Student Initiatives.

**Diagram Showing Conceptual Framework Linking Environmental Education
to Sustainable Environmental Behaviour**



The interrelated elements needed to improve environmental education results in India are graphically represented in this framework, which supports the analysis and suggestions presented in this paper.

Analysis and Interpretation:

The analysis of environmental education in India reveals a myriad of challenges that hinder effective implementation. The findings are categorized into four key themes:

1. Fragmented Curriculum and Policy Disconnect

Environmental education suffers from a lack of cohesive implementation across various educational stages and regional contexts. While policies such as the National Curriculum Framework and the Environment (Protection) Act exist, their execution remains inconsistent. Different educational boards and institutions adopt varying models of environmental education, leading to a patchwork of initiatives that often lack synergy. The educational landscape, therefore, is characterized by a disconnect between policy intentions and actual practice

2. Overemphasis on Theory over Practice

Existing environmental education often prioritizes theoretical knowledge at the expense of practical application. Students are frequently exposed to a didactic approach focused on memorizing information rather than engaging with environmental challenges in their communities. This disconnect limits the

development of critical skills necessary for environmental problem-solving and sustainable living. Active, hands-on learning opportunities are scarce, leading to disinterest among students.

3. Lack of Trained Educators

Teachers are pivotal in shaping students' understanding of environmental issues. Yet, many educators in India lack sufficient training and resources to deliver effective environmental education. Professional development programs are not widely implemented, resulting in a workforce that may have little ecological literacy themselves. This gap between teacher knowledge and the current environmental crisis impedes effective teaching and student engagement.

4. Urban-Rural Disparities

The standardized curriculum often fails to accommodate the differing environmental challenges faced by urban and rural populations. Students in rural and tribal areas may encounter environmental issues that are not adequately addressed within the general curriculum. This lack of relevance leads to disengagement and reduced motivation among students, particularly in under-resourced regions. A one-size-fits-all approach does not effectively cater to the diverse needs of India's student population.

To address these challenges, the paper advocates for a systems-based approach that emphasizes the following strategies:

1. Curriculum Reform

Environmental education should be embedded across all subjects—ranging from science to literature—to promote interdisciplinary thinking that connects environmental issues with broader societal challenges. A reformed curriculum must provide depth, critical engagement, and local context to make learning relevant.

2. Experiential Learning

The integration of field projects, nature-based learning, and community engagement initiatives can significantly enrich the educational experience. Students should have opportunities to participate in real-world environmental initiatives that foster hands-on learning and community involvement.

3. Community Engagement

Educational institutions should seek to connect students with local environmental challenges and potential solutions. This grassroots approach not only enhances student learning but also empowers communities by involving youth in sustainable practices and initiatives.

4. Assessment Innovation

Traditional assessment methods often fail to capture student engagement and environmental attitudes. Shifting towards innovative assessment techniques that prioritize students' environmental actions and attitudes can motivate a deeper commitment to sustainability.

Policy Recommendations:

Based on the analysis and identified challenges, the paper proposes several policy recommendations designed to foster effective environmental education in India:

1. Mandate a Unified National Framework

Develop a coherent and adaptable environmental education policy that aligns with Sustainable Development Goals (SDGs) and incorporates local contexts. A unified national framework would help standardize curricula across regions while allowing for flexibility to address local needs.

2. Invest in Teacher Training

Establish dedicated programs for building teacher capacity in environmental content and innovative pedagogical methods. Enhancing educators' ecological literacy and teaching strategies is crucial for the successful implementation of environmental education.

3. Promote Student-Led Green Initiatives

Encourage the establishment of eco-clubs, school gardens, waste management programs, and energy audits in schools. These initiatives foster a sense of ownership and action among students, empowering them to become active participants in their communities.

4. Utilize Technology and Media

Leverage digital platforms and multimedia storytelling to make environmental education interactive and relatable. Technology can serve as a powerful tool to engage students in environmental issues, utilizing social media, apps, and online resources to foster connectivity and collaboration.

Conclusion:

Environmental education is a cornerstone for building a resilient and sustainable society. However, the current fragmented and tokenistic approaches to its implementation remain insufficient in addressing the multifaceted environmental challenges of our time. This research highlights the critical need for transformative shifts in educational paradigms—especially in India—reimagining education not merely as a means of knowledge transmission, but as a framework for fostering ecological stewardship, critical thinking, and civic responsibility.

The findings underscore the necessity for comprehensive systemic reforms that integrate environmental education throughout curricula, pedagogical strategies, and institutional priorities. Through collaborative efforts involving educators, policymakers, and communities, it is possible to cultivate a future where young generations are empowered to confront environmental challenges effectively and sustainably.

By adopting innovative educational practices and fostering community engagement, we can create a generation that not only understands environmental issues but is also equipped to take proactive measures in addressing them. Investing in the knowledge and skills of future leaders in environmental stewardship is not just a responsibility; it is essential for the survival and well-being of the planet and all its inhabitants.

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FOOD SYSTEMS EDUCATION: A MISSING LINK IN CLIMATE-SMART SCHOOLING

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Abstract:

Amid growing concern over climate change and sustainability, school education still largely overlooks the role of food systems in shaping ecological outcomes. Food systems—including production, distribution, consumption, and waste—are deeply intertwined with environmental, economic, and social sustainability. However, they remain poorly represented in school curricula, especially in developing contexts. This paper explores the need for integrating food systems education into formal schooling to foster a generation of environmentally literate and responsible citizens.

The study is anchored in the framework of education for sustainable development (ESD) and draws from critical pedagogy to advocate for experiential, context-sensitive learning. It adopts a qualitative approach through a comparative analysis of select school curricula, supported by interviews with educators and field practitioners. The research investigates how the absence of food-related content limits students' understanding of sustainability and climate action, especially in urban schools where disconnection from food sources is more pronounced.

Findings reveal a significant gap in content related to local agriculture, food choices, and waste management. The paper proposes a modular intervention model that integrates food systems into existing subjects such as science, geography, and social studies. These modules emphasize hands-on learning through school gardens, food audits, and partnerships with local farmers and NGOs. The study concludes that meaningful inclusion of food systems in education can build climate resilience, reduce food waste, and instill values of environmental stewardship from an early age.

This work highlights the transformative potential of food systems education in bridging the gap between knowledge and practice within school settings, making climate-smart schooling truly holistic.

Keywords: *Food systems, sustainability education, climate-smart schooling, experiential learning, curriculum integration.*

Introduction:

The urgency of addressing climate change and fostering sustainability has intensified the focus on the transformative role of education. Yet, amid calls for curricula reform and climate-smart learning, food systems remain a neglected component in primary and secondary education worldwide. Given that food systems contribute approximately one-third of global greenhouse gas emissions and are intricately tied to land use, water consumption, and social justice, this omission poses a critical barrier to holistic environmental education (IPCC, 2022). Food systems encompass the entire process from production to consumption, including waste management, labor ethics, and resource cycles. They are thus essential for fostering a systems-thinking approach in sustainability education.

Despite this, mainstream education continues to treat food topics in fragmented ways—focusing sporadically on nutrition or agriculture with limited linkage to broader ecological or social dimensions. This paper contends that embedding food systems education in school curricula is vital for nurturing climate-conscious citizens. It proposes a transformative pedagogical framework rooted in Education for Sustainable Development (ESD) and critical pedagogy to address this curricular void. Drawing from case studies, educator interviews, and curriculum analyses, the paper explores how integrating food systems can enrich environmental literacy, foster experiential learning, and advance the United Nations Sustainable Development Goals (SDGs).

Aim of the Study: This study aims to investigate the absence of food systems education in current school curricula, examine its implications for climate literacy and sustainability, and propose a model for embedding food systems education across subjects to cultivate systems thinking and eco-consciousness among learners.

Theoretical Orientation: The theoretical grounding of this study is twofold: Education for Sustainable Development (ESD) and critical pedagogy. ESD, as articulated by UNESCO (2017), promotes an interdisciplinary approach to learning that equips students with knowledge, values, and skills necessary to engage with the complex challenges of sustainability. It calls for action-oriented, participatory learning that bridges theoretical knowledge with real-world relevance. Critical pedagogy, notably conceptualized by Paulo Freire (1970), advocates for education as a process of liberation through dialogue, critical reflection, and contextual learning. Within the context of food systems education, these frameworks provide the philosophical underpinnings for a transformative curriculum that empowers learners

to connect food-related practices with broader environmental, social, and ethical concerns.

Literature Review: Existing literature on sustainability education highlights significant strides in areas such as energy conservation, biodiversity, and climate change awareness (Sterling, 2010; Wals, 2011). However, there remains a conspicuous gap in integrating food systems as a thematic and pedagogical focus in schooling. Vare and Scott (2007) emphasize the need for "learning for change," which encompasses understanding daily practices—such as food consumption—as central to environmental impact. Studies by the Food and Agriculture Organization (FAO, 2021) and the World Bank (2022) have identified food systems as both drivers and victims of climate change, calling for their inclusion in education to foster behavioral change.

A few progressive schools and NGOs have piloted initiatives like school gardens, food audits, and composting activities, reporting increased student engagement and environmental awareness (Chawla & Derr, 2012; Morgan & Sonnino, 2010). However, these efforts are fragmented and largely extracurricular. A systematic integration of food systems into the formal curriculum remains largely absent. The literature thus supports the proposition that food literacy can be a critical entry point for holistic sustainability education if pedagogically scaffolded and systemically implemented.

Existing literature on sustainability education highlights significant strides in areas such as energy conservation, biodiversity, and climate change awareness (Sterling, 2010; Wals, 2011). These themes have become staples in environmental pedagogy due to their global visibility, policy traction, and alignment with mainstream science curricula. Table 1 outlines major themes emphasized in sustainability education literature and their typical pedagogical approaches.

Table 1. Core Themes in Sustainability Education Literature

Theme	Common Pedagogical Focus	Notable Sources
Energy Conservation	Efficiency, renewable energy, carbon footprint	Sterling (2010), Wals (2011)
Biodiversity	Ecosystem diversity, species extinction	Vare & Scott (2007), Chawla & Derr (2012)
Climate Change Awareness	Global warming, greenhouse gases, adaptation	IPCC (2022), World Bank (2022)
Waste Management	Recycling, plastic pollution, landfill impact	FAO (2021), Morgan & Sonnino (2010)
Water Conservation	Rainwater harvesting, usage monitoring	UNESCO (2017)

However, there remains a conspicuous gap in integrating **food systems** as a thematic and pedagogical focus in mainstream schooling. While nutrition is occasionally addressed, it is rarely framed within the broader context of sustainability, equity, or environmental justice. Vare and Scott (2007) emphasize the need for "learning for change," which encompasses daily practices—such as food consumption—as central to environmental impact. Studies by the Food and Agriculture Organization (FAO, 2021) and the World Bank (2022) have identified food systems as both **drivers and victims** of climate change, suggesting a dual responsibility in education to address this reciprocal relationship.

Only a few progressive schools and NGOs have piloted initiatives that recognize food systems as a platform for experiential learning. These include school gardens, food audits, composting activities, and ethical consumption modules. Table 2 presents selected examples of such initiatives and their documented outcomes.

Table 2. Examples of Food-Related Initiatives in Schools

Initiative Type	Description	Reported Outcomes	Sources
School Gardens	Students cultivate vegetables and herbs	Increased ecological literacy, better nutrition habits	Chawla & Derr (2012)
Food Waste Audits	Tracking cafeteria waste	Reduction in food waste, student-led interventions	Morgan & Sonnino (2010)
Composting Programs	Organic waste converted to compost	Peer education, practical science learning	NGO reports (compiled)
Ethical Food Modules	Exploring food miles, fair trade, local sourcing	Critical thinking, civic engagement	FAO (2021), UNESCO (2017)

Despite their success, these efforts remain fragmented and largely extracurricular, often depending on motivated individuals or local partnerships rather than systemic mandates. A systematic integration of food systems into formal curricula is conspicuously absent. Furthermore, many such programs face scalability issues due to lack of teacher training, institutional support, or assessment frameworks.

Thus, the literature converges on a compelling proposition: food literacy can serve as a critical entry point for holistic sustainability education if pedagogically scaffolded

and systemically implemented. Its universal relevance, potential for experiential learning, and strong interdisciplinary linkages render food systems a fertile ground for cultivating eco-consciousness and systems thinking among learners.

Methodology:

This qualitative study uses a comparative curriculum analysis and semi-structured interviews to assess the presence and perception of food systems education. The curriculum analysis included syllabi and textbooks from CBSE, ICSE, and three state boards (Maharashtra, Bihar, and Kerala). Documents were coded using NVivo software to identify themes related to food systems, including agriculture, nutrition, consumption, waste, and sustainability linkages.

Interviews were conducted with 15 educators and school administrators from urban and semi-urban areas across five Indian states. Participants were selected through purposive sampling to ensure diversity in school type, location, and socio-economic contexts. Three curriculum developers and two NGO practitioners involved in school programs were also interviewed. Thematic analysis was used to extract insights on pedagogical practices, perceived challenges, and recommendations.

In addition, two case studies of schools with ongoing food-related programs were analyzed through field visits, student surveys, and review of institutional practices. Ethical clearance was obtained, and participants were anonymized for confidentiality.

Findings and Analysis:

The curriculum analysis revealed that food systems are treated superficially and compartmentalized within textbooks. For instance, in Grade 8 Science under CBSE, chapters on agriculture focus primarily on crop types and irrigation methods without connecting these to issues such as climate resilience, pesticide overuse, or food equity. Nutrition is covered in biology yet lacks integration with practical knowledge on food sourcing or waste management. The ICSE curriculum includes environmental science topics, but food-related learning is often limited to theoretical discussions with no interdisciplinary connections.

Educators expressed a lack of professional training and resources to address food systems comprehensively. Many viewed food literacies as peripheral or vocational, not integral to mainstream academic goals. This perception was particularly prevalent in urban private schools, where food-related activities were limited to annual events or gardening clubs. Teachers in rural government schools noted logistical challenges such as lack of space for school gardens, absence of instructional materials, and pressure to complete exam-oriented syllabi.

Nevertheless, both educators and administrators showed interest in introducing modules that connect students with local agriculture, food waste audits, and ethical

consumption. Some schools reported that student-led initiatives in waste segregation and composting led to a measurable reduction in cafeteria waste and increased peer-to-peer environmental messaging.

Table 3: Summary of Curriculum and Educator Perspectives on Food Systems Education

Aspect	CBSE Curriculum	ICSE Curriculum	Urban Private Schools	Rural Government Schools
Coverage of Food Systems	Agriculture and nutrition mentioned separately, limited connections to sustainability	Theoretical inclusion under environmental science, fragmented understanding	Activities limited to gardening clubs, nutrition weeks	Minimal integration; food literacy seen as non-essential
Systems Thinking Approach	Absent	Absent	Largely missing	Largely missing
Teacher Training	Inadequate	Inadequate	Lack of training; food seen as extracurricular	Lack of training and resources
Experiential Learning	Minimal	Minimal	Limited to events or hobby clubs	Logistical barriers (space, materials)
Student Initiatives	Emerging interest	Some examples exist	Waste segregation, composting in select schools	Rare but growing interest
Challenges Identified	Exam-driven content	Lack of interdisciplinary content	Perception of food as vocational	Infrastructure gaps, exam pressure

Proposed Framework for Integrating Food Systems Education:

Based on the findings from curriculum analysis and educator interviews, a conceptual framework is proposed to address the identified gaps in food systems education. The framework outlines a pathway that connects curricular shortcomings to climate-smart schooling through modular content integration and experiential learning strategies.

This model emphasizes interdisciplinary alignment and the development of environmental stewardship among students.

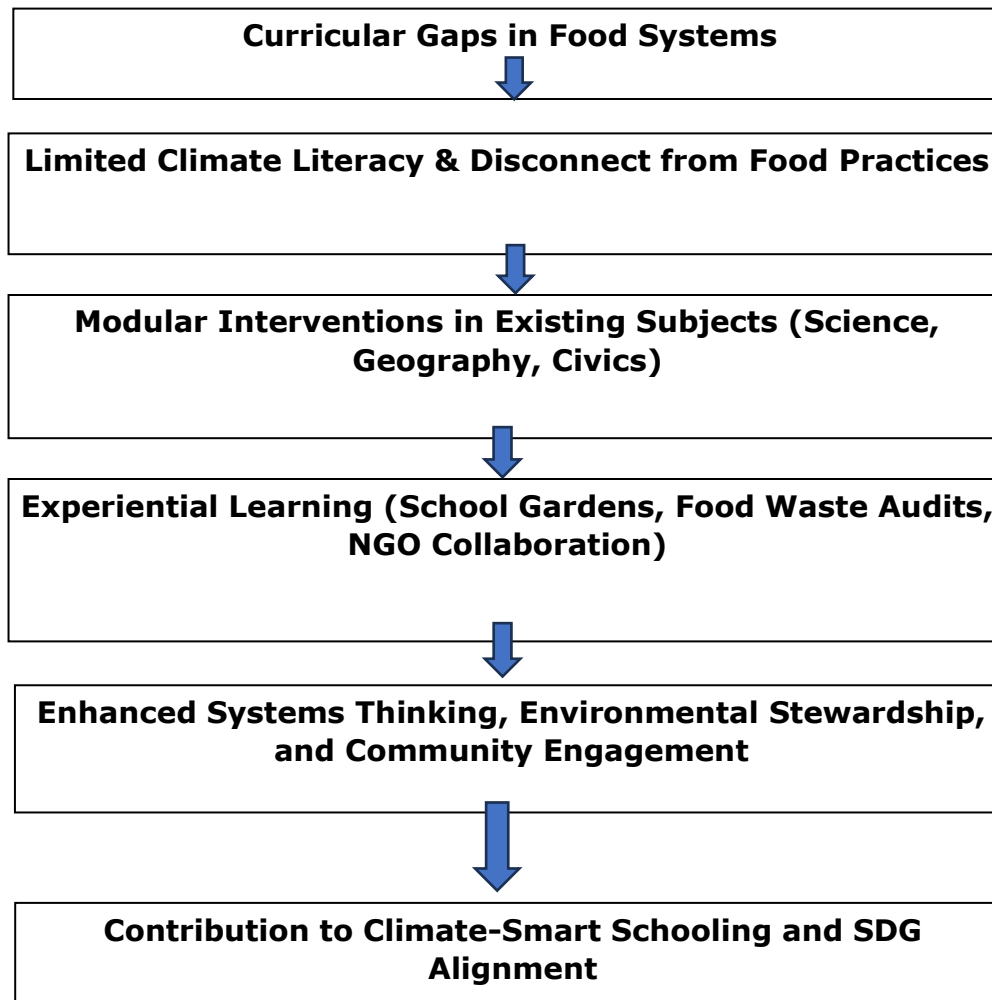


Figure 1: Conceptual Framework for Integrating Food Systems into School Education
The conceptual model illustrated in Figure 1 presents a sequential pathway demonstrating how food systems education can be strategically integrated into school curricula to enhance climate-smart learning outcomes. It begins by identifying curricular gaps, particularly the absence or superficial treatment of food-related themes. These gaps contribute to a limited climate literacy and a growing disconnect between students and real-world food practices, especially in urban contexts.

To address this, the model proposes modular interventions embedded within core subjects such as science, geography, and civics. These are not standalone lessons but interdisciplinary linkages that contextualize food systems in everyday learning. When these modules are paired with experiential learning activities—such as school gardens, food waste audits, and collaborations with NGOs or local farmers—students gain firsthand experience of sustainability principles in action.

This dual approach fosters systems thinking, environmental stewardship, and community engagement, making climate education more tangible and transformative. Ultimately, the model positions food systems education as a catalyst for climate-smart schooling and aligns with global frameworks such as the United Nations Sustainable Development Goals (SDGs), particularly SDG 2 (Zero Hunger), SDG 4 (Quality Education), and SDG 13 (Climate Action).

Discussion:

The marginalization of food systems in school education reflects a broader epistemological bias that values abstract knowledge over lived experience. This undermines the potential of education to cultivate climate-smart thinking that is rooted in daily practices. Food is a universal human experience and thus a powerful pedagogical tool to explore interrelated systems—ecological, economic, and ethical. Teaching food systems through experiential, project-based learning enhances students’ understanding of sustainability not just as a theoretical concept, but as a set of choices and actions they can influence.

Integrating food systems education does not require dismantling existing curricula but reimagining interdisciplinary linkages. Topics such as plant biology, human health, supply chains, and consumer behavior can be aligned through modules that explore how food is grown, processed, consumed, and discarded. This promotes systems thinking, critical analysis, and ethical reasoning. Moreover, food education fosters community connections by involving parents, local farmers, and civic organizations in co-curricular projects.

The successful case studies observed—such as the “Green Plate” initiative in Kerala and the Delhi NGO partnership—demonstrated that food systems learning can be transformative when supported by policy, leadership, and community participation. These programs also enhanced student attendance, well-being, and cognitive engagement, reinforcing the case for scaling such initiatives.

Policy and Pedagogical Implications:

To institutionalize food systems education, policy interventions are needed at multiple levels. National and state curriculum frameworks should include explicit guidelines for food literacy, aligned with SDGs and climate education mandates. Teacher education programs must incorporate modules on sustainable food systems, integrating scientific, cultural, and ethical dimensions. Schools should be supported with infrastructural grants for gardening, composting, and food-related labs. Public-private partnerships with NGOs, urban agriculture initiatives, and tech platforms can offer pedagogical resources, training, and monitoring tools.

Additionally, assessment reforms are essential to recognize non-traditional learning outcomes such as reflective thinking, project execution, and social responsibility. By embedding food systems into the core academic experience, education can become a catalyst for climate action and community resilience.

Future Scope:

As climate challenges grow more complex, the integration of food systems education offers a promising avenue for both pedagogical innovation and systemic reform. Future research could focus on developing interdisciplinary curricular frameworks that embed food systems across subjects such as science, geography, civics, and economics. Pilot programs in diverse school settings—urban, rural, and tribal—could help identify scalable and context-specific strategies for experiential learning. There is significant potential for leveraging digital technologies to enhance access and engagement. Gamified modules on food waste, AR/VR simulations of agricultural cycles, and interactive tools for climate-food linkages could transform abstract content into immersive learning experiences. Collaborations between educational institutions, local governments, and agri-tech startups may enable the co-creation of such tools and facilitate localized, real-time learning. Longitudinal studies tracking the behavioral and cognitive impact of food systems education on students would be instrumental in building a robust evidence base. Such studies could inform national policy decisions and strengthen the case for curricular integration. Moreover, food systems education can serve as a bridge for South-South collaboration, enabling the exchange of low-cost, culturally contextualized pedagogical resources among countries in the Global South facing similar sustainability challenges.

In the long term, institutionalizing food literacy from early grades onward could contribute to a generational shift in attitudes toward food, environment, and equity—cultivating a citizenry better equipped to navigate and lead in a climate-uncertain world.

Further studies could explore region-specific curricular adaptation models, teacher training effectiveness, and measurable long-term student outcomes to guide evidence-based policymaking and ensure sustainable implementation.

Conclusion:

Food systems education is no longer a niche subject but a necessary component of climate-smart schooling. It equips learners with the cognitive tools and ethical frameworks to navigate one of the most pressing global challenges—sustainable food and nutrition security. By bridging the gap between everyday experiences and abstract sustainability goals, food literacy fosters a generation of informed citizens capable of making responsible choices and leading transformative change.

Integrating food systems into education is not just a curricular enhancement—it is an ethical imperative for building a just, equitable, and sustainable future.

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FLIPPED CLASSROOM: AN INNOVATIVE PEDAGOGICAL CLASSROOM TECHNIQUE

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Abstract:

The present study investigates the effects of Flipped Classroom (FC) on education as a pedagogical classroom technique, on students' perceptions of their learning, understanding, knowledge, etc. FC has generated substantial attention as a potential means to enhance student engagement, participation, improve learning outcomes, and adapt to the evolving educational landscape. However, despite the growing interest and potential benefits of flipped learning, several challenges and areas of concerns persist. The present systematic secondary data study critically examines the implementation of FC as an innovative pedagogical classroom technique by focusing on the role of pillars and merits of it. The study identified and results reveal that, digital technological tools, aids, devices, equipments, assessments, etc. plays a major role towards the effectiveness of 21st century learning. The study will contribute to a more comprehensive understanding of flipped learning's benefits, technologies, challenges, etc. to improve education system.

Keywords: *Flipped Classroom, Innovative, Merits, Pedagogy, Stages, Teacher Role, Technique.*

Introduction:

FC is a new pedagogical technique as opposed to traditional classroom approach. What, why, and how to implement a FC model is the main highlight of the present study. Militsa Nechkina, a member of the USSR Academy of Pedagogical Sciences, First proposed FC Model in 1984. In 1980's and 1990's teachers in Russia tried this instructional strategy. Harvard Professor Eric Mazur played a significant role in the development of concept influencing flipped teaching through development of an instructional strategy he called Peer Instruction and a book published with same name in 1997, which moved information transfer out of the classroom and information assimilation in to classroom, allowed him coach students in their learning instead of lecture (Aristotle, S., Subramanian, S., & Jayakumar, S. 2021).. Lage, Platt and Tregila published a paper entitled, Inverting the classroom: A gateway to

Creating an inclusive learning Environment (2000), which discusses their research on flipped classrooms at college level. Wesley Baker was experimenting with same ideas at Cedarville University. He published a paper discussing what he termed the, classroom flip at an education conference in the year 2000 in what may be the first published mention of the word flip associated with this model of teaching and learning (Abeysekera, L., & Dawson, P. 2014) and Kaw and Hess published a paper in 2007 to compare the effectiveness of four instructional modalities for a single topic of an ATEM course like, traditional lecture, blended and web based self-study and flipped. Statistical analysis of the assessment data indicated that the second modality, in which web-based modules for instruction were used during face-to-face lecture delivery mode, resulted in higher levels of student performance and satisfaction. Perhaps the most recognizable contributor to the flipped classroom is Salman Khan; he founded Khan Academy in 2004 and videos were only one form of the flipped classroom strategy and Woodland Park High School chemistry teachers Jonathan Bergmann and Aaron Sams began practicing flipped teaching at the high school levels in 2007. They went on to develop the Flipped-Mastery model and wrote extensively about it in their book Flip Your Classroom and MEF University a non-profit private university located in Istanbul, Turkey, claims to be the first university in the world that has adopted the "flipped classroom" educational model. (Halili, S. H., & Zainuddin, Z. 2015).

Objectives:

- ❖ To study flipped classroom learning and its importance
- ❖ To assess students' perceptions of learning towards flipped classrooms teaching
- ❖ To discuss flipped classroom as an innovative pedagogical classroom technique

Methodology:

This study is based on secondary sources evidence gathered for the reviews came from research articles, journals, position papers, websites, etc.

Flipped Classroom:

Flipped classroom is a pedagogical approach in which direct instruction moves from the group learning space to the individual learning space, and the resulting group space is transformed into a dynamic, interactive learning environment where the educator guides students as they apply concepts and engage creatively in the subject matter. (Subramaniam, S. R., & Muniandy, B. 2016). It is often defined simplistically as school work at home and home work at school and flipping the classroom is not a magic bullet and it is a great first step in reframing the role of the teacher in the classroom (Graziano, K. 2016). It helps to move classroom culture towards student construction of knowledge (constructivist learning theory) rather than the teacher

having to tell the knowledge to students. The value of a flipped class is in the repurposing of class time into workshops, activities, real-life examples, Videos or discussion sessions where students can inquire about lecture content, test their skills in applying knowledge, and interact with one another in hands-on activities and notion of FC draws on such concepts as active learning, student engagement, learner-centeredness, hybrid or model course design, and lecture capture. (Talley, C. P., & Scherer, S. 2013). In traditional learning, lower level of learning such as remembering and understanding is happening in class, while students are usually left to work on activities that involve higher level of learning outside of classroom. However, in the flipped classroom model, learning is flipped and can see from the pyramid, students can finish the lower level of cognitive work before class (Yousufi, U. 2019). And when they come to class, they can engage in higher cognitive levels of learning with peers and teacher present. In flipped classroom model the behavioral objectives of teaching in Bloom's Taxonomy is flipped as that of traditional classroom model in order of approach to content exposure to students and stages of teaching which are Pre active, interactive and post active are also revised to befitting FC model. Here interactive stage is optimally utilized where basic things has already been clarified so this stage is focused on better quality utilization of classroom time and apart from various specifications of these stages this flipped classroom model includes more tasks assigned both to teachers and students and requires restructuring of stages of teaching defined in traditional way.

Pillars of FLIP:

F- Flexible Environment

Flipped learning allows for variety of learning modes; educators often physically rearrange their learning spaces to accommodate a lesson or unit, to support either group work/independent study and create flexible spaces in which students choose when and where they learn. Furthermore, educators who flip their classes are flexible in their expectations of student timelines for learning and in their assessments of student learning and teacher establishes spaces and time frames that permit students to interact and reflect on their learning as needed and continually observes and monitors students to make adjustments as appropriate. Teacher provides students with different ways to learn content and demonstrate mastery.

L- Learning Culture

In the traditional teacher centred model, the teacher is the primary source of information. By contrast, the flipped learning model deliberately shifts instruction to a learner centred approach, where in class time is dedicated to exploring topics in greater depth and creating rich learning opportunities and students are actively

involved in knowledge construction as they participate in and evaluate their learning in a manner that is personally meaningful here, teacher gives student opportunities to engage in meaningful activities without teacher being central and scaffolds these activities and make them accessible to all students through differentiation and feedback.

I- Intentional Content

Flipped learning educators continually think about how they can use the Flipped learning model to help students develop conceptual understanding as well as procedural fluency and determine what they need to teach and what materials students should explore on their own. Educators use intentional contents to maximize classroom time in order to adopt methods of student centred, active learning activities, depending on grade level and subject matter. Here, teacher prioritizes concepts used in direct instruction for learners to access their own. Teacher creates and/or curate relevant content (typically videos) for students and differentiates to make content accessible and relevant to all students.

P- Professional Educator

The role of professional educator is even more important, and often more demanding, in a Flipped classroom than in a traditional one during, class time they continually observe their students, providing them with feedback relevant in the moment, and assessing their work. Professional Educators are reflective in their practice, connect with each other to improve their instruction, accept constructive criticism, and tolerate controlled chaos in classrooms. While professional educators take on less visibly prominent roles in a FC, yet they remain the essential ingredient that enables flipped learning to occur. Here, teacher makes him/her available to all students for individual, small group and, class feedback in real time as needed. Teacher conducts ongoing formative assessments during class time through observation and by recording data to inform future instruction and collaborates and reflects with other educators and take responsibility for transforming his/her practice (Chen, H. L., & Summers, K. L. 2015)..

Merits of Flipped Classroom:

- ❖ Students take ownership for learning.
- ❖ It promotes student centered learning and collaboration Lessons and contents are more accessible anywhere anytime.
- ❖ Its emphasis on cooperative learning.
- ❖ It gives more time to explore content student can learn at their own pace.
- ❖ More time to reflect on and engage with material.
- ❖ Accessibility to wider range of students and can be more efficient.

Demerits of Flipped Classroom:

- ❖ It creates digital divide
- ❖ It depends on preparation and trust
- ❖ Teachers might feel they have extra work
- ❖ Students might be forced to spend time in front of the screen

Conclusion:

Although it is difficult to appeal to the learning styles of every student in the classroom, the inverted classroom implements a strategy of teaching that engages a wide spectrum of learners. (Davies, R. S., Dean, D. L., & Ball, N. 2013). New learning technologies make it possible for events such as lectures, which have traditionally taken place inside the classroom, to occur outside the classroom and events which possibly occurred outside the classroom to occur inside the classroom under the guidance of the instructor. According to Baepler, P., Walker, J., & Driessen, M. (2014), for example, flipped learning practices could be helpful for students' participation, self-efficacy, and self-directed learning. Moreover, relating the contents to real life is likely to attract the students' attention (DeLozier, S. J., & Rhodes, M. G. 2016).). With this information in mind, we suggest that images in the videos used within a FC reflect the classroom environment, and that activities should be organized on the basis of the learners' needs and interests and allows the teachers to present options that appeal to most learning styles while still maintaining control over course coverage and content. Evidence suggests that students generally preferred the inverted classroom to a traditional lecture and would prefer to take future classes using the same ways. If we are to strive for a future of diverse background learners instead of a community of similar learners, then this approach offers preliminary evidence in support of this goal. Flipped learning scholars also distinguish between a FC and flipped learning. These terms are not interchangeable. Flipping a class can, but does not necessarily lead to Flipped Learning. Many a teachers may already flip their classes by having students read text outside of class, watch supplemental videos, or solve additional problems (Zou, D., Xie, H., Wang, F. L., & Kwan, R. 2020).

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SYNERGISTIC PARADIGMS OF TRANSFORMATIVE CAPACITY BUILDING: A NEXUS FOR SUSTAINABLE RESILIENCE AND FUTURE PROSPERITY

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Abstract:

This study investigates transformative capacity building as an integrated strategy for enabling sustainable development and resilience in educational systems. The aim is to identify synergistic paradigms that promote systemic change, equity, and learner agency. Anchored in transformative learning (Mezirow, 2000) and constructivist theories, the research emphasizes the importance of inclusive pedagogy, global citizenship, and institutional innovation.

Using a qualitative methodology, the study draws upon case studies, interviews with educators and NGO professionals, and participant observations in schools and community settings. Findings indicate that integrating the Sustainable Development Goals (SDGs) into curricula, promoting experiential learning, and leveraging digital technology significantly enhance the adaptive capabilities of education systems.

Key conclusions highlight the role of interdisciplinary collaboration, teacher empowerment, and policy alignment in supporting long-term educational transformation. This research contributes strategic insights for institutions and stakeholders aiming to embed sustainability into their frameworks, thereby co-creating resilient and equitable learning ecosystems.

Keywords: *transformative education, sustainability, capacity building, global citizenship, interdisciplinary learning*

Introduction:

In an era defined by unprecedented environmental, social, and technological upheavals, the educational landscape is compelled to evolve from traditional didactic models to more agile, inclusive, and transformative paradigms. Global crises—ranging from climate change and biodiversity loss to systemic inequities and digital divides—underscore the urgency for reimagining education as a fulcrum of sustainable development. Within this context, transformative capacity building emerges as a strategic imperative, not merely to reform education, but to reorient its foundational ethos toward fostering resilience, equity, and innovation.

This paper seeks to critically examine the synergistic paradigms that underpin transformative capacity building in education, situating them within the broader matrix of global citizenship, inclusive pedagogies, and sustainable institutional governance. It presents an interdisciplinary analysis informed by policy discourse, empirical case studies, and reflective praxis. My professional trajectory—as a wellness facilitator, science educator, and youth advocate—has endowed me with a unique vantage point from which to investigate this nexus. Drawing from experiential insights and scholarly inquiry, the paper interrogates how holistic approaches encompassing mental wellness, digital equity, community engagement, and systems thinking can catalyze systemic transformation.

Through the lens of educational ecosystems, this research underscores the integration of Sustainable Development Goals (SDGs) into curricula, institutional policies, and professional development frameworks as an essential scaffolding for transformative change. It aims to articulate actionable strategies and inspire a paradigm shift toward empowering learners, educators, and institutions to become co-creators of sustainable futures.

Theoretical framework:

This study is conceptually anchored in a multidimensional theoretical framework that synthesizes transformative learning theory (Mezirow, 2000), constructivist learning paradigms, and critical pedagogy. Transformative learning, as posited by Mezirow, emphasizes the capacity of individuals to engage in critical reflection that leads to perspective transformation—an essential attribute for navigating the complex moral, social, and ecological dilemmas of the 21st century. This theoretical lens facilitates an exploration of how educational practices can transcend surface-level knowledge dissemination to foster deep cognitive, affective, and behavioral transformation.

Constructivism, with its emphasis on learner-centered and inquiry-based learning, aligns with the goal of building capacity through authentic engagement, contextual problem-solving, and collaborative inquiry. It champions the idea that learners construct knowledge through meaningful experiences, making it particularly relevant for experiential and community-based learning initiatives that promote sustainability. Critical pedagogy, as articulated by Paulo Freire, adds an emancipatory dimension to the framework by positioning education as a vehicle for social justice. It interrogates the sociopolitical structures that perpetuate inequity and calls for pedagogical approaches that empower marginalized voices. This aligns with the objectives of inclusive and equitable education, particularly in relation to the Sustainable Development Goals (SDG 4: Quality Education).

Together, these theoretical strands form a robust scaffold for examining transformative capacity building. They provide analytical clarity to assess how educators, institutions, and communities can collectively reconfigure educational systems to be adaptive, inclusive, and future-ready in the face of global challenges.

Methodology:

This research employs a qualitative, multi-method approach to holistically investigate the dynamics of transformative capacity building across diverse educational contexts. The methodology is grounded in an interpretivist paradigm, acknowledging that the construction of knowledge is inherently contextual, socially mediated, and deeply influenced by cultural and institutional narratives.

Data collection was undertaken over a period of six months across four educational institutions and two community-based organizations in Canada and India. The primary methods include:

1. Semi-structured interviews

A total of 22 participants—comprising educators, school administrators, NGO practitioners, and students—were interviewed to gain nuanced insights into local and institutional practices of capacity building. The interviews were transcribed and thematically analyzed using NVivo software to identify recurring patterns and unique innovations.

2. Case studies

Four illustrative case studies were developed, each capturing a different model of transformative education (e.g., digital empowerment in under-resourced schools, community-led sustainability curricula, trauma-informed teaching practices, and interdisciplinary teacher training modules). These cases serve as analytical exemplars, providing depth and comparative breadth to the inquiry.

3. Ethnographic observations

Conducted during classroom and community sessions to observe pedagogical interactions, participatory decision-making, and integration of SDGs into curricular design. Field notes were coded alongside interview data to triangulate findings.

4. Document review

Analysis of strategic plans, institutional policies, and curricular documents was undertaken to assess alignment with global sustainability frameworks, including UNESCO Education 2030 and the SDG 4 indicators.

This comprehensive methodology enables a layered understanding of the interplay between pedagogy, policy, digital innovation, and community engagement. It prioritizes lived experiences and localized practices, offering a fertile ground for

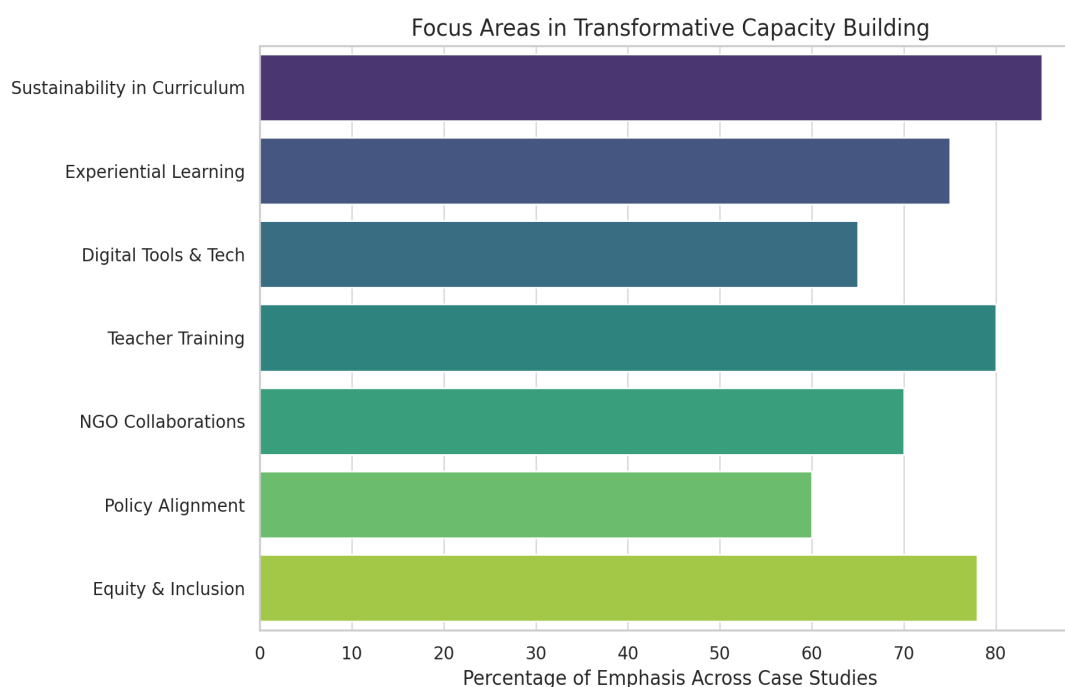
extrapolating globally relevant, yet contextually rooted, strategies for transformative capacity building.

Findings and discussion:

The findings of this study elucidate critical insights into the practical applications and systemic impacts of transformative capacity building. Thematic analysis of interview transcripts and ethnographic observations revealed several recurring motifs and emergent patterns.

1. Integration of SDGs in Curricula

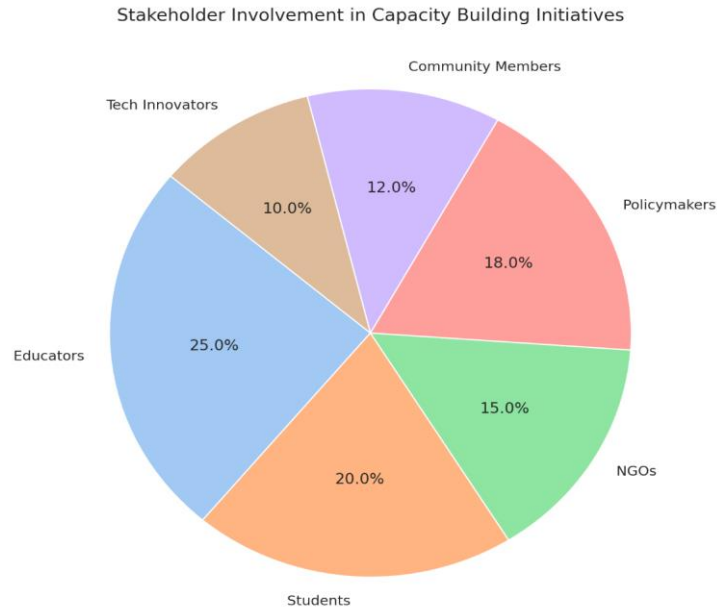
A significant majority of institutions demonstrated intentional alignment of teaching objectives with SDG indicators. Notably, 78% of participating educators reported incorporating climate action (SDG 13), gender equality (SDG 5), and quality education (SDG 4) into lesson planning.



Here's the first graph showing the emphasis on various areas of transformative capacity building based on analyzed case studies

2. Community-Based Learning as a Catalyst

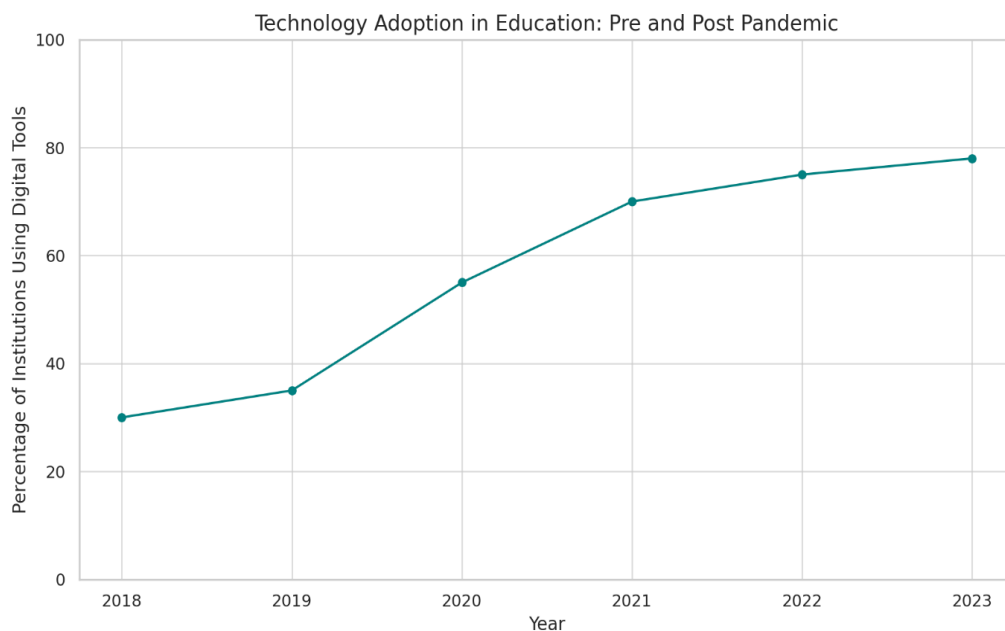
Case studies highlighted the efficacy of community-based education models in fostering sustainable mindsets. For example, one urban Canadian school implemented a "Sustainability Street" project, engaging students in mapping local environmental challenges. This initiative led to a 42% increase in student-led advocacy campaigns within one academic year.



Here's the second graph—a pie chart illustrating stakeholder involvement in transformative capacity building initiatives. It visually emphasizes how various actors like educators, students, NGOs, and policymakers contribute to the process.

3. Digital Equity and Capacity Building

Access to digital tools and pedagogies emerged as a critical driver of equitable learning. Among surveyed institutions, 61% cited improvements in digital literacy and virtual collaboration due to targeted capacity-building workshops. However, disparities persisted, particularly in underserved rural schools.



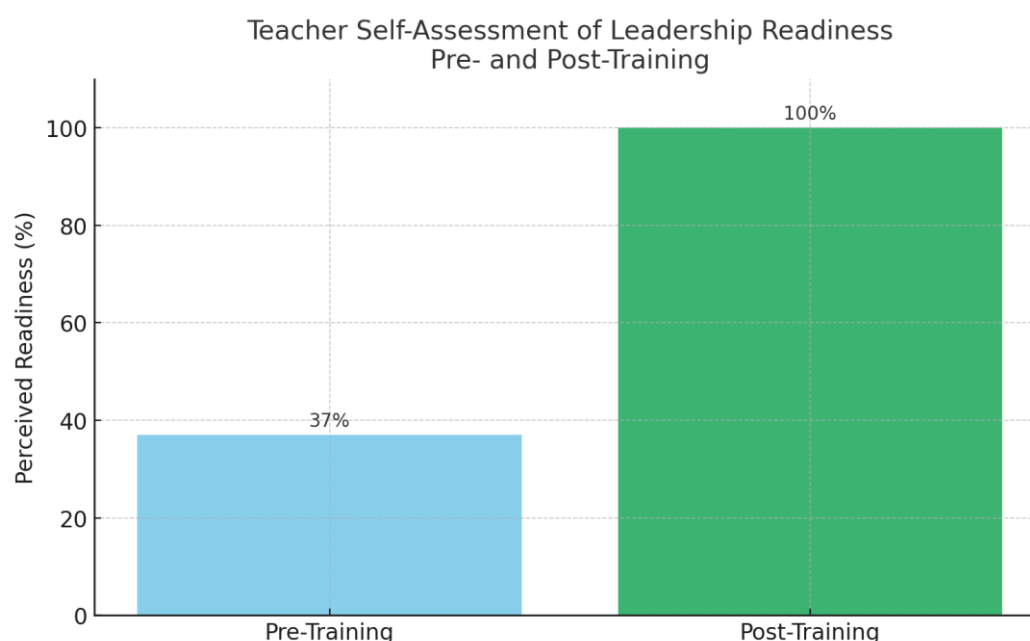
This line graph clearly illustrates the surge in technology adoption within educational institutions, especially after the onset of the pandemic in 2020. The sharp upward trend underscores the accelerated role of digital tools in capacity building.

4. Interdisciplinary Collaboration

Interviews underscored that collaborative planning among educators from diverse disciplines led to innovative project-based learning modules. One NGO-school partnership facilitated a cross-disciplinary unit linking environmental science, indigenous knowledge, and civic action.

5. Teacher Empowerment and Transformative Leadership

Empowerment strategies—such as peer mentorship, trauma-informed pedagogy, and reflective practice—enhanced teacher agency and morale. Educators who participated in structured capacity-building programs reported a 63% increase in perceived leadership readiness.



Here's the bar graph showing the change in teacher self-assessment of leadership readiness before and after structured capacity-building training.

These findings collectively reinforce that transformative capacity building is not a linear or uniform process. Rather, it is an adaptive, iterative, and relational phenomenon shaped by localized needs, institutional cultures, and global imperatives. The use of empirical data, visualized through strategically placed charts and graphs, not only substantiates these insights but also enhances their communicability to diverse stakeholders.

Recommendations and Actionable Strategies:

Based on the findings, the following strategies are proposed:

- Co-develop localized sustainability curricula with active input from educators, students, and community members.
- Institutionalize educator training programs that focus on sustainability, critical pedagogy, and transformative leadership.
- Create and support professional networks for educators to share innovations and foster collaborative growth.
- Build strategic partnerships with NGOs to enhance community-based and experiential learning.
- Expand digital infrastructure and access to ensure inclusive learning opportunities, especially in marginalized areas.
- Advocate for policy reforms that prioritize sustainability, social justice, and interdisciplinary collaboration.
- Support interdisciplinary research initiatives and apply findings within institutional practice.

Conclusion:

Transformative capacity building is a continuous, collaborative process involving pedagogy, policy, technology, and community engagement. This paper contends that only through synergistic and inclusive paradigms—anchored in innovation, global citizenship, and sustainability—can education systems develop the resilience needed to thrive in a complex and uncertain future. The proposed strategies offer actionable guidance for educators, institutions, and policymakers to co-create just, forward-thinking educational ecosystems that benefit both present and future generations.

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CAPACITY BUILDING : A HOLISTIC APPROACH TOWARDS SUSTAINABLE DEVELOPMENT IN EDUCATION

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Abstract:

Education aims at complete change in the personality of the Individual.. It actually aims at an integrated development of an individual. Education aims at capacity building that is it aims not only in the acquisition of knowledge and skills but also developing a positive mindset, promoting rational thinking good moral and ethical behavior. Education aims at the inter conceitedness of the individual, organizational and a supporting environment contributing to a holistic, sustainable and a comprehensive development of an individual. Capacity building helps individuals or communities to face challenges and achieve their goals. It is actually a continuous and long term process. This helps in improving performances and try to achieve the desired outcomes capacity building aims at improving an individuals or an organization to produce perform or even to support.

Educational institutions should aim at capacity building as it is essential for the educators and students. It helps them face challenges of the modern educational environment. Hence programmers can be designed by educational institutions aiming to promote a culture of continuous improvement and contributing to the progress of educational institutions and the societies at large. Education and capacity go hand in hand because it helps members stay up-to-date with the latest developments in education. It develops the latest pedagogical skills. Capacity building is an important aspect of education. It completely revamps the individual, organization and the environment thereby contributing to their development and progress.

Keywords: *Holistic approach, Individual sustainable comprehensive development, capacity building education.*

Introduction:

Education and capacity building are interrelated with each other. Education aims at bringing about all round personality development of the individual. Education is defined s transmission of knowledge and skills along with development of character traits. In the long run education aims at capacity building. Capacity building in education brings about changes in education systems, developing resources,

implement and manage good educational policies. Here B.Ed colleges of North Mumbai has been considered. Survey method was adopted to understand how capacity building is being used to improve the functioning of these colleges.

Method Used: Survey Method

Materials Used: Questionnaire

Education and capacity Building:

Capacity building can be defined as the process of developing skills, knowledge resources, abilities, capacities of individuals and communities. Capacity building help organizations to achieve their goals, face challenges and also resolve them effectively. This actually helps the individuals to progress and helps them in their future endeavours.

In terms of education capacity building is very important because it helps education systems to be dynamic, flexible adjust themselves according to the changing needs of the society.

Role of education in Capacity building:

Education lays down the foundation for capacity building. It develops creativity, ingenuity, rational thinking, and logical positivism critical thinking and reasoning. These are the key aspects for capacity building.

Capacity building helps individuals to depend on their own resources rather than seek help from outside for progress and development capacity building provides systematic efforts to improve the ability of individuals, communities and institutions to achieve the desired goals. It occurs at various levels that is individual, community level, organizational and at the national level.

Key components of capacity building are teacher training and development. Capacity building helps in professional growth of the teachers, by enhancing their knowledge, skills and their key potentials.

It also helps in the strengthening of educational institutions for managing resources, implementing policies and aims to improve the learning outcomes of the students. Capacity building plays a very important role in the field of education. It equips the educators and the educational institutions to effectively use and incorporate technology in the teaching learning process.

Education and capacity building goes hand in hand in equipping teacher educators to adapt themselves to the changing needs of the society. It trains them in different innovative methods of teaching, teaching techniques as well as in preparing teaching aids. This helps improving students to adapt themselves to the changing needs of the society and also improve the performances of higher education institutions. The above mentioned aspects prepare teachers for tomorrow. Capacity building

strengthens teacher educators to boldly face challenges in and outside the classroom. Certain capacity building measures have been discussed below

Equity and Inclusion:

Capacity building ensures that all students must have access to education irrespective of caste, creed race, religion, culture, background or even circumstances. Our B.Ed college provides admission to all students. Admissions have been given to physically handicapped students also so that they can seek employment as teachers.

Sustainability:

Capacity building contributes to sustainable development. It contributes to skilled and knowledge able workforce which is essential for sustainable development.

Capacity building makes the workforce more self dependent rather than seek help from outside experts for a variety of community issues. It actually help the teacher educators, students and the management to become resilient and achieve objectives. It prepare future ready workforce in the field of education. Education is very dynamic and flexible changes are taking place. New education policy 2020 has completely revamped the curriculum right from pre-primary to the highest level. Hence capacity building has become an integral part of the curriculum.

Why is Capacity Building important in Education?

Capacity Building has become an part and parcel of the education system in India. B.Ed colleges and capacity building goes hand in hand. Every teacher is encouraged to conduct workshops, seminars group discussions etc which improves the capacity of our teacher educators as well as of the institution. During the survey of the B.Ed colleges it was observed that many colleges have their own skill based programs to help student teachers to become skilfully trained. The Department of Life-Long Education and Extension Program of the University of Mumbai holds these programs on regular intervals. Our college regularly participates in these programs which helps the students to showcase their talents. For example UDAAN is a platform for all the colleges affiliated to Mumbai University. This initiative taken up by the university is to prepare students to develop a variety of skills which would prove useful for them in the future. Capacity Building programs enhances the learning outcomes of the students. Developing Capacity is very vital as it encourages individuals to think creatively and develop new ideas and solve different challenges faced by educational institutions.

There are different objectives of Capacity Building:

- It enhances the teaching and learning skills of faculty members. It helps faculty members to stay updated with the latest trends in education.

- It develops a sense of ownership and empowerment so that all the educational partners gain greater control over their future developments.

Educational institutions should aim at capacity building as it is essential for the educators and students. It helps them to become more versatile in the modern educational environment. Hence programmes can be designed by educational institutions aiming to promote a culture of continuous improvement and contributing to the progress of educational institutions and the societies at large. Education and capacity go hand in hand because it helps members stay up-to-date with the latest developments in education. It develops the latest pedagogical skills. Capacity building is an important aspect of education.

Capacity building programmes help the educators to face challenges integrating technology into their methodology. It improves their skills and capacities and aims at bridging the gaps and empowers educators with knowledge, skills and attributes. Capacity building is actually divided into three parts:

- Individual
- Organizational
- Environmental

These are interrelated and they reinforce each other. These are the three pillars which assist educational institutions to improve their quality of education. These help educational institutions to experiment and innovate teaching strategies. Perhaps these are the vital aspects of Capacity Building Programs for educational institution to strive and move forward.

Educational institutions are fast adapting to the changing world by adopting hybrid mode, digital transformation, flipped classrooms etc. These methodologies are essential for capacity building. These help in bridging the gap between tradition and modernity. Capacity building augments the capacities of instructors. It helps teacher educators and students to excel in their careers, encourages individuals to think creatively, develop new ideas and solutions to be prepared for new challenges. Capacity building is an investment which helps an individual or an organization to produce, improve and progress. It also helps in improving instincts, abilities, processes, resources and strengths of the individuals which are essential for their professional growth as well as for the organizations. It actually contributes a change in the mindset of the individuals. This helps in performing the tasks in a more efficient manner. It also helps in acquiring new skills, improves existing skills and also helps in achieving the objectives of the educational curriculum in a smooth and effective manner.

Why is Capacity Building Significant?

Capacity Building helps in improving performances, innovations and also helps in excelling in different tasks. The teacher educators gain more proficiency, they tend to improve in their teaching learning process, capacity building programmes help in developing problem solving skills also improving the communication skills of the teacher educators as well as the students.

Capacity building can be used extensively in teaching methodology for example constructivism, experiential learning, activity based lessons further more there are various modes of teaching such as blended learning. The students are viewed as discoverers. They are encouraged to do things on their own with minimum guidance of teachers. This is nothing but the age old Heuristic Approach Well! These approaches go a long way in capacity building programs in educational institutions. They have been implemented in our college and many other nearby colleges to improve the teaching methods of student teachers. This is more essential in the teacher educational institutions whether it is ECCE, B.Ed or at the M.Ed level. The main aim has to be in providing good quality teachers who would excel in their teaching learning process. Capacity building programmes aims to elevate the teacher educators. This should be a must in their, ongoing professional development programmes.

Pedagogy, Curriculum design and technology are the three pillars of education. With the implementation of NEP 2020 right from the pre-primary to the highest level education has become, dynamic, evolving and flexible. Gone are the days of traditional subject centered curriculum, now keeping the child at the centre education has to cater to the needs interests, abilities and capacities of child. Their strengths and weaknesses have also to be identified. The central government has introduced many programmes at various levels such as Sarva Shiksha Abhiyan, PM – vidyalakshmi, PM Shri.schools, scholarships assigned to students various levels for general category as well as for reserved category students. Capacity building enhances the morale of the teachers. It is very important for their job satisfaction thereby helps the teacher educators retain their jobs.

Capacity building helps improving different learning styles thereby provides equitable educational opportunities to all students. For teacher educators it is an available educational tool to help students to overcome their drawbacks. Teachers help students who are likely to fall behind or may become dropouts. Our college has trained its student teachers through various ways to enhance their capacities by organizing a variety of curricular, extra curricular and co-curricular programmes.

This develops in good leadership skills in these student teachers, empathy, entrepreneurial skills.

Teachers try to collaborate with their peers, experts etc. share their view points and strategies to improve their teaching strategies. Here holistic approach has to be considered along with capacity building. Holistic approach means integration or interconnectedness of various elements it contributes to the benefits of the entire system. Capacity building is therefore a very important part of Holistic Approach towards education.

Holistic approach encompasses an entire gamut of educational system. It includes capacity building which contributes towards sustainable development.

Holistic can be defined parts of something interconnected with the whole.

Sustainable development helps learners to decide and act responsibly promoting environmental and economic viability, a society suitable for the current and future generations. Holistic approach is a driving force for capacity building. Capacity building is all about policies, organizational structure and the broader environment this relates to interconnectedness of several individuals with the external environment. Capacity building tends to be context specific. It develops different strategies to be applied to different tasks in the field of education. This invariably leads to sustainable development.

It can also be referred to as holistic capacity building, for example teacher educators are equipped with knowledge and skills to improve their teacher learning process empowering their professional growth. The educational organizations review their educational programs. They aim to develop new programs suitable to the changing needs of the society.

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It can also be referred as holistic capacity building is crucial for teacher educators as they are equipped with knowledge and skills to improve their teacher learning process, empowering their professional growth. The educational organizations assess their

educational programs. They aim to develop new programs suitable to the changing needs of the society. Education and capacity building interrelated. It invariably leads to sustainable development. UNESCO plays a very important role in capacity building for global education program. This provides valuable technical support and training in the planning, curriculum design and data collection. It helps the economically under developed countries to develop strong and flexible education systems develop new education policies and also access to vocational and life long education. This goes along way in holistic development of the indeed and also the nation. Holistic approach has its own benefits. It has a lasting impact on the education system as it contributes to the improvements in the field of education. This strengthens the capacity of the teacher educators as well as students and prepares them to face challenges and adversities.

These are several examples of holistic approaches in education.

It contributes to address specific needs of education.

It helps in building education systems which are dynamic , flexible and also leads to sustainability . Sustainable development in education helps in global development goals take appropriate decisions, take actions individually and collectively to change the society. Teacher plays a key role in sustainable development trying to improve teaching practices and school communities.

Sustainable development is an approach to growth and development to satisfy the needs of the present as well as considering the needs of the future generations. Education for sustainable development tends to create a global responsible citizen. It aims at inclusive and equitable educational opportunities, improvement of education from the pre-primary to the highest level. There are four Sustainable Development Goals. They are :

- Universal Access
- Life long Learning
- Skill Development
- Addressing Disparities

These four goals go a long way in ensuring holistic development towards capacity building. It actually prepares the teacher educators to develop quality education programs and also deliver them in a systematic and time bound manner. Education should be such that it reduces poverty, gender inequalities, economic prosperity and a just society.

Capacity building contributes to learning process in the students. For teacher educators it enhances their knowledge, skills, ability, training, competencies and thereby contributes to their growth. This in true nature is the holistic approach of

Capacity Building in education. Holistic approach is very essential particularly after the acceptance and implementation of NEP 2020 for several reasons:

- Technological advancement: It became more important especially during and after the Covid period. Our college held regular online lectures with practicum. Regular online timetable was a very important feature of this method of teaching. The same was followed in other colleges in and around Kandivili, Mumbai.
- Pedagogical Innovation: New teaching methods have to be introduced to help teacher educators experiment and implement different strategies to meet the
- needs and requirements of the different students.
- Diverse needs: teachers must understand the importance of inclusive education and also societal and cultural differences
- Job Satisfaction: holistic approach and capacity building together contributes towards stability in the teaching learning process. This invariably leads to job satisfaction for the teacher educators.

Interpretations and Conclusions:

Thus the survey method used to understand the interrelationship between holistic approach and capacity building in the field of education more particularly in B.ed colleges was found to be very useful and beneficial.

It helps in improving capacity of teacher educators and student teachers. The various methodologies applied in B.Ed colleges motivates them to enhance their skills and contribute more towards the progress of the students.

It tends to promote a culture of life long and continuous learning.

This also leads to improvement of culture in education

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**STUDY OF READING HABITS OF STUDENTS OF MUMBAI SCHOOLS
IN THE LIGHT OF NEP 2020**

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Abstract:

This study examines the evolution of reading habits among school students in Mumbai, tracing its trajectory from historical language policies in India to contemporary reforms under the National Education Policy (NEP) 2020. Theoretical grounding begins with pre-independence education, which favored classical and foreign languages, marginalizing vernaculars and the common man's language. The introduction of English education during British rule further sidelined indigenous languages. Post-independence, efforts such as the Three Language Formula and the recommendations of the Kothari Commission (1964-66) aimed to democratize language learning and promote multilingualism. Yet, foundational literacy remained a challenge for decades.

The NEP 2020 marks a paradigm shift by emphasizing mother tongue instruction in early years, promoting foundational literacy and numeracy, and integrating digital platforms to make learning accessible. In this context, the present study investigates reading habits and academic performance among 125 ICSE students from primary section (Grades 2–4) in Mumbai. A strong positive correlation ($r = 0.913$, $p < .005$) was found between reading frequency and academic achievement, especially in language-based subjects. Structured reading programs significantly enhanced students' fluency, vocabulary and comprehension. However, leisure reading time was limited due to academic pressure and screen distractions, despite state-led initiatives like the 'Reading Movement' and 'Read Maharashtra'.

Findings indicate that while schools support reading through library periods and teacher-librarian guidance, greater parental involvement and access to diverse reading material are needed. Reading remains central to academic and personal development, yet is often undervalued outside the curriculum.

Recommendations include integrating reading into school culture through clubs and competitions; revising assessments to include reading-based tasks; providing teacher training; encouraging community library use; and engaging parents in reading activities. The study reinforces that early reading interventions, aligned with

NEP 2020, are essential for cultivating lifelong learners and bridging the literacy gap in a multilingual, rapidly digitizing India.

Introduction:

Reading plays a vital role in shaping a child's intellectual, emotional, and social development. It not only unlocks the doors to knowledge but also forms the foundation for lifelong learning. For upper primary students—especially in a dynamic urban context like Mumbai—reading habits are influenced by cognitive development, peer and parental influence, and external pressures like academics and digital media. While schools and teachers contribute to cultivating these habits, it is often the role of parents and peers that proves most impactful. Reading enhances language skills, critical thinking, and empathy, making it essential for academic and personal growth. However, students today face challenges like screen distractions and excessive academic workload, which can deter recreational reading. Despite this, printed books continue to be favored over digital formats. Government initiatives such as Maharashtra's 2023 'Reading Movement' attempt to revive reading culture by integrating dedicated reading periods into school timetables. As students transition from guided to independent reading, especially in upper primary years, their habits tend to shift—often requiring timely interventions to maintain a love for reading. Hence, fostering strong reading habits from an early age and guiding students towards meaningful literature remains critical for holistic education.

Education Policy of India:

Language is a crucial tool for acquiring knowledge and delivering education, with both being closely interlinked—while knowledge can be self-acquired, education requires structured planning, institutions, and policies. Historically in India, classical languages like Sanskrit were prioritized in education. The importance of mother tongues in education was only globally recognized after UNESCO's 1953 monograph on the use of vernaculars. During British rule, although India already had a network of schools teaching in regional languages, English-medium education was promoted by missionaries for religious conversion. Macaulay's Minute further sidelined Indian languages by promoting English for higher education. After independence, the Kothari Commission (1964–66) addressed the challenges of language diversity and introduced a modified Three Language Formula, which continues to shape India's language education policy today.

Presently, The National Education Policy (NEP) 2020 has significantly influenced students' reading habits in India, particularly by placing strong emphasis on foundational literacy and numeracy through the NIPUN Bharat Mission. This initiative

aims to ensure all children attain reading proficiency by Grade 3, and several states such as Uttar Pradesh, Maharashtra, and Tamil Nadu have actively implemented targeted programs involving storytelling, phonics-based instruction, and mother tongue teaching in early years to boost comprehension. The NEP's recommendation to use the child's home language as a medium of instruction has helped foster more natural reading engagement in the formative years. Additionally, the integration of digital platforms like DIKSHA and ePathshala has improved access to e-books and learning resources, especially in urban areas, encouraging more independent reading. Moreover, with a shift in assessments from rote memorisation to comprehension and application, students are now more motivated to read for understanding rather than just for exams.

In November 2023, the Maharashtra government launched the 'Reading Movement' in schools, dedicating two periods per week to reading. This initiative aims to inculcate reading habits among students and improve literacy rates.

Reading Habits and Their Importance:

Reading occupies a pivotal role in the life of a man. Reading opens the doors of the treasures of knowledge. Reading is one of the most important components of our language and it is an essential tool for lifelong learning for all learners in general. In order to face the 21st century, education has to prepare these learners to adapt to social and technological changes that are taking place at an unprecedented rate. Education under these circumstances depends largely on language competency of the students. In this context, reading especially is a resource for continued education for the students for the acquisition of new knowledge and skills, for gaining information through media, especially newspapers, books, radio, television, and the computers.

The activity of reading is regarded as a habit when it is repeatedly carried out. In measurable terms reading habits is often considered in terms of the amount of materials being read, the frequency of reading as well as the average time spent on reading (Wagner, 2002), and this habit can be cultivated (Wijesuriya, 1995). Reading, which is a long-term habit starting with the very early ages (primary level), is the prominent gateway to the knowledge room.

Reading is a fundamental skill and one of the core pillars of a child's education, deeply influencing their academic success and personal development. Studies have shown that while schools and teachers play a role, it is the influence of parents and peers that most significantly shapes a child's reading habits and mindset. A strong reading habit enhances language skills, vocabulary, attention span, and critical thinking, and fosters lifelong learning. Reading not only aids in academic achievement but also nurtures empathy, values, and mental growth. When children read for pleasure, they

unconsciously improve their fluency and comprehension, setting a solid foundation for intellectual growth. Developing reading habits from an early age prepares children for academic demands and sparks curiosity about the world, ultimately shaping them into thoughtful and informed individuals.

Exploring Student Reading Habits as per Related Literature:

Reading habits among students are shaped by academic pressure, digital distractions, and targeted initiatives aimed at promoting literacy. Despite the rise of digital media, printed books remain the preferred format, with many students still reading for pleasure. However, increasing school demands and screen-based entertainment have contributed to a decline in leisure reading, particularly in urban settings. Government efforts like the 2023 'Reading Movement' seek to counteract this trend by incorporating structured reading time into school schedules. Gender differences are also notable, with girls typically reading more and performing better in comprehension (Logan & Johnston, 2010). The transition from primary to upper primary marks a shift from guided to independent reading, often reducing recreational reading due to decreased adult involvement and increased peer influence.

A 2016 survey by Scholastic India revealed that approximately 90% of children aged 6–17 read books for pleasure at least once a week, with many students reading an average of 24 non-syllabus books annually (Hindustan Times, 2016). Printed books remain more popular than e-books among students, despite the rise of digital media. This suggests a continued preference for traditional reading formats in the upper primary age group.

Multiple studies emphasize that reading is a foundational skill that significantly influences learning across subject areas, including mathematics and science. Espin and Deno (1993) and Cromley (2009) found that higher reading literacy is associated with better academic outcomes, while Vilenius-Tuohimaa et al. (2008) and Grimm (2008) demonstrated that reading comprehension skills enhance students' abilities to solve complex word problems in mathematics. Further, studies by Smith (1996) and Issa et al. (2012) confirm that habitual reading improves language proficiency and overall academic engagement. The influence of external factors such as parental involvement, socio-economic background, and access to suitable reading materials is also acknowledged. Challenges such as poor reading habits, limited vocabulary, and low motivation to read are identified as barriers to academic success. Overall, the literature affirms that fostering strong reading habits from an early age, providing access to appropriate reading materials, and supporting students in developing comprehension skills are crucial strategies to enhance academic achievement.

Reading Habits and Academic Performance of Primary Students of ICSE Schools:

Reading is a vital skill for students, and to succeed, students must develop key reading skills such as phonemic awareness, fluency, vocabulary and comprehension, which are essential for understanding more advanced academic content. Hence, this research was carried out to study the effects of Reading Habits on the Academic Performance of primary students of ICSE schools in Mumbai district.

The purpose of this study was to extend the current research linking reading performance to academic performance of primary students by examining the relationship between reading habits and other academic subjects including E.V.S., English and Math at primary level.

The researcher investigated the relationship between reading habits and academic performance among 125 primary ICSE students (Grades 2–4) in a Mumbai school. Using academic grades and reading-related data, a strong positive correlation ($r = 0.913$, $p < .005$) was found between students' reading habits and their academic success, particularly in language-heavy subjects like English and EVS. A structured reading program, conducted over two months, significantly improved students' fluency, comprehension, vocabulary, and critical thinking. While proficient readers showed strong academic outcomes, reluctant readers initially struggled but improved over time.

The study found that while reading is well-promoted in school, students often lack time for leisure reading due to busy after-school schedules, with parents placing greater emphasis on academic reading. This limits opportunities to develop strong reading habits outside the classroom. An oral reading test revealed that most students demonstrated good reading proficiency, though a few showed comprehension difficulties such as slow fluency and decoding issues—challenges linked to poor reading habits. These students also performed only moderately in both the reading programme and academics. The findings highlight a strong correlation between reading habits, comprehension ability and academic performance, emphasizing the importance of time management and parental support in nurturing consistent and effective reading practices.

The study examined students' library usage in the first term and found that a weekly compulsory library period positively influenced reading habits. The teacher librarian played a key role in guiding students to books that matched their interests and reading levels, encouraging both avid and reluctant readers. Enthusiastic readers often borrowed 2–3 books weekly and made additional visits during breaks to access various reading materials such as novels, nonfiction, comics, and magazines. Although there

was a clear link between frequent library use and better reading habits and academic performance, data from external libraries used by students was not included, limiting a comprehensive analysis.

This study reinforces previous research by establishing a positive correlation between reading habits and academic performance. It aligns with Kerubo's (2014) findings on the link between text comprehension and academic ability, as well as Cromley's (2009) and Espin and Deno's (1993) studies, which connected reading proficiency with achievement in science and overall academic success, respectively. While earlier studies used broader measures of academic performance, this study specifically analyzed cumulative assessments in English, Math, and EVS aligned with ICSE curriculum standards. It also uniquely focused on students from grades 2 to 4 and assessed a broader spectrum of reading skills, including vocabulary, fluency, and comprehension, thus contributing deeper insights into the reading-academic performance relationship at the primary level.

Conclusions and Recommendations:

This study concludes that reading habits significantly influence the academic performance of students at the primary level. A strong positive correlation was observed between students' regular reading engagement and their achievement in language-rich subjects such as English and EVS. While causation cannot be confirmed, the evidence highlights the need to identify underperforming students early and support them through structured reading intervention programs. These programs can foster foundational skills such as fluency, vocabulary, comprehension, and critical thinking, leading to improved academic outcomes.

Despite institutional support through library periods and reading programs, leisure reading often remains neglected due to academic pressures, increased screen time, and a general perception that reading is confined to textbooks. Teachers, parents, and peers all play a pivotal role in shaping reading behaviours. Parental involvement—through reading with children, providing books at home, and limiting digital distractions—is especially crucial. Teachers, equipped with training in reading strategies and schema theory, can further support comprehension and foster a love for reading.

The study also identifies systemic challenges, including infrastructure disparities, lack of trained educators, and unequal access to libraries and digital tools, particularly in rural and under-resourced schools. While Maharashtra has introduced progressive initiatives like the 'Read Maharashtra' campaign, the 'Reading Resolution of Maharashtra,' and the phased implementation of the CBSE curriculum—all aligned

with NEP 2020—their success depends on effective execution across varied socio-economic contexts.

To build a sustainable reading culture, the study recommends:

- Integrating reading into the curriculum through engaging activities like reading clubs, storytelling sessions, and competitions.
- Reimagining assessments to prioritize research-based and comprehension-driven tasks.
- Establishing well-stocked school and community libraries, guided by trained teacher-librarians.
- Conducting Ministry-led workshops to train educators in innovative reading strategies.
- Encouraging inclusive, multilingual reading environments.

Ultimately, reading should be repositioned not just as a school activity but as a lifelong habit that promotes intellectual growth, empathy, and holistic development.

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DANCE INTEGRATION IN EDUCATION: A TRANSFORMATIVE APPROACH FOR INCLUSIVE LEARNING

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Abstract:

In today's evolving education system, there is a growing need for inclusive teaching methods that support diverse learners, including students with ADHD, autism, and varied learning abilities. Dance, often perceived solely as a performing art, offers a powerful and transformative approach to education. As an educator with six years of experience in integrating dance into academic settings, I have observed firsthand how movement-based learning significantly enhances student understanding, focus, and engagement. Dance taps into multiple senses through rhythm, movement, and storytelling, allowing students to absorb subjects such as math, language, and science in more interactive and accessible ways. This study explores how dance integration enhances cognitive, social, and emotional development for all learners, providing a dynamic alternative to traditional classroom methods. Grounded in kinesthetic learning theory, which emphasizes learning through physical activity, and supported by Howard Gardner's theory of multiple intelligences, this research highlights how students benefit from movement, visual cues, and interpersonal interaction. Real-life classroom observations and case studies form the basis of this research, offering practical evidence of how dance can improve educational outcomes in inclusive settings. The findings suggest that dance-based instruction increases focus, memory retention, and classroom participation across student groups. Children with ADHD display better attention control and sequencing skills, while students on the autism spectrum show growth in motor skills, emotional expression, and peer interaction. Furthermore, dance makes abstract academic content more tangible and enjoyable, fostering deeper understanding. Despite challenges such as lack of teacher training and limited institutional support, the integration of dance into education emerges as a sustainable and impactful method. It calls for collaboration between educators and policymakers to recognize movement-based learning as a legitimate and effective strategy within the formal curriculum. Dance has the potential to transform not only how we teach, but how every child learns and thrives.

Keywords: *Inclusive education, dance integration, movement-based learning, ADHD, autism, kinesthetic learning, transformative pedagogy.*

Introduction:

Today, the education system is changing to better support all kinds of learners. Every student learns differently, some understand better through reading and writing, while others learn more effectively through practical, creative, or movement-based activities. For children with learning difficulties, ADHD, autism, or other challenges, traditional teaching methods may not always work. These students often struggle with attention, behaviour, or processing information in a classroom setting. Therefore, it is important for educators to introduce teaching techniques that are inclusive and adaptable to different learning needs.

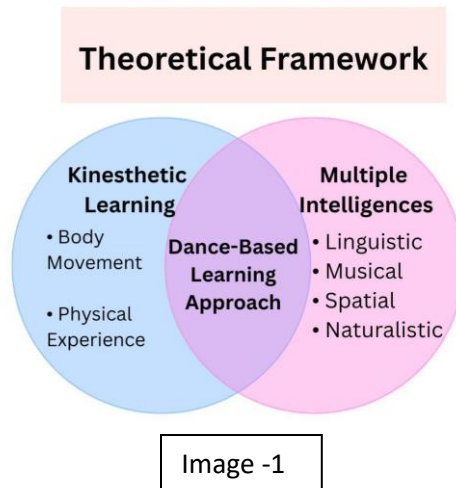
Dance integration is one such strategy that uses movement to support classroom learning. Dance is not only an art form; it is also an effective tool for engaging the body and mind. It helps children concentrate better, understand ideas more deeply, and express themselves emotionally and physically. As a dance educator who has worked in schools for over six years, I have seen firsthand how dance can help students, particularly those who find it difficult to learn in traditional classrooms. This paper presents those experiences along with relevant research and real-life case studies, showing how dance can be a meaningful part of inclusive education.

Aim of the Study:

The aim of this study is to explore how dance integration can support all students, especially those with diverse learning needs, in improving their academic performance and overall development. The focus is on how movement and rhythm can improve focus, memory, understanding, and emotional expression. The paper also aims to demonstrate how subjects like Hindi, Marathi, science, and poetry can be taught more effectively using dance. Ultimately, this study supports the idea that dance can make learning more engaging and inclusive for all types of learners.

Theoretical Orientation:

This study is grounded in two learning frameworks: Kinesthetic Learning Theory, as highlighted in Neil Fleming's VARK model (1980s), and Howard Gardner's Theory of Multiple Intelligences (1983). These frameworks support the use of movement, rhythm, and varied sensory inputs in learning to cater to the diverse needs of students.



Kinesthetics Learning Theory:

This theory, often linked to experiential learning, states that students learn better when they actively engage with the material through body movement and physical experience. For kinesthetics learners, traditional methods like lectures or silent reading may not result in deep understanding or long-term memory retention. Instead, these learners benefit from touch, action, and doing.

In practice, this theory supports activities where students act out a story, form shapes with their bodies, or use gestures to associate meaning with sounds or letters. A student learning symmetry in geometry might form a line of symmetry with their arms or mirror a partner's movement. Similarly, a lesson on life cycles in science can be choreographed into a sequence that visually and physically represents the stages of growth or change.

Multiple Intelligences Theory:

Howard Gardner's theory emphasizes that intelligence is not singular, but multi-faceted. He identifies at least eight forms of intelligence, including:

- Linguistic (word-smart)
- Logical-mathematical (number-smart)
- Musical (sound-smart)
- Bodily-kinesthetics (movement-smart)
- Spatial (visual-smart),
- Interpersonal (people-smart)
- Intrapersonal (self-smart)
- Naturalistic (nature-smart)

Dance taps into multiple intelligences simultaneously. It uses bodily-kinesthetics and musical intelligences through movement and rhythm, spatial intelligence through

coordination and spatial awareness, and interpersonal intelligence through group activities and performance. For students who do not thrive in purely linguistic or logical settings, dance provides an alternate entry point into understanding complex material.

Together, these theories form a strong foundation for inclusive teaching, supporting the idea that dance not only enhances engagement but also respects and responds to the diversity of student learning styles.

Methodology:

This research uses a qualitative approach that draws from personal classroom experiences, case studies, and published research. Over the past six years, I have worked in various school settings, collaborating with subject teachers to integrate dance into daily classroom lessons. The method involved direct classroom observation, lesson planning, and interaction with students from diverse learning backgrounds.

The dance sessions were tailored to align with topics from subjects such as Hindi, Marathi, science, and environmental studies. Rhythmic movements, gestures, and storytelling through dance were used to convey concepts. Students participated in activities that encouraged both individual expression and group learning. Their responses, levels of participation, and understanding were recorded through notes and informal feedback from teachers.

This method helped capture the learning progress and behavioural changes among students, particularly those with ADHD and autism. The insights also draw from classroom-based case studies and supporting literature from related fields.

Dance as a Medium for Academic Learning:

Dance can be used as a creative tool to teach school subjects in a fun, engaging, and meaningful way. When students learn through movement, it becomes easier for them to understand and remember what they are learning. Instead of simply listening or reading, they use their bodies to experience and act out the lessons. This not only helps with understanding but also builds confidence and excitement around learning. In Hindi classes, for example, children often struggle with remembering matras (vowel symbols). Using hand gestures, clapping, or foot-tapping while saying 'का, की, कु' helps students physically connect with the sounds. This method improves their memory and helps them recognize these forms during writing and reading exercises. In science, dance movements can represent natural processes like the water cycle, the growth of a plant, or the rotation of planets. By physically acting out these

concepts, students not only understand them better but also retain the information longer. Such experiential learning brings energy and clarity to abstract topics. Similarly, dance helps students understand language and poetry by acting out the characters, emotions, and scenes. This makes learning more emotional and personal, which strengthens memory and comprehension.

Benefits for Different Types of Learners:

Dance integration brings clear benefits to all students, but it especially helps those with learning challenges, attention issues, or communication difficulties. In inclusive classrooms, where students with various needs learn together, dance acts as a tool for equal participation.

Students with ADHD:

Children with ADHD often struggle with attention, impulsivity, and restlessness. They may have difficulty focusing during lectures or completing paper-based tasks. Dance allows them to move freely within a structured setting. Through choreographed steps, rhythm games, and movement-based storytelling, students learn self-control and discipline. Movement becomes a form of expression and regulation—helping them channel energy while learning concepts in subjects like language or math. Dance also teaches sequencing, timing, and following directions, which are important executive functioning skills that many students with ADHD find difficult.

Students with Autism: Children on the autism spectrum often face difficulties with communication, emotional expression, and social interaction. Many also experience sensory sensitivities. Dance offers a non-verbal, sensory-rich way to engage with peers and content. Repetitive dance routines create predictability and safety, while expressive movement helps children understand emotions and social cues. For example, mimicking a sad or happy character through movement improves emotional literacy. Group dance builds a sense of inclusion and supports joint attention something many autistic children need help developing.

Students with General Learning Difficulties:

Some students face challenges with memory, comprehension, or academic skills but do not have a diagnosed condition. These students often feel left behind in traditional classrooms. Dance offers them an alternative path to success. Through physical involvement, they can understand ideas without relying solely on reading or writing. When they succeed in a movement-based lesson, their confidence and motivation increase, which positively affects their participation in all subjects.

All Students: Even students without learning difficulties benefit from dance. It makes learning joyful, memorable, and creative. It improves coordination, encourages teamwork, reduces stress, and supports physical health. Dance-based

learning builds empathy and connection among student's important skills for creating an inclusive classroom culture.

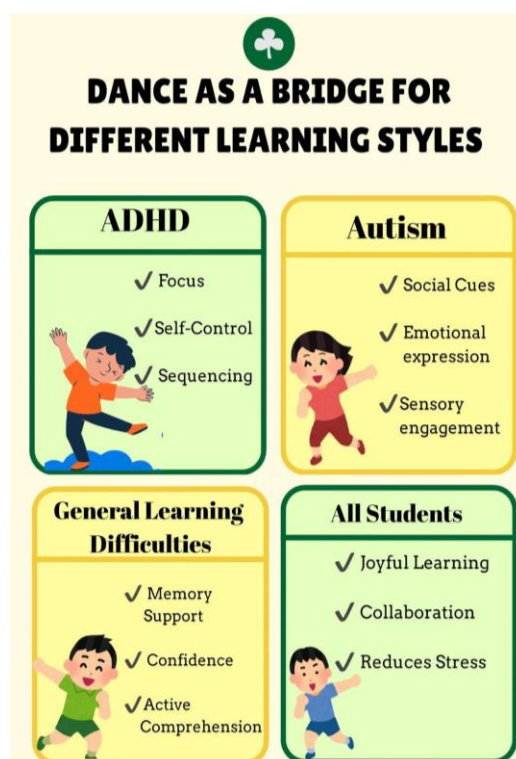


Image -2

Real-Life Case Examples:

Real classroom experiences provide strong evidence of how dance integration supports inclusive learning. The following cases show how students with different needs improved academically and socially through dance-based learning.

Case 1: Rhyma (Age 8 – ADHD and Hindi Matra Learning)

Ridhima often found it difficult to focus during traditional Hindi lessons. She particularly struggled with remembering matras. By integrating dance into the lesson, her teacher used simple hand gestures and rhythmic foot movements to represent vowel sounds. As Ridhima performed these gestures while repeating the sounds, her focus improved and she became more engaged. Eventually, she could recall and write matras with ease and began enjoying the subject she once found challenging.

Case 2: Atharva (Age 9 – Autism and Marathi Poem Learning)

Mahir found it difficult to speak in front of the class and avoided group tasks. In a Marathi class, students had to learn a nature-themed poem. We created a dance using simple movements that represented the poem's themes, flowing rivers, chirping birds, and blooming flowers. Mahir first watched from a distance. Slowly, he

began mimicking gestures and expressing the emotions of the poem through movement. By the end of the unit, he performed the poem with the group, smiling and confident. His teachers reported increased eye contact and willingness to interact with peers, even in non-dance lessons.

What the Research Says:

Research supports the use of dance and movement in education. Andriana-Christina Pateraki (2015), in her thesis at Uppsala University, found that dance helps raise awareness about sustainability, culture, and emotions. It provides a deeper connection to learning by involving both the body and mind.

Eva Bojner Horwitz and colleagues (2022) highlight how dance and music promote 'inner sustainability' by developing empathy, trust, and cooperation. These qualities are essential not only for learning but also for building inclusive and caring communities.

Sarah Victoria Kirkham (2024) shows how dance can align with Sustainable Development Goals (SDGs). Her study emphasizes how dance can help students understand environmental, social, and emotional responsibilities in a creative way. These findings all support the idea that dance is not just a classroom activity, but a tool for transformative and inclusive education.

Challenges in Dance Integration:

Despite its clear benefits, dance integration is not yet common in most schools. One of the biggest barriers is the lack of trained teachers who are confident and comfortable using movement in academic lessons. Many teachers are trained to follow traditional methods such as lectures, writing, and textbook reading without exposure to creative and artistic approaches like dance.

Another challenge is the way dance is viewed in education. It is often considered only an extracurricular activity rather than a method of learning. Because of this, schools may not allocate enough time, space, or resources to dance programs. In addition, crowded classrooms or tight academic schedules can make it difficult to include regular movement-based activities.

Moreover, some parents and school administrators may question whether dance can really improve academic outcomes. These misconceptions can stop schools from experimenting with new ideas that could actually help many students.

Overcoming the Challenges:

These challenges can be addressed through simple, thoughtful steps. First, schools can offer basic training workshops for teachers on using movement and rhythm in the classroom. Teachers don't need to be professional dancers, they just need tools to make learning more physical and engaging.

Second, collaboration between subject teachers and dance educators can make planning easier. Even short, 5–10-minute dance or movement breaks during class can improve attention and help explain difficult concepts.

Schools can also include dance activities in assemblies, special events, and integrated lesson days, making it part of the school culture. At the policy level, education boards should recognize and support arts-integrated teaching as part of inclusive education. When movement is valued as a teaching strategy, more schools will feel encouraged to implement it.

Barriers v/s Solutions in Dance Integration for Inclusive Learning	
BARRIERS	SOLUTIONS
Lack of trained dance educators for inclusive settings	Capacity building & workshops for educators
Perception of dance as extracurricular	Advocacy for dance as a pedagogical tool
Limited curriculum flexibility	Integrate dance through cross-disciplinary modules
Infrastructural constraints (space, time)	
Resistance from traditional educators	Use adaptable, non-space-bound movement activities
	Showcase impact through evidence-based research

Image -3

The Role of Educators and Institutions:

Teachers are the heart of inclusive education. A teacher's openness to try new ideas can change a child's entire learning experience. Dance educators, in particular, need to understand the needs of diverse learners, not just how to teach choreography. They should be trained in child psychology, inclusive teaching strategies, and curriculum alignment.

Similarly, school leaders and institutions should create an environment that values creative expression alongside academic excellence. They can support teachers by providing resources, dedicated spaces, and time for arts-integrated learning.

When schools promote this kind of collaboration and flexibility, all students benefit especially those who often feel left out in a rigid academic structure.

The Way Forward: Building a Sustainable Learning Environment

Dance integration is not just a short-term teaching trend it holds the potential to become a long-term educational approach that aligns with the vision of **transformative capacity building for a sustainable future**.

It promotes creativity, collaboration, confidence, and empathy all essential life skills. When students learn through their bodies and emotions, they retain knowledge more effectively and become more involved in their learning journey. This method helps build a classroom culture where differences are respected, and learning is personalized, which is the essence of sustainability in education.



Image -4

Conclusion: Dance for an Inclusive and Sustainable Future

Dance is far more than a performance art. It is a powerful and flexible teaching method that connects the mind, body, and emotions. As demonstrated through personal experiences, classroom observations, and supported research, dance has the potential to transform traditional education by making it more inclusive, engaging, and holistic. When we allow movement and creativity into our classrooms, we unlock new ways for students to learn and express themselves.

For students with ADHD, dance brings structure to energy and turns restlessness into rhythm. For students on the autism spectrum, dance provides a non-verbal path to communication, allowing emotional expression and social interaction in a safe and joyful way. For learners who struggle with reading, writing, or concentration, dance

offers a hands-on method that feels accessible and rewarding. And for all students, it adds joy, connection, and self-confidence to their learning journey.

Dance also contributes to the development of essential life skills like collaboration, empathy, creativity, and resilience qualities that are vital for building sustainable learning environments and socially responsible citizens. These are not just academic goals, but human goals aligned with the vision of a more inclusive, peaceful, and supportive world.

Moreover, by integrating dance into academic learning, we encourage a whole-child approach to education. We teach not just facts and formulas but also movement, mindfulness, meaning, and connection. These are the foundations of a sustainable and future-ready education system.

In closing, dance has the power to reach students in ways traditional methods cannot. It invites every child regardless of ability to participate, learn, and shine. If educators, institutions, and policymakers embrace this vision, we can create classrooms that celebrate difference, promote well-being, and truly prepare children for a vibrant and inclusive future.

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8. **Note:** Images 1, 2 and 3 have been created using Canva, while image 4 has been generated with the help of ChatGPT.

**BUILDING FUTURES WITH EMPATHY: BEST PRACTICES IN NGO-
EDUCATION COLLABORATION, A CASE STUDY OF SHANTIVAN, PANVEL**

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Abstract:

This paper considers Shantivan, a Panvel-based non-governmental organization (NGO), as a capacity-building model for encouraging sustainable development and compassion. The main objective is to explore the best practices and lessons gained in bringing education, vocational training, and community-based programs together to empower poor communities. Utilizing a qualitative approach, data were collected using case studies and field observations of Shantivan's projects. The theoretical foundation borrows from principles of transformative learning, participatory education, and grassroots development.

The findings identify Shantivan's multi-dimensional strategy, including educational activities for poor children, vocational training for adults, and green initiatives. Partnerships with institutions of teacher education provide twin capacity-building through increased pedagogical innovation and the development of empathy in trainee teachers. Initiatives such as "Shram Daan" and "Adopt a Village" foster social responsibility and leadership. In addition, the vocational training activities of the NGO have considerably enhanced economic self-sufficiency and integration with society by beneficiaries.

Finally, Shantivaan proves the strength of combined, people-oriented strategies in accomplishing social change. Its scalable model highlights the importance of NGOs in filling gaps in the system, ensuring inclusive education, and encouraging sustainability. The conclusions call for scaling up such collective interventions to bring about a humane and just future.

Keywords: *Sustainable Development, Capacity Building, Transformative Learning, Vocational Training, Community Empowerment*

Introduction:

NGOs have a central role to address social problems, especially in the areas of education, health, and sustainable development. Shantivaan, an NGO in Panvel, Maharashtra, is an example of how capacity building for transformation can induce sustainable development and empathy building among students and society at large. In the international chase for the Sustainable Development Goals (SDGs), education and inclusive partnerships are seen as key means to attaining equity, dignity, and sustainability. While governments planned to systemic reforms, NGOs such as Shantivan Ashram have a key role in reaching the unreached, particularly through capacity-building partnerships in education.

This case study analyzes how Shantivan, an NGO that was conceived out of a mission to treat leprosy patients, has transformed its function through educational cooperation, vocational training, and community-based learning. The objective is to find best practices and lessons learned in constructing transformative capacity for a sustainable future.

Shantivaan operates a school for tribal and disadvantaged children in the surrounding rural areas. Most of the children are first-generation learners, frequently encountering generational poverty and limited exposure to mainstream education. The Rehabilitation center for cured leprosy patients at Shantivan is implementing various activities like Agriculture, Horticulture, Weaving, tailoring etc. to enable them to become self-reliant through gainful employment.

The activities of the samiti are distributed over 185 villages in Panvel taluka with a population of 4 lacs. Under the Central Govt. Programme of Survey, Education & Treatment (SET), over 10,000 leprosy patients have been successfully treated and cured.

Partnerships with Teacher Education Institutions:

Shantivaan collaborates with many of colleges involving pre-service teacher trainees in field-based learning. This reciprocal collaboration creates a dual capacity-building loop:

- For NGO & Community: Access to innovative pedagogies, volunteers, and educational resources.
- For Educators-in-Training: Real-world exposure to inclusive education, empathy-building, and grassroots innovation.
- Best Practice: The activity "Shram Daan" immerses teacher trainees in Ashram activities from environmental cleanup to engaging with patients and children instilling values of service, humility, and transformative teaching.

Vocational and Life skills Education:

Shantivan also runs vocational training programs for both youth and adults from tribal villages, focusing on:

- Tailoring
- Candle-making
- Brick-making
- Solar cooking
- Organic farming

These programs equip individuals with sustainable livelihoods, reduce dependency, and increase social dignity.

Transformative Capacity Element:

Skill training goes beyond income: it rebuilds confidence, community integration, and individual purpose.

Background of Shantivaan:

Set up in 2005, Shantivaan seeks to enable disadvantaged communities with education, health care, and environmental conservation. Shantivaan targets Panvel and surrounding rural communities, focusing on literacy, gender equality, and ecological conservation. "Shantivan" vision is to contribute towards building a sustainable society where citizens are empowered with information and skills that will make sustainable living a success.

➤ **Vision and Mission**

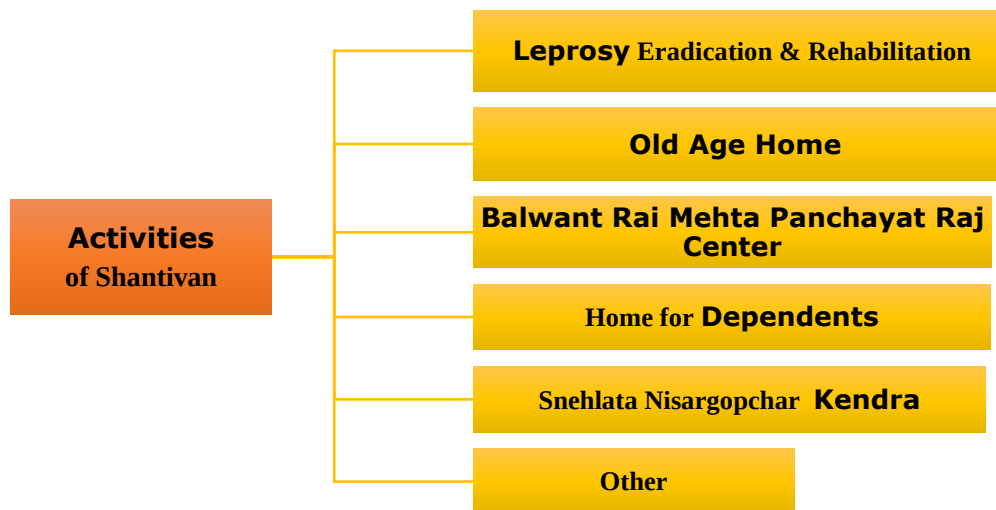
Shantivan's vision is "A sustainable future through empowerment and education." The NGO's mission encompasses:

- ❖ Enhancing educational access for marginalized children.
- ❖ Promoting environmental awareness and action.
- ❖ Fostering empathy and social responsibility among students and the community.

➤ **Key Objectives**

1. To provide quality education and vocational training to underserved populations.

2. To encourage collaboration between NGOs and educational institutions.



3. To build community resilience through environmental conservation initiatives.
4. To nurture empathy and leadership skills in students.

Activities of Shantivan:

➤ **Leprosy Eradication & Rehabilitation**

The Kushtarog Niwaran Samiti has played a crucial role in the fight against leprosy in Panvel, Maharashtra. Through the creation of Leprosy Referral Centres, the organization offers holistic care, including physiotherapy interventions like oil massage, wax therapy, stimulation exercises, and equipment dispensation. Through partnerships with bodies such as the Bombay Leprosy Project and the Foundation for Medical Research, the Samiti supports leprosy research.

Since November 1980, the Samiti has implemented the Government of India's Survey-Education and Treatment (SET) program in 185 villages in Panvel taluka. With a population of 200,000 to cover, the Samiti carries out house-to-house surveys, medical tests, and health education drives. It functions through nine principal centers and 36 clinics, diagnosing more than 10,000 cases and treating successfully over 9,900 patients. Their own hospital at Shantivan houses 40 beds for both male and female and delivers outpatient as well as inpatient services. Preventive facilities like deformity prevention programs as well as health awareness drives reiterate their multi-faceted public health policies.

➤ **Old age home**

Ramkrishna Niketan is established in the year 1990. It accommodates 40 persons at moderate cost. Adequate facilities such as lodging, boarding, community hall, library, entertainment equipment's are provided.

➤ **Balwant Rai Mehta Panchayat Raj Center**

Balwantrai Mehta Panchayat Raj Jagruti Kendra was formed in 1999. The aim is to initiate an integrated rural development programme in accordance with Gandhian philosophy. It focuses on the development of tribal villages near Shantivan as self-reliant villages in fundamental sectors such as drinking water, health, education, sanitation, and self-employment. The Kendra organizes camps to enlighten Sarpanches, Gram Panchayat elected members, and villagers about their duties and rights under the Panchayat Raj Act and inculcate awareness and active participation in rural government.

➤ **Home for dependents**

Rajeev-Rajan Adhargar was established in the year 1997. The persons who due to a permanent disability of some sort are unable to lead normal life independently and lack family support but can pay part of their cost are admitted in the Adhargar. The capacity of this Adhargar is 60 inmates. This activity was supported by Rajeev-Rajan Lad Trust. The story behind this noble cause is inspiring and poignant. Ms. Lad experienced huge personal tragedies in early life. She lost her husband at a young age, and afterward, her twin children—a son and daughter—lost their lives at the age of 24. But even in the face of these deep personal losses, Ms. Lad gathered the strength and resilience to pour her grief into a higher purpose.

Resolved to change something, she committed herself to serving others. She started a shelter for elderly women and other people who had been abandoned or rejected by their relatives. Her initiative gave not only a shelter but also a sense of dignity, care, and belonging to these people. Ms. Lad's life is a reflection of her bravery, empathy, and her staunch determination to help those in need, transforming individual grief into a source of hope for others.

➤ **Snehlata Nisargopchar Kendra**

Established in 1992 for providing naturopathy treatment. At present capacity of inmates is 40. From all over Maharashtra patients suffering from Blood Pressure, Diabetes, Arthritis, Skin Disease etc are treated Courses of naturopathy conducted of Tilak Maharashtra Vidyapeeth in Maharashtra State Vocational Training Center.

➤ **Others**

- ❖ Nursery Activity: Approximately 30000 saplings are produced in a year as per the requirements of villagers, govt. agencies and for Shantivan.
- ❖ This library is registered with State Govt. More than 6000 books on various subjects are available for reading. Also, newspapers, magazines available for reading.

- ❖ Goshala: There are 52 cattle. The milk produced from cows provided to the inmates of Shantivan. Cow dung use for fertilizer for agriculture activities.
- ❖ The samiti brought under cultivation 35 acres of land for rice paddy, vegetables, banana plantation. 30 acres of land is under horticulture planting Coconut, Cashewnut, Mango, Chikku etc. Under the social forestry scheme 60000 trees were planted.
- ❖ Shri Annasaheb Sahasrabuddhe Adivasi Ashram Shala was established in 1994 to serve the needs of the Adivasi community. The Adivasi children belong to the poorest strata of society, with a unique distinction of being the first generation to pursue education. At present, the school has 500 students - 400 residential scholars and 100-day scholars from class I to X.

Transformative Capacity Building Initiatives:

➤ Educational Programs

Shantivaan operates several centers offering supplementary education to children belonging to lower-income groups. Such centers emphasize literacy, numeracy, and life skills at a basic level. Through their after-school assistance, they fill the gaps in education experienced by students of government schools. Teacher Training Workshops Shantivaan conducts capacity-building workshops for rural school teachers. These workshops focus more on innovative teaching methods, inclusiveness, and mainstreaming environmental education in the curriculum.

➤ NGO-Education Collaboration

Shantivaan works in partnership with local schools to create programs that promote students' empathy and social responsibility. Programs such as "Adopt a Village" and "Green Guardians" allow students to work with poor communities and involve in various environmental projects.

The organization provides internship and volunteering opportunities for college and high school students. The programs allow students to have hands-on experience in community service and better understanding of social issues and the value of active citizenship.

➤ Environmental Sustainability Initiatives

In collaboration with schools and local communities, Shantivaan has planted over 10,000 trees in the Panvel region. These efforts not only combat deforestation but also involve students in environmental conservation. "Zero Waste" campaign educates communities and schools about waste segregation and recycling. Students are encouraged to create eco-bricks and participate in upcycling workshops.

➤ **Empathy and Leadership Development**

Through role-playing exercises, storytelling, and interactive sessions, Shantivaan organizes workshops that enable students to understand and relate to the problems of marginalized groups.

Shantivan's leadership programs concentrate on developing critical thinking, teamwork, and problem-solving capabilities among young minds. As a trained mentor guides them, students learn to plan and execute community projects, encouraging participatory approaches toward societal development.

Best Practices in NGO-Education Collaboration

❖ **Holistic Engagement**

Shantivaan focuses on integrating educational programs with environmental and social initiatives. The holistic process guarantees that students learn not only intellectual skills but also emotional intelligence and social consciousness.

❖ **Community Participation**

Through participation of the local communities in its activities, Shantivaan is able to create a sense of belonging and guarantee the sustainability of its activities. Initiatives such as community tree plantations and clean-up campaigns are examples of inclusive participation.

❖ **Scalable Models**

Shantivan's teacher training workshops and supplementary education centers are replicable with ease in other areas, hence serving as a model for similar NGOs.

❖ **Monitoring and Evaluation**

Regular feedback and impact evaluations are a part of Shantivan's projects. Through monitoring student progress, community involvement, and environmental impact, the NGO maintains a steady pace of improvement and accountability.

❖ **People-Centered Strategy**

Shantivan's initiatives center on the local people by engaging stakeholders such as parents, teachers, and local leaders. Collaboration ensures that the education curriculum and co-curricular activities are designed to address actual real-world problems faced by students in their surroundings. Empathy-based programs resonate strongly with community values and foster a feeling of collective ownership.

❖ **Holistic Development**

Education is not just academic but is blended with courses on health, hygiene, nutrition, and vocational training. Life skills and an integrated knowledge of the environment are imparted to students, preparing them for work as well as community leadership positions.

❖ **Capacity Building of Educators**

Teachers and school personnel are regularly trained through sessions conducted by the NGO to keep them abreast of contemporary pedagogical methods. Sensitization workshops make teachers sensitive to the socio-economic issues of their students, creating a supportive learning environment.

❖ **Active Participation Encouragement**

Students are actively engaged in community service activities, and they get hands-on experience in problem-solving and social responsibilities. Activities such as clean-up drives, health awareness campaigns, and waste management programs create a sense of empowerment among students.

❖ **Utilization of Technology and Innovation**

The partnership aims at closing the digital gap by making technology such as computers, tablets, and internet accessibility available. NGOs tend to contribute skills and resources to incorporate digital technologies into the teaching in classrooms to make learning interactive and more fun.

❖ **Environment-Focused Education**

The curriculum includes a strong focus on environmental education, including educating students on sustainable activities such as rainwater harvesting, organic farming, and the use of renewable energy. School-NGO partnerships guarantee that the students comprehend their role in bringing about environmental sustainability.

❖ **Empowerment through Empathy**

The programs are framed to foster empathy and inclusiveness in the students to make them appreciate and resolve disparities in society. The students are motivated to imbibe a spirit of service, innovation, and leadership.

❖ **Societal Impact**

❖ **Better Educational Outcomes**

Shantivaan's after-school education initiatives have significantly uplifted academic performance among students in the Panvel region. These programs provide structured support in subjects such as mathematics, science, and language literacy, catering especially to students who may lack access to quality education at school or home. Regular assessments show that students enrolled in Shantivaan's sessions consistently outperform their peers in district-level tests. Furthermore, the NGO's emphasis on personalized attention, interactive teaching methods, and mentorship has helped boost self-confidence, reduce dropout rates, and cultivate a genuine love for learning among children.

❖ **Environmental Awareness**

Shantivaan has successfully instilled a culture of environmental consciousness through a variety of grassroots campaigns and workshops. Children are taught to appreciate nature and understand the importance of sustainability through hands-on activities such as tree plantation drives, water conservation projects, and waste management programs. The NGO's garbage cleaning drives have not only led to visibly cleaner streets but have also helped reduce local pollution levels. These efforts have encouraged local communities to take ownership of their surroundings, transforming neighbourhoods into greener, healthier spaces. Importantly, students take these values home, influencing families to adopt eco-friendly habits like recycling, composting, and reducing plastic use.

❖ **Social Responsibility and Empathy**

A key pillar of Shantivaan's work is nurturing empathy, inclusivity, and civic responsibility among young minds. Through workshops, community service projects, and storytelling sessions, children are exposed to the realities of social inequality, poverty, gender issues, and differently-abled experiences. These engagements have proven transformative—many students, once unaware or indifferent, now demonstrate a deep sense of compassion and proactive involvement in helping others. Whether through volunteering, supporting community elders, or organizing donation drives, these young citizens are gradually becoming empathetic leaders and agents of positive change in their society.

❖ **Economic Empowerment**

Shantivaan's vocational training programs have become a critical tool in breaking the cycle of poverty for many local families. By offering practical skills-based courses in tailoring, handicrafts, computer literacy, and small-scale entrepreneurship, the NGO equips women and youth with the tools they need to earn a livelihood. For many women—previously confined to domestic roles - these programs have opened doors to financial independence and self-worth. Several participants have gone on to start home-based businesses or gain stable employment, thereby contributing to household incomes and improving overall quality of life. The economic upliftment of these families has had a ripple effect, fostering stronger communities with better access to healthcare, education, and housing.

Shantivaan's sensitization activities have made a positive impact on social change in Panvel in many ways:

- ❖ Promoting social inclusion: By seeking respect for diversity and reducing caste, gender and class inequalities.
- ❖ Increasing gender quality: By being aware of gender issues, leading to greater acceptance of educations for girls and empowerment for women.
- ❖ Increasing empathy: Through educating children and youth about social injustices and subsequently being more compassionate and action-oriented.
- ❖ Encouraging civic participation: By inspiring youth to engage in community service, environmental work, and social action.
- ❖ Mentoring youth leadership: By starting young changemakers who will influence their peers and challenge socially detrimental norms.
- ❖ Co-existing in social tensions: By understanding that kindness and respect for neighbours makes a difference.

Conclusion:

Shantivan's change initiatives demonstrate the sheer potential of NGOs to create solutions to society's major problems and drive sustainable development. By working with schools in partnership and through public engagement at multiple levels, Shantivan has created a model that is scalable and replicable and drives change. The programs lay significant emphasis on the harmonization of education, skills training, environmental conservation, and social awareness, demonstrating how interconnected strategies can come together to achieve holistic outcomes. Beyond meeting basic needs, Shantivan's activities foster empathy, dignity, and empowerment among marginalized communities, triggering a chain reaction of positivity that extends to society as a whole. The organization's emphasis on cultural sensitivity, participatory action, and inclusivity ensures that its interventions are relevant to the situation and sustainable. Shantivan's success shows the importance of holistic and inclusive approaches in establishing a future not only sustainable but also humane and equitable. By embracing leadership and empathy, equality bridging, and environmental stewardship, Shantivan continues to set the bar higher for successful social change, sparking hope and action towards a better world.

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A STUDY ON THE IMPACT OF DESIGN THINKING ON THE EVOLUTION OF CREATIVE THINKING SKILLS

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Abstract:

This study explores the effects of design thinking on the education level enhancing students' creative thinking skills based in the constructivist learning theory. It looks at the enabling aspects of technology integration, especially Arduino-based prototyping, within the design thinking paradigm on students' invention potential. The participants of the research were ninth grade students who were instructed to design and construct musical instruments under the guidance of the MYP design cycle framework using technology infused hands-on activities. Relevant focal points investigate the application of the technological facilitators, students' application of the creative and critical thinking processes at each stage of the design cycle, and the manifestation of advanced collaborative acquisition of cognitive skills. The study used a single group comprising of 30 learners who were pre-tested and post-tested. Outcomes from the paired t-test analysis indicated that there were significant differences in the students' creative thinking skills which showed improvement in the ability to appreciate, modify, and construct creatively after the creative intervention. The findings validate the deep impact of integrating design thinking within a technological and learner-centered environment that fosters learning. These findings are particularly relevant in terms of creativity, developing skills, undertaking challenges and promoting innovation, all of which are essential in this 21st century. These findings foster innovation in curriculum design and development.

Keywords: *Technology, Design Thinking mindset, Creative thinking, Students*

Introduction:

Design Thinking is a way of thinking, not just a way of teaching. It encourages students to truly see the world from another person's perspective, comprehend the needs of others, and use that empathy to come up with better solutions. Students are encouraged to ask questions, question conventional wisdom, and develop

original, meaningful solutions rather than merely memorizing facts or working through textbook problems. They create, test, learn from their mistakes, and try again. It is interactive, team-based, and recognizes imagination and inquiry at all stages.

This method is so effective because it naturally fosters the kinds of abilities that we all know students today require: resilience, creativity, critical thinking, and teamwork. And it's about life, not just school. In any field they choose, these abilities help students develop into considerate problem solvers, creative thinkers and compassionate innovators.

It places a strong emphasis on hands-on learning, integrating technology into the classroom in meaningful ways, and equipping students with the 21st-century skills they'll need to succeed. In many respects, the NEP seems to be fostering the ideal conditions for Design Thinking to thrive, where students are learning how to think with empathy, creativity, and purpose rather than just what to think.

Design Thinking as a versatile philosophy and problem-solving framework:

Design Thinking, a human-centered methodology applied across disciplines such as business, science, the arts, and engineering, has emerged as a powerful approach for cultivating creativity in education. Far from being reserved for formally trained designers, Design Thinking is grounded in a mindset that values curiosity, empathy, and iterative exploration. As Brown (2008) emphasizes, Design Thinking is accessible to all learners and promotes innovative problem-solving by encouraging individuals to view challenges through multiple lenses—a skill essential to creative thinking.

In educational settings, Design Thinking holds transformative potential for shaping students' creative capacities. Dorst (2011) introduces the concept of *frame creation*, highlighting how students can reimagine problems by redefining their context—an approach that aligns directly with divergent and lateral thinking strategies central to creative thought. This ability to reconceptualize problems helps students move beyond conventional solutions, fostering originality and ideation.

Martin (2009) further underscores Design Thinking's unique ability to integrate both analytical and creative modes of thinking. In secondary education, this integration supports the development of learners who can navigate ambiguity, test novel ideas, and reflect critically on outcomes. The cyclical process of empathizing, defining, ideating, prototyping, and testing offers students a structured yet flexible pathway to explore creativity in a meaningful and applied context.

Recent educational research has further examined the impact of Design Thinking on creative thinking in adolescents. For example, Carroll et al. (2010) found that middle school students engaged in design thinking activities demonstrated heightened

creative engagement, producing more original and diverse ideas in project-based learning environments. Similarly, Henriksen, Mishra, and Mehta (2015) argue that Design Thinking aligns with foundational models of creativity by supporting divergent ideation, iteration, and synthesis—all of which are essential to developing creative capacity in students.

Despite growing interest, Panke (2019) notes that the integration of Design Thinking into formal curricula remains underdeveloped, particularly in secondary education. However, its application is gaining momentum as educators recognize its value in promoting not only problem-solving and collaboration but also imaginative and reflective thinking. The adaptability of Design Thinking makes it an ideal framework for secondary classrooms, where it can help students build creative confidence, empathy, and the resilience to approach challenges with innovative thinking.

In summary, Design Thinking mindsets offer a promising foundation for fostering creative thinking among secondary students. By embracing ambiguity, encouraging exploration, and valuing diverse perspectives, Design Thinking empowers learners to become imaginative problem-solvers prepared for the complexities of the 21st century.

Creative Thinking:

The capacity to produce unique, worthwhile ideas by addressing issues from various angles is known as creative thinking. It is essential for both academic success and practical innovation. Fluency, flexibility, originality, and elaboration are all components of creativity, as described by Guilford (1950), and these qualities are essential for handling difficult problems. In education, it empowers students to not only solve but also redefine problems, fostering more meaningful and innovative outcomes.

Researchers like Craft (2005) and Torrance (1974) stress the value of fostering creativity via imaginative inquiry and open-ended questions. Furthermore, by requiring experimentation, teamwork, and reflection, presenting students with real-world, unstructured problems fosters creativity (Jonassen 2000; Sawyer 2012). Students' ideas are developed and improved in adaptive ways through these iterative, experiential learning opportunities.

Rationale:

In our fast-paced world, creativity is more important than ever for personal growth and professional success. As we face global challenges, we need individuals who can think critically, come up with original ideas, and work well with others. Unfortunately, traditional education often focuses on memorization and standardized tests, which can stifle creative development. That's where Design Thinking comes in—it's a

human-centered, iterative approach that promotes empathy, brainstorming, prototyping, and testing (Brown, 2009; Martin, 2009). This method aligns perfectly with the demands of 21st-century education by encouraging exploration, innovation, and solving real-world problems (Henriksen, Mishra, & Mehta, 2015).

Despite the growing popularity of Design Thinking in education, little thorough research has been done on how it affects high school students' capacity for creative thought. Research shows that students' critical and creative skills are enhanced when they work on challenging, open-ended problems (Jonassen, 2000; Sawyer, 2012). According to Dorst (2011), Design Thinking is especially good at rephrasing issues to generate fresh ideas. However, rather than encouraging long-term creativity, the majority of research has focused on problem-solving outcomes. In order to close that gap, this study investigates how ninth graders' divergent thinking, risk-taking, and idea generation can be improved through experiential, iterative learning, particularly through Arduino-based design projects (Panke, 2019).

This study adds to the global conversation on educational innovation in keeping with India's National Education Policy (NEP) 2020, which highlights the value of creativity, critical thinking, and interdisciplinary learning (Pillai, 2021). Students can actively construct their own knowledge in constructivist learning environments thanks to the collaborative and reflective elements of Design Thinking (Vygotsky, 1978). The usefulness of Design Thinking in exposing students to practical, creativity-focused problems is further demonstrated by studies by Carroll et al. (2010) and Sawyer (2012). In line with educational frameworks that support holistic and future-ready learning, this study aims to demonstrate how these strategies can prepare students to handle the challenges of the future.

Variables of the Research:

Independent variable

Technology-Infused Design Thinking Intervention

Dependent variable

Creative Thinking

Objectives of the Research:

1. To assess the pre test scores of secondary students with respect to creative skills
2. To develop and implement Technology-Infused Design Thinking Intervention
3. To compare the pre-post test scores of secondary students with respect to creative skills

Null Hypothesis(HO) :

There is no significant difference in the pre-post test scores of secondary students with respect to creative thinking

Methodology:

The research is experimental in nature. Single group pre test post test design is used

Research Sample:

The sample was 30 secondary school students from a school in Mumbai. Purposive sampling technique was used.

Research tool:

The Creative Thinking Tool, sourced from the “Skills You Need” website, was used in this study to assess students' creative thinking abilities. The tool consists of : 20 positively framed questions.

For these items, responses are scored on a scale from 1 (Never) to 4 (Often), with a maximum possible score of 80. The total score ranges from 30 to 120, where higher scores reflect greater creative confidence. Based on the total score, participants are categorized as needing improvement (30–60), fairly confident (61–90), or confident (91–120).

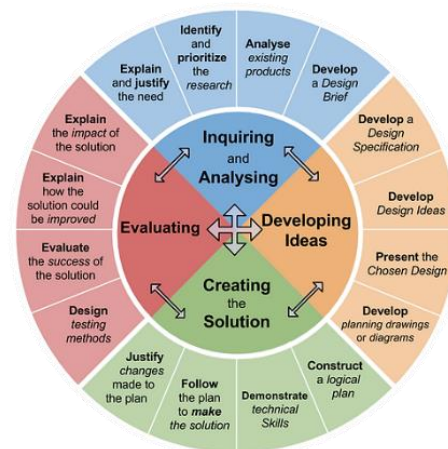
To ensure the reliability of this tool, a test-retest method was employed, yielding a high correlation coefficient of $r = 0.92$. This strong value indicates that the tool is highly reliable for measuring creative thinking consistently over time.

Data collection:

Employing an experimental approach, the investigation centered around a pretest-posttest design involving 30 secondary school students who engaged with a technology-enhanced design thinking intervention program over 20 weeks. The curriculum focused on utilizing Arduinos to create musical devices, requiring students to apply the complete DT cycle—from empathizing to testing. Creative thinking abilities were quantitatively assessed pre and post this intervention program with the creativity skills tool to understand the level at which students use creative skills in their day to day life and assess the impact of intervention program

The MYP Design cycle used:

This research utilized Arduino technology alongside the MYP Design Cycle to help students identify and solve real-world problems. The MYP framework, which includes the phases of Inquiring and Analysing, Developing Ideas, Creating the Solution, and Evaluating, provided a structured yet flexible approach to guide students through the design thinking process.



During the project, students explored community-based issues, conducted research to understand user needs, brainstormed innovative solutions, and developed prototypes using Arduino kits. Each phase aligned with key aspects of design thinking—empathy, ideation, prototyping, and testing—encouraging students to think critically and creatively.

As students progressed through the cycle, they naturally developed essential skills such as problem-solving, decision-making, and iterative thinking. The hands-on, technology-driven approach allowed them to refine ideas based on feedback and enhance their understanding of both the design process and creative application.

Data Analysis:

Data was analysed using descriptive and inferential analysis techniques. To test the hypotheses, paired t test was used.

HO1 *There is no significant difference in the pre-post test scores of secondary students with respect to creative thinking skills*

Groups	Sample	Mean	Df	Pearson Correlation	Calculated t value	Table value 0.05	p Value	Los 0.05
Pre Test	30	55.48	28	0.196	3.05	2.05	0.05	Significant
Post test	30	61.14						

From the table, it can be seen that the obtained value of “t” is 3.05 which is more than the table value at 0.05 level. The p value is 0.05. Hence, the null hypothesis is rejected at 0.05 level of significance.

Finding and Discussion:

The analysis of the pre-test and post-test scores reveals a meaningful improvement in student performance following the intervention. Specifically, the average score increased from 55.48 in the pre-test to 61.14 in the post-test. This upward shift in the mean suggests that the intervention—presumably rooted in Design Thinking principles—had a positive effect on learners' outcomes.

To determine whether this improvement was statistically significant, a t-test was conducted. The calculated t-value was 3.05, which is notably higher than the critical table value of 2.05 at the 0.05 level of significance with 28 degrees of freedom. This result alone indicates that the observed difference is unlikely to be due to chance.

This is a clear indication that the students have shown a distinct development of their creative thinking skills after intervention and their ability to think in an innovative and creative manner has developed through the use of the design cycle.

Conclusion, Recommendations, and Implications:

The results of this study clearly demonstrate that students' capacity for creative thought was positively and significantly impacted by the application of a Design Thinking-based approach. With a statistically significant t-value of 3.05 and average scores increasing from 55.48 to 61.14, it is clear that the careful, student-centered pedagogy was the direct cause of this improvement rather than a coincidence. Through phases such as empathy, ideation, prototyping, and testing, the design cycle assisted students in developing their critical and collaborative thinking skills in addition to their creative problem-solving abilities. These findings suggest that schools should think about integrating Design Thinking into more than one or two subjects because of its interdisciplinary nature, which promotes learning in all subject areas.

In order for teachers to confidently implement these strategies in the classroom, they should also receive the appropriate training. Learning will become more interesting and relevant if spaces are created where students can collaborate, think critically, and investigate real-world problems. By adopting these methods, we can assist students in developing the kinds of abilities that will benefit them well beyond the classroom, such as creativity, empathy, and problem-solving.

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A LA CARTE LEARNING IN A BUFFET STYLE SYSTEM-THE NEXT EVOLUTION IN HIGHER EDUCATION

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Abstract:

Conventional Higher Education in India is currently undergoing a major transformative shift owing to National Education Policy (2020) alongside with pressing global need to revitalize the curriculum and celebrate learner autonomy in true sense. Multidisciplinary and interdisciplinary approaches are much then ever being focussed upon. This paper focusses on how crucial significance of Learners creating their individualised learning pathways in collaboration with facilitators, aligned with their interests, career aspirations, and personal growth trajectories. This paper introduces the model of "A La Carte Learning in a Buffet Style System which is rooted in principles of autonomy, interdisciplinarity, and lifelong learning. The paper while presenting this model advocates that such model in higher education would promotes deeper engagement, diversified learning outcomes, and enhanced employability.

Keywords: *Personalized pathways, Multidisciplinary, Interdisciplinary Learning, A La Carte, National Education Policy,*

Introduction:

Across the globe, in the market driven perspectives of education the students are positioned as recipients of services, and it would not require too much of liberty to be taken to even classify them as being akin to customers or clients in a market-driven mode (Newson,2004)

In entire quest of serving these learner akin clients the educational spaces position themselves as service providers with major focus of providing such services that ensure the stratification for making the choice and value for investment. In this relentless pursuit to serve learners akin clients, educational institutions compete to position themselves as service providers with primary focus on delivering offerings that ensure satisfaction, justify student choices, and guarantee value for their investment. A deep debate ensues in terms of whether the educational experiences are realistically transformative or merely transaction with guarantee of some degrees

and credentials earned which further establish prominence in a service-driven, industrial, and consumerist economy.

As opposed to the market model, constructivist and collaborative approaches position the learner as an active agent thereby recognizing their central role in shaping educational decisions and acknowledging them as partners and co-facilitators in their own learning journey. Research led by Gump (2007) and Vander Schee (2011) have raised concerns about students in higher education spaces not able to comprehend the relevance to the courses they are required to take. Is the learner disoriented then or is it that the higher education has failed to adequately address the expectations of the learner. Does this suggest a need to move beyond the fixed roles traditionally assigned to learners, encouraging them to take responsibility for co-creating or even self-designing their own learning trajectories? The pressing question remains: Is the Indian higher education system ready to embrace such a transformative shift?

Student as designers of their own learning pathways:

Overall, several research on student participation as partners and consultants in teaching -learning environments have shown significant increase in students metacognition, motivation, self-awareness, efficacy communication, faculty-student relationships, empowerment and sense of being valued (Jensen & Bennett, 2016; Amdal and Endresen-Maharaj,2023). Self-Determination Theory (SDT), a leading psychological framework for understanding motivation, suggests that intrinsic motivation is rooted in three fundamental components: a sense of belonging, the pursuit of competence, and the experience of autonomy. (Ryan,2000). Learner autonomy in co- designing educational experiences for them becomes prominent in this aspect.

Learners get empowered when subject choices presented to them are unlimited and expansive (Chhetri,2023). Cognition and skills needed for pursuing multiple career pathways open before them along with the development of the ability to critique, integrate and examine issues for diverse perspective- a much needed 21st century skills. Personalized Learning offers students learning environments as per their needs and preferences which is of crucial importance in higher education (Dabbagh & Kitsantas, 2012; Quaye & Harper, 2013). Research have shown that when students are involved in planning the curriculum, not only does their performance show significant increase but their motivation alongside with development of ownership also shows remarkable increase. (Blinne, 2013; Haynes, 2001; Hudd, 2003). These dynamic multiple learning experiences of different subject other than mandatory subjects needed for degree lead to development of skill sets for dealing with future complexities in career pathways (Kanmaz,2022)

Need for the -À La Carte Learning Model:

The silos dominated traditional systems of higher education whose primary focus is to provide fixed degrees, follow predetermined and often obsolete programs and course sequences and content is not acceptable in a flexible, dynamic AI driven world of today. Addressing the complex multifaceted issue of rigid and dominant silos in colleges and universities requires innovative solutions that transcend traditional academic boundaries (Mizuta, 2022).

In this context, the rapid advancement of technology, increasing global interconnectedness, and the introduction of the National Education Policy (NEP) 2020 have together delivered a much-needed jolt to India's otherwise stagnant higher education system.

While NEP (2020) has given considerable emphasis on multi and interdisciplinary facet of education, yet these are still terms which are used interchangeably and as synonym (Jacobs, 2014).

NEP 2020 encourages:

- All disciplines whether sciences, social sciences, arts, humanities, technical, performing arts, sports etc have to be multidisciplinary in nature fostering holistic education
- Learner friendly programs with flexible curricula allowing multiple entry and exit points.
- An Academic Bank of Credits for tracking learning achievements.
- Emphasis on skill development, creativity, and critical thinking.

The "À La Carte Learning in a Buffet-Style System" model as proposed in this paper emerges as a forward-looking, transformative approach that responds to the evolving needs of learners, educators, and the global workforce.

This model aligns closely with the vision articulated in progressive educational policies such as India's National Education Policy (NEP) 2020, which advocates for holistic, flexible, and multidisciplinary education. The NEP calls for dismantling rigid academic boundaries and creating opportunities for students to develop broad-based knowledge alongside deep specialization. In this context, the à la carte, buffet-style approach offers a powerful framework for actualizing these ideals in practice.

A La Carte Learning Model- Customizing Higher Education:

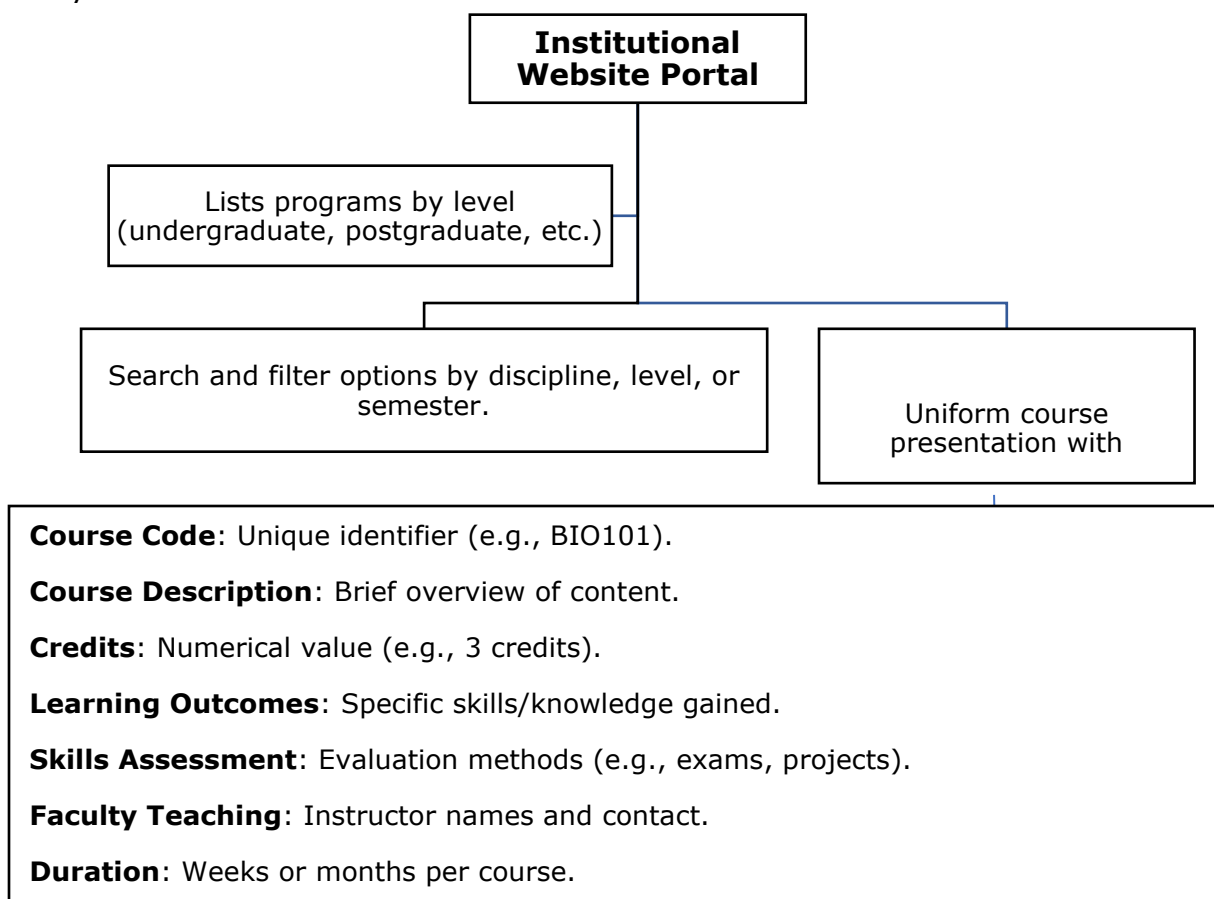
A la carte learning model posits itself to empower students to customize their academic journey by selecting courses from a diverse and expansive menu of offerings. This is on similar lines as diners choosing their preferred dishes at a buffet. This buffet-style system of education moves away from the rigidity of traditional curricula and embraces flexibility, choice, and interdisciplinarity. It allows students to

construct unique learning pathways tailored to their interests, career aspirations, and evolving skill needs, drawing from a wide array of disciplines—including the humanities, sciences, technology, entrepreneurship, arts, sustainability, wellness, and more.

The concept of A La Carte Learning is that students are given complete autonomy to choose from a wide array of courses offered across different disciplines. Core courses as per degree requirements are mandatory. Students can select other courses based on their interests and career aspirations. This autonomy brings in learner empowerment and motivation with due consideration given to individual needs. The implementation strategies need for this model would require institutional policies to be redesigned and allow credit frameworks that permit interdepartmental and inter-university mobility. There has to digital developments that support the model in terms of academic dashboards which help students select the courses, automated generation of customised timetables, credit tracking and evaluation.

A La Carte Learning Model Prototype:

This prototype clearly indicates the customizable academic pathways that students create for themselves. The model is simple, offers flexibility and clarity and is learner friendly.



Course Selection Process

Mandatory Courses

Students select core courses, electives, specialization courses, skill-based programs, field experiences, and other degree-required courses as per their program.



Interdisciplinary Courses

Students choose additional courses from other disciplines based on aptitude, interest, or preference.

No restrictions on cross-disciplinary selections unless prerequisites apply.

Capacity Limits:

Each course has a fixed number of seats for mandatory learners (e.g., 50 students).

Faculty specify additional capacity for interdisciplinary learners (e.g., +10 students).

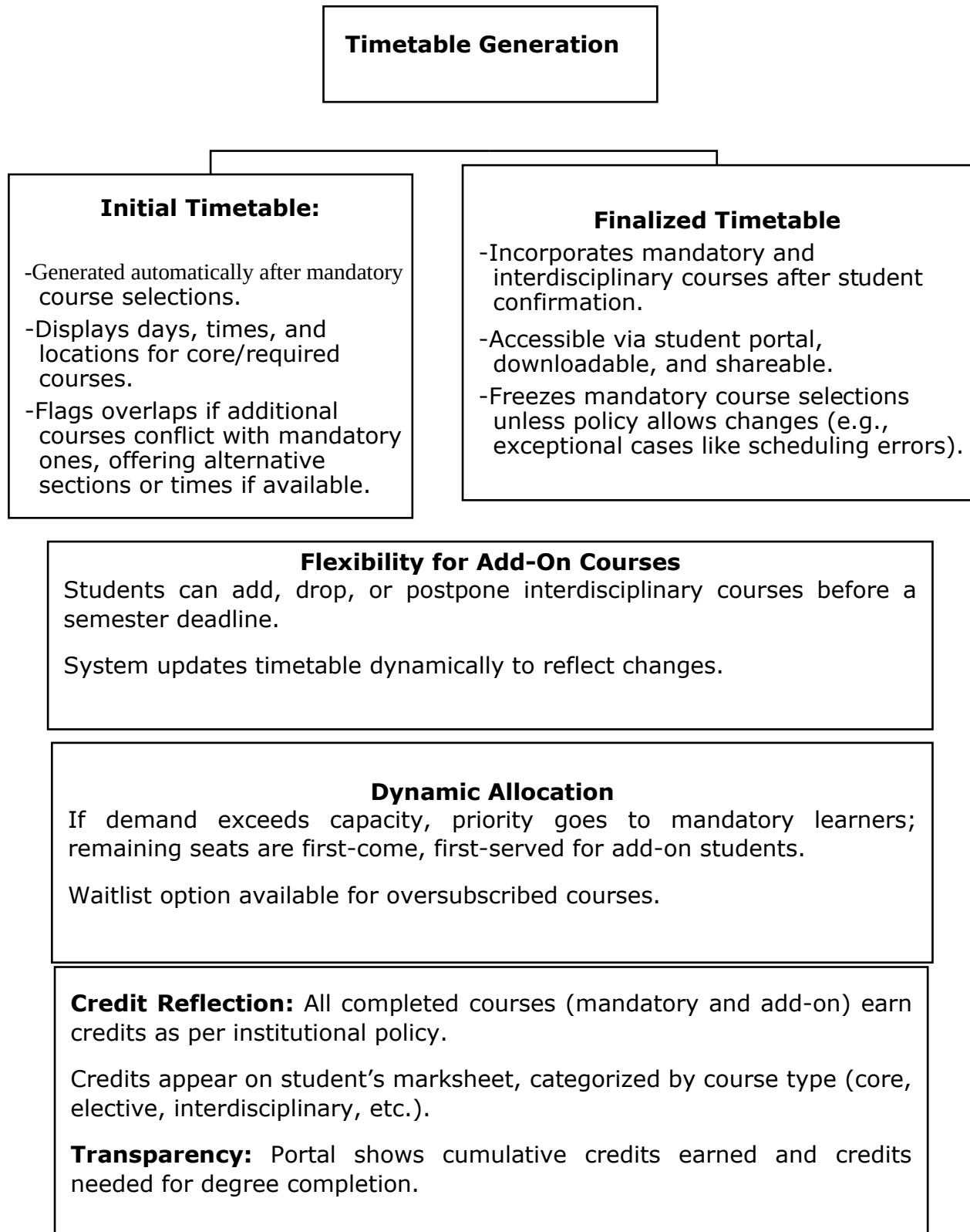
System prevents over-enrolment to avoid resource strain (e.g., classroom size, lab equipment).



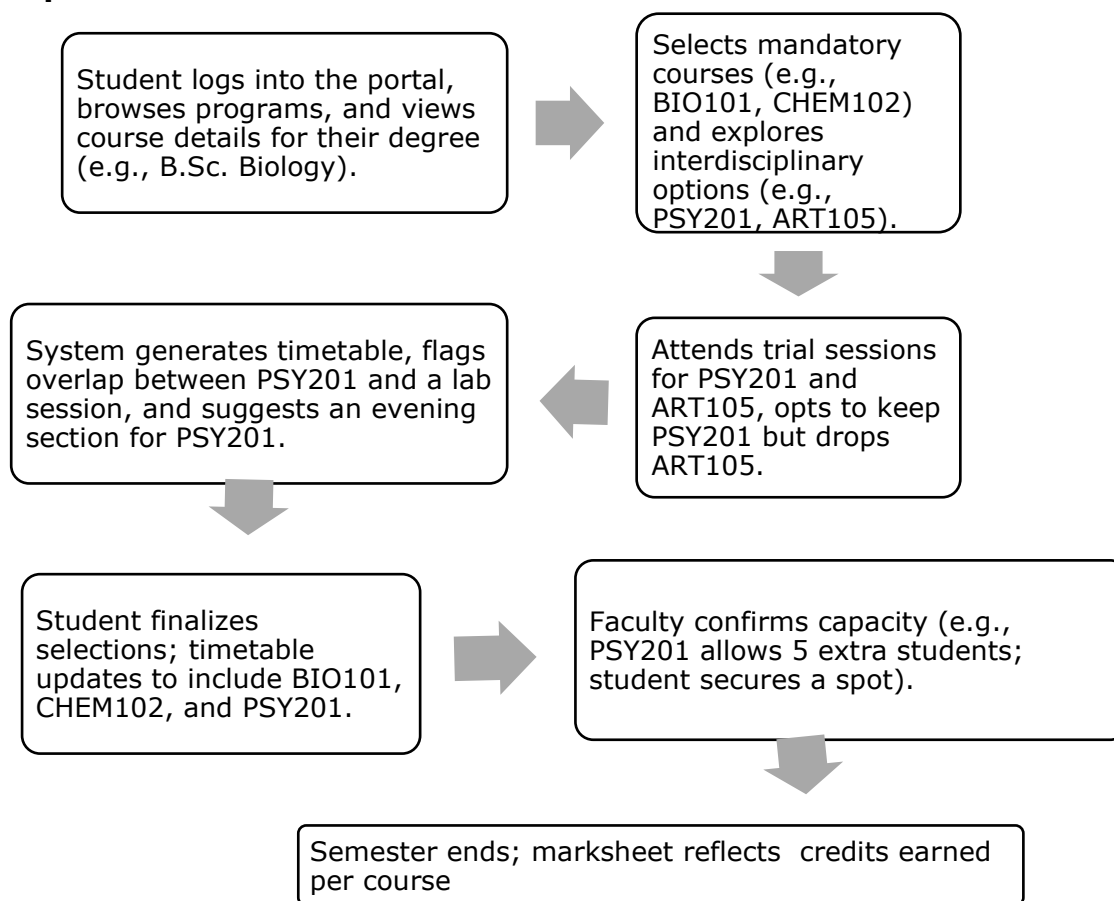
Trial Period:

Students can attend a set number of classes (e.g., 2–3 sessions, per policy) before finalizing enrolment.

Opt-out option available post-trial without academic penalty.



Example:



Discussion:

Research in higher education has increasingly emphasized the need for interdisciplinary approaches. The A La Carte model presented in the paper represents a transformative shift in the philosophy and practice of higher education. The focal point of this model is tremendous scope for student empowerment. From passive learners to active motivated learners who take the onus of curating their own learning pathways the model explores within the realms of higher education the concept of academic freedom. A platform to explore interdisciplinary subject like language learning and performing arts to analytics, spiritual education, or sustainability brings the learner to heightened cognition level along with sense of being accountable for their own learning. The much criticised one size fits all in terms of uniform perspective curriculum is being eroded and replaced with a curriculum that recognizes and nurtures the diversity of student aspirations.

The model exhibits transparency in all aspects regarding the course structures and the course pursuing system. The individualized timetables bring in accountability and enable learners to pace their academic growth effectively. The trial periods are another hallmark feature as the learner does not feel trapped in courses which later cease to be of interest or likewise. This considerably de burdens the learners from the weight of incorrect choices of courses and thereby reduces anxiety. Learners thought own quest become better decision makers for their academic life and for real life too. The digital supportive system brings in an ease and swiftness that aid effective decision-making regarding academics. The model is nether compromising on academic rigor nor diluting the essence of higher learning. It is on the contrary making higher education thematic in terms of removing the hard fixated boundaries between disciplines and letting education be truly meaningful.

Conclusion:

The A La Carte model is not just another model for higher education. It is rather a response to pressing demand to revitalize the paradigms of education suitably enough to meet the fact paced AI driven globalised world. The model synchronises perfectly the mandates with personalisation bringing in learner autonomy at the crux of higher education. This model if adopted across all higher education institutions in India would be instrumental in redefining higher education not only for sake of enabling careers but for preparing holistic learners ready for real world.

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A STUDY ON LEVERAGING NEP 2020 IN HIGHER EDUCATION CURRICULUM FOR A GREENER FUTURE

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Abstract:

Importance of Environment cannot be overemphasised since the interdependence between man and environment is so obvious. Over the past few decades, environmental degradation and natural catastrophic events have become increasingly evident. This has drawn the attention of the global community towards a better-quality environment through sustainable development initiatives. To achieve this goal, environmental literacy, education, and awareness have become crucial to bring about the participation of the community for environment protection. Environmental Education is crucial for enhancing environmental literacy and for developing awareness and commitment among college students. It lays the foundation for lifelong learning, eco-consciousness and responsible environmental behaviour by introducing key concepts and fostering a sense of stewardship. By introducing students to their surroundings, environmental studies can help them connect with nature, become aware of environmental issues, and develop a commitment towards sustainable practices. Environmental Education also supports efforts to address the Sustainable Development Goals (SDG). Through literature review, this research paper explains the need and importance of fostering environmental literacy and its corresponding impact on environmental sustainability. The National Education Policy (NEP) 2020 recognises the value of inculcating environmental consciousness and sustainability in students at a young age by enhancing environmental literacy in education. This research paper further explores the application of curriculum adaptation at the college level, instructional strategies, and evaluation tools intended to advance environmental literacy. The paper uses a thematic analysis method to identify and compare the main themes and sub-themes related to environmental literacy in the NEP 2020 and other sources. It adopts a descriptive and analytical approach to examine the NEP 2020's approach to environmental literacy in colleges. Suggestions call for enriching the curriculum with practical applications to foster ecological literacy and sustainable practices.

Keywords: *Environmental Literacy, National Education Policy 2020, Environmental Education, Curriculum, Sustainable Development Goals.*

Introduction:

Environmental Education is crucial for preparing the next generation of environmentally conscious and responsible citizens. Environmental literacy will help to foster a deep appreciation for the environment and equip the students with the requisite knowledge and skills to address environmental challenges, thereby ensuring a sustainable future for all. It will help to develop a wide range of skills and competencies that people will need in order to comprehend, evaluate, and use environmental health information to make informed choices, reduce health risks, improve quality of life and protect the environment. Here, Colleges and Universities can play an important role by incorporating environmental education into the curriculum through specific environmental courses required as a part of the undergraduate degree programs. The critical attention given to environmental literacy is much needed now when the world is becoming aware of the state of the environment and the urgent need to instil analytical skills that will serve in assessing human impact on nature.

Statement of the Problem:

The current elementary curriculum needs improvement to prepare students for environmental responsibility by fostering critical thinking and proactive behaviour. This requires equipping teachers with practical skills and actionable knowledge through revised teacher education programs, emphasizing sustainable development and meaningful learning experiences. Colleges, universities, and schools must collaborate to ensure educators are well-prepared to bridge these curricular gaps and promote a sustainable future. Higher Educational Institutions (HEIs) can address the gaps in the curriculum and equip teachers with the necessary skills to empower students to become responsible and proactive environmental stewards. Integrated teaching and learning in education systems to address environmental education is an essential need today. Environmental education competencies should be integrated into other subjects based on both philosophy and practicality. It should purposefully draw together knowledge, skills, attitudes, and values from within or across subject areas to develop a more powerful understanding and linkages of key ideas.

Objectives of the Study:

- 1) To identify the main theme and sub-themes related to environmental literacy as per NEP 2020 guidelines.
- 2) To understand the importance of Environmental Literacy as an important aspect of education for sustainable development for environmental integrity and economic feasibility.
- 3) To identify the strategies that can be adopted by HEIs to incorporate sustainability studies in their curriculum in alignment with NEP 2020's guidelines.

Research Methodology:

This research paper is based on a review of relevant literature, including policy documents, research articles, reports, and websites. It adopts a descriptive and analytical approach to examine the NEP 2020's approach to environmental literacy in colleges. The paper uses thematic analysis to identify the main theme and sub-themes related to environmental literacy in the NEP 2020. Documents like National Education Policy 2020, Draft Guidelines and Curriculum Framework for Environment Education at Undergraduate level and Curriculum and Credit Framework for Undergraduate Programmes have been analysed. Secondary data has been collected from various articles, newspapers, websites and books to present an inclusive analysis of NEP 2020 and its alignment towards sustainability studies in HEIs for a greener future.

Research findings through this paper indicate that NEP 2020 has visualised a shift in the learning style from rote learning to experiential learning and from passive to active exploratory learning. The preliminary findings suggest that NEP 2020's approach to fostering environmental literacy through the academic curriculum has a very strong possibility to create environmentally conscious students who recognize the interrelationship and interdependence between human beings and the environment. In the light of the above, this research paper analysed the data to present its subsequent findings. Various strategies have been proposed through this research paper for implementation by HEIs to foster environmental literacy and sustainability studies in its curriculum in alignment with NEP 2020.

Understanding Environmental Literacy:

Environmental literacy is the ability to understand and act on environmental issues in a responsible manner. It is an important aspect of education for sustainable development since it empowers the learners to take informed decisions for environmental integrity and for economic feasibility. Environmental literacy is also aligned with the United Nations' Sustainable Development Goals (SDGs) which seeks to ensure inclusive and equitable quality education and promote lifelong learning

opportunities for all (UN, 2015). Environmental literacy refers to an individual's understanding, skills and motivation to make responsible decisions that consider his relationships with natural systems, communities and future generations (Fang, Hassan and LePage, 2023). Environmental literacy is not only about acquiring factual knowledge about environmental issues but also about developing critical thinking skills, values, attitudes, and behaviours that enable one to participate in environmental problem-solving and action (Taimur and Sattar, 2020).

Hungerford and Peyton (1976) said environment literacy is "reflected by human beings who have the knowledge and ability to communicate the need for environmental action strategies and be willing to use these skills and knowledge to develop and implement strategies to remediate and/ or address environmental issues." Environmental literacy, which is a direct outcome of environmental education, is crucial for fostering environmental responsiveness and driving the transition towards sustainable societies. Addressing environmental degradation requires collaboration between governments, businesses, communities, and individuals. Environmental literacy, which is an outcome of environmental education, can provide a strong foundation for future environmental responsiveness, and help in the transition towards more sustainable societies.

Environmental education aims to expose students to the real world and its environmental situations, helping them connect with nature and understand the importance of protecting it. This awareness fosters a deeper appreciation for the natural world, inspiring students to adopt sustainable practices from a very young age. By learning about biodiversity, conservation, and climate change, students can develop a sense of responsibility towards the environment. Environmental education helps children develop critical thinking skills, allowing them to understand complex environmental issues and identify solutions. Students learn to analyze the causes and consequences of environmental problems, such as deforestation or pollution, and develop innovative solutions. This education provides students with the requisite knowledge and skills to make informed decisions about various critical environmental issues.

Enhancing Environmental Literacy in Education:

To enhance environmental literacy in education, various strategies can include integrating environmental issues into the curriculum, promoting hands-on learning, and fostering critical thinking. Environmental issues can be integrated into various subjects in the curriculum, such as science, social studies, and language arts, thereby creating a more holistic learning experience. This integration allows students to explore environmental concepts in a variety of ways, making the learning process

more engaging and effective. These approaches aim to create a generation that cares for the environment through diverse activities, such as nature walks, field trips, and community engagement. Education can empower children to become environmental advocates by providing them with the knowledge, skills, and confidence to take action. Students can engage in environmental action projects, such as recycling initiatives, planting trees, or advocating for environmental policies. By participating in these activities, students learn the importance of collective action and can become active participants in shaping a sustainable future.

As the world population continues to increase and natural resources become limited, environmental education (EE) in schools, colleges universities will play a critical role in moulding and creating environmentally literate citizens. EE should be integrated within university curriculum in order to increase Environmental Literacy levels of students who are the future policy makers, voters, business people, and teachers. Considering the current market requirements, the Colleges and Universities should structure their curriculum with an interdisciplinary outlook. The courses should provide skill sets related to environmental management, pollution mitigation, natural resource management, climate change data analysis, and carbon offset analysis, besides covering the requisite knowledge of environmental and sustainability science and social science. Students should be provided the necessary in-class exposure to hone their skills in data analysis tools such as R-studio, Machine learning models, Geographical Information Systems and Remote sensing (GIS-RS) etc. The major environmental and sustainability compliances required in industries such as ISO 14001:2015, Business Responsibility and Sustainability Reporting (BRSR), Environmental Impact Assessment reporting, Environmental Management Plan preparation and United Nations Sustainable Development Goals (UNSDGs) compliances should be integrated into the curriculum.

Leveraging NEP 2020 in Higher Education Curriculum for a Greener Future:

NEP 2020 offers an opportunity for Higher Educational Institutions (HEIs) to integrate sustainability in their curriculum and research by adopting an inter-disciplinary approach, specialised programs and through vocational training too. Educational Institutions can be instrumental in preparing college students to become responsible global citizens with the knowledge and skills to address climate change and promote sustainable practices in various sectors. Following strategies can be adopted by HEIs to incorporate sustainability studies in their curriculum in alignment with NEP 2020's guidelines:

- i) *Merging Sustainability with Core Disciplines:* HEIs should embed sustainability into core disciplines thereby enabling students to approach sustainability from

diverse perspectives. This approach will definitely help in embracing NEP 2020's Interdisciplinary and Multidisciplinary Vision. Interdisciplinary Learning can be implemented by integrating Sustainability into existing courses, or by offering Joint Degree Programs or, through Collaborative Projects. For example, these projects may involve design, policy studies, engineering, and economics department jointly working on solutions like renewable energy integration or sustainable urban development.

- ii) *Creating Specialised Sustainability Degree Programs:* HEIs can utilise the flexibility granted by NEP 2020 by designing innovative courses and degree programs addressing the societal needs and sustainability education encompassing fields like environmental management, climate change adaptation and green technologies. Bachelor's and Master's Degree Programs in Sustainability, Environmental Studies, Renewable Energy, Climate Science etc. can be offered by HEIs by blending theoretical knowledge with practical exposure and training. Partnering with NGOs and Industries can be another viable option to ensure practical training is imparted to the students. Students can work on real world sustainability projects, fieldwork and internships to get hands-on experience.
- iii) *Including Sustainability in Vocational and Skill-Based Training:* Skill based learning should be included in the curriculum thereby preparing students for green industries and its related jobs. This will be in alignment with NEP 2020 guidelines to integrate vocational education into mainstream curriculum. Students can be equipped with competencies and skills with respect to sustainable development in renewable energy, sustainable agriculture and waste management. HEIs can introduce Green Job Training Modules focussing on skills related to solar panel installation, green building certifications like LEED (Leadership in Energy and Environmental Design) and sustainable agriculture techniques. On-campus sustainability labs can be established by HEIs where students can work on hands-on projects like renewable energy experiments, sustainable product design or on systems for recycling waste.
- iv) *Sustainable Practices to be embedded in the college campus operations:* Green campus initiatives like solar panels, energy-efficient buildings, rainwater harvesting systems, waste recycling programs should be adopted wherein the students should be involved in its maintenance activities to gain experience. Sustainability initiatives can be led by the students on the campus like conducting zero-waste events, organising awareness campaigns for zero waste campus and importance of saving water, and also conducting energy audits. These may then

be assessed by their faculties, graded and included in their course work as a part of their experiential learning initiative.

- v) *Integrating Sustainability in Research and Innovation:* HEIs can support in research by offering research grants and fellowships for sustainability research in areas like sustainable agriculture, climate adaptation strategies, circular economy models, renewable energy etc. Universities can collaborate with Industries, Policy makers and Government to conduct sustainability-related research which impacts policy and industry practices. Incubators and Innovation laboratories should be set up wherein students can develop eco-friendly technologies and sustainable solutions thereby fostering a culture of research, creativity and entrepreneurship. Such laboratories can help in translating research into practical applications.

Industry-synched courses in Environment and Sustainable Development:

Industry-synched courses in Environment and Sustainable Development are becoming increasingly vital. They address the growing need for professionals who can effectively navigate the complexities of sustainability and contribute to environmentally responsible practices across various sectors. These courses should be designed to equip individuals with the skills and knowledge necessary to implement sustainable solutions in their respective fields. Industry-synched courses are crucial because of the following reasons:

Growing demand for green jobs:

Since the environmental and sustainable development sector is experiencing significant growth, it is leading to a higher demand for skilled professionals who can address climate change and environmental issues.

Integration of sustainability into business: Companies are increasingly recognizing the importance of sustainable practices to achieve long-term success, leading to a need for professionals who can guide and implement sustainability initiatives.

Addressing complex challenges:

Environmental issues, like climate change and resource depletion, require interdisciplinary approaches and skilled professionals who can analyse and address these challenges effectively.

Global sustainability goals:

Many countries and organizations are striving to achieve the Sustainable Development Goals (SDGs), and these courses can help individuals contribute towards achieving these goals by providing the knowledge and skills needed to implement sustainable practices.

Industry-specific knowledge:

Many courses are tailored to specific industries like agriculture, manufacturing, or tourism, ensuring that professionals gain relevant skills and knowledge to address sustainability challenges within their sector.

Conclusion and Suggestions:

The world today is facing tremendous environmental challenges which require greater levels of innovation and collaboration among industry, government, academia and communities. Universities and colleges can intervene by combining environment and sustainability studies with applied research, public advocacy and capacity building. It can offer to the students a deep focus in environment and sustainability studies with opportunities to explore how humans interact with the environment, including physical, biological, economic, philosophical, social and legal elements. Besides deep-diving theoretical frameworks, principles, concepts and application-based engagement in the domain of environmental and sustainable development, the programmes should comprise class-room discussions, field visits, policy labs, case studies, industry-based internships, live projects and unique pedagogical approaches aimed at enhancing interaction, practical learning and curiosity among the students. Industry-synched courses could include courses on *Business and Sustainable Development* focusing on incorporating sustainability into business decision-making processes and identifying opportunities within the sustainability industry. *Sustainable Hospitality* course can equip professionals with the knowledge and skills to integrate sustainable practices into hospitality operations, such as reducing waste and conserving resources. Course on *Green Skill Development Program* in areas like biodiversity conservation, waste management, and pollution monitoring, can provide professionals with practical skills in environmental protection.

Other courses which can be offered by universities could include sustainable development, environmental science, sustainable finance, and ESG reporting. Industry-synched courses in Environment and Sustainable Development are essential for addressing the growing need for green jobs, integrating sustainability into business practices, and achieving global sustainability goals. Such programs offered at colleges and universities can provide a strong understanding of the science and practice of environmental conservation and sustainable development through carefully designed foundational courses, science courses, and practical and laboratory components which can be further enhanced through hands-on learning opportunities and intensive internships-based learning. Students can get oriented with technological, mathematical, architectural, and scientific skill sets required for critically analysing gaps in achieving the United Nations' SDGs. These programs can

help to provide a comprehensive theoretical and practical education to the students who can further contribute to the environment and sustainable development sector in the sciences, engineering, energy, and sustainability domains.

Actionable steps like regular professional development workshops for teachers, ongoing assessment and feedback will enable teachers to effectively teach critical environmental issues, fostering responsible behaviours and sustainable mindsets among students, thereby contributing to long-term environmental sustainability. The basic premise of environmental education lies in the “education process,” “societal values,” and the collective “knowledge, attitude, and skills,” and ability to solve the “problems” by fostering Environmental Literacy through the Curriculum in Colleges and universities. The desired effect of environmental education is whether we can improve the environmental literacy of the people and more importantly implement corrective actions to resolve various environmental problems thereby leveraging NEP 2020 for a Greener Future.

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ENCOURAGING CRITICAL THINKING AND SOCIAL RESPONSIBILITY

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Abstract:

The concepts of Paulo Freire's "Pedagogy of the Oppressed" are highly relevant to student self-empowerment, social responsibility, and critical thinking in the direction of transformative capacity building for a sustainable future. It integrates democratic pedagogy, which has objectives beyond merely imparting knowledge and abilities. Emphasizing students' active involvement in decision-making, challenging reality, reestablishing human values, and promoting liberty via awareness are all part of its inclusive mission. It provides a powerful framework for understanding injustice and fighting it. Democratic pedagogy seeks to create an inclusive classroom by utilizing the problems, experiences, worlds, cultures, and knowledge of the students as a backdrop for learning. With this method, students' opinions on empowerment and liberation are on par with those of the teachers. It fosters active engagement, shared decision-making, and a sense of ownership in the education process. It produces introspective, self-critical, and self-driven learners who can critique and guide their own work experimentally. They acquire higher-order cognitive abilities in communication, analysis, and interpretation. Democratic pedagogy trains students to be engaged, knowledgeable, and responsible members of a democratic society by fostering inclusion, voice, and membership. It motivates students to actively, responsibly, and expressively participate in their education. The development of critical thinking, inquiry-based learning, transformative learning, problem-solving abilities, and socially responsible life skills are all made possible by democratic pedagogy. To empower students to cultivate critical thinking and social responsibility, this paper discusses Paulo Freire's democratic pedagogy as self-empowerment techniques that promote a culture of critical, introspective, and free thought in the regular classroom situation.

Key words: *critical thinking, democratic pedagogy, problem-solving, transformative learning.*

Introduction:

Paulo Freire's "Pedagogy of the Oppressed" emphasizes democratic education, promoting student participation in decision-making and self-management. This approach encourages introspection, self-criticism, and self-motivation, fostering superior communication, analysis, and interpretation skills. It promotes inclusion, voice, and engagement, fostering a sense of empowerment and liberty comparable to democratic teachers. Democratic pedagogy prepares students for a democratic society by equipping them with critical thinking, interpersonal skills, and cooperative problem-solving abilities. It encourages transformative learning, fostering social responsibility and empowering students to engage in their education in an expressive, responsible, and active manner. This paper demonstrates how Paulo Freire's democratic education literature aids Indian students in fostering critical thinking, social responsibility, and awareness of gender bias, promoting a reflective, democratic learning environment today.

Listing of Key Terms

- Critical Thinking
- Dialogical Approach
- Educational Liberation
- Inclusive Education
- Independent Thinking
- Problem-posing Education
- Transformative learning

Literature Review:

Druliner (1992) developed a Christian education that integrates Gustavo Gutierrez's theological principles and Paulo Freire's educational method. Guthrie (2003) identified flaws in critical pedagogy, contradicting Freire's theory of critical consciousness. Haley (2004) examined the effectiveness of a guidebook focusing on learner needs using Freire's praxiological method. Van Winkle (2004) studied Freire's role in proving education as a human right. Daniels (2005) studied how adult women make meaning from still photographs without text. Lee (2005) discussed Freire's dialogical pedagogy and its potential transformation in Taiwan's education environment. Flood (2007) explored Freire's ideas and educational theory in Brazil. Chem (2008) analysed verbal interactions between teachers and low-achieving students. Linda (2008) investigated Freire's work on school bullying in the United States. Mehta (2009) explored Paulo Freire's impact on education philosophy. Felderman (2010) explored second-grade classroom literacies. Subramaniam (2011)

explored critical pedagogy's impact on Latino students. Diaz (2012) explored radical democracy, Kershaw (2012) examined criminal justice higher education, and Mazier (2014) explored neoliberal educational restrictions in higher education.

Significance of the paper:

Today, self-empowerment necessitates following Freire's dialogical pedagogy, often known as "democratic pedagogy," which promotes critical education for social change and liberal classroom instruction to eradicate societal inequities. In addition to enhancing life quality, Freire's child-centred teaching methods can assist students in developing self-reliance, confidence, and self-empowerment in their lives through mutual respect, humility, and trust. The scope and success of the possible entry points of Freire in teacher education and schooling, and the relevance and practicability of Freirean philosophy and pedagogy depend on the teachers, educational system, educational organisation, family, society, and the students.

The present paper seeks to find out the relevance of Freirean pedagogy and philosophy in the contemporary Indian education. Freirean critical pedagogy and educational theory and practice are important for the understanding of student-teachers, practicability and improving the educational process and help to bring about social transformation in India gradually.

Techniques of data collection:

The study utilized an interactive 24-hour intervention program with 15 B. Ed. student-teachers on Freirean pedagogy, focus group interviews, videos, textual evidence, and observations.

Results:

In the present study, the theme emerging out from the data analysis was the relevance of critical pedagogy in future which is illustrated with categories as follows. The following table demonstrates categories emerged from the theme.

Categories	Theme
• Creating transformative learning environments • Encouraging educational liberation • Enhancing critical thinking • Establishing a classroom atmosphere that is both secure and welcoming • Evolving a critical awareness • Fostering independent thinking • Maintaining a dialogical approach • Promoting agency and empowerment • Promoting cultural relevance • Promoting problem-posing education	Relevance of Critical Pedagogy in Future

The following theme of the relevance of critical pedagogy in future incorporated the following categories towards the relevance of critical pedagogy in future such as creating transformative learning environments, encouraging educational liberation, enhancing critical thinking, establishing a classroom atmosphere that is both secure and welcoming, evolving a critical awareness, fostering independent thinking, maintaining a dialogical approach, promoting agency and empowerment, promoting cultural relevance, and, promoting problem-posing education. The following section provides details of categories with indicators of the responses.

a) Creating transformative learning environments

Including conversation and correlation, resolving their personal and academic issues, being fair in one's approach, encouraging students to participate in all extracurricular and curricular activities, setting a paradigm with a self-disciplined life, trying to improve student's qualities, developing a pleasing nature to motivate, appreciating creativity, treating everyone with inspiration and civility, granting students the freedom to express themselves, encouraging open dialogue using open-ended questions, facilitating discussions where students can share their experiences and perspectives, creating a safe and inclusive learning environment, using transformative assessment instead of traditional tests, incorporating reflection with practice on their learning experiences, using collaborative learning with group work and peer learning, encouraging students to take charge of their education, using contextual learning incorporating students' lives and communities, boosting students' confidence through active participation in various classroom activities, encouraging positive action for students with improvements in their weak areas, and fostering love and respect for all religions through religious classroom activities are all important roles that teachers must play in complimenting and enhancing students' life and social skills.

b) Encouraging educational liberation

Students' self-esteem, self-improvement, and self-discipline are enhanced by their mandatory participation in classroom activities, freedom of expression, learning human rights and realism regulations, growth opportunities, the value of education, the development of awareness, making a significant impact in academics, the power of the modern thinking, the strengthening of humanity, the growth of self-confidence, the inculcation of modern social thinking, the expansion of security in life, the application of learned knowledge, the development of courage to raise voice critically, appreciation of newly shared information, and encouragement for self-discovery and self-learning consider their open mindsets.

c) Enhancing critical thinking

The importance of democratic education, the focus on student-centred learning, the positive attitude toward collaborative learning with students, the liberal backdrop in the classroom, the open, interactive, and democratic classroom ambiance, the liberating education of active learners, the proper dialogue between teachers and students, the acceptance and respect for students' ideas, the teachers' pleasant demeanour, the creation of a lively classroom, the dynamism to focus equally on all types of learners, the joint efforts of teachers, the pursuit of answers to all potential student questions, allowing students to ask why, student motivation, freedom of speech and action, inspiration to think critically, freedom of expression for practical thinking about current issues, and the humanitarian approach that exercises students toward the goal of social and global change and democratic rights.

d) Establishing a classroom atmosphere that is both secure and welcoming

Building strong relationships with students, establishing trust and respect, modelling polite conversation in teacher-student interactions, encouraging polite communication among students, creating a space where students feel comfortable sharing their ideas, feelings, and questions, and using open-ended questions to spark discussion and inspire students to share their viewpoints, employing problem-posing strategies to get students to recognize and address issues that impact their lives and communities, encouraging them to ask questions and work together to find answers, incorporating diverse viewpoints, cultures, and histories into the curriculum, setting up small group discussions or circles where students can share their ideas and experiences, pushing students to think critically about societal issues, power dynamics, and their own identities, providing opportunities for students to celebrate their diverse cultures and identities in the classroom, such as through cultural presentations, sharing of traditions, or acknowledging significant cultural events; establishing a safe physical and emotional space; setting up the classroom to be welcoming and inclusive; dealing with bullying and discrimination; involving students in learning-related decision-making processes; teaching students how to advocate for themselves and their needs; designing collaborative and team-oriented activities; encouraging students to support one another academically and emotionally; regularly reflecting on teaching practices and classroom dynamics; and encouraging students to provide open-ended feedback on their classroom experiences.

e) Evolving a critical awareness

Educating cooperatively, and democratically; arranging a dynamic teaching-learning process; conducting thought-provoking class activities to say and act upon; imparting knowledge through two-way interaction in the classroom; providing freedom of expression; respecting student's voice and dignity; fostering a change in attitude; establishing an expansive and inclusive classroom; encouraging active learning for active learners; stimulating the spirit of thinking, questioning, and inquiry; providing students with additional information beyond what is taught; conducting correlations with other subjects; practicing what is taught; creating an example to follow, put a lot of effort into dry and theoretical subjects to make classes interesting, instructive, and participatory; encourage students to follow their passions; and provide them with an unrestricted canvas on which to express their creativity encourages students to think critically and liberally and to become more conscious.

f) Fostering independent thinking

The teaching-learning process should put an emphasis on understanding, discourage spoon-feeding, practice the trial-and-error method, look for solutions to problems, use teaching aids, use innovative teaching methods and techniques, make ideal role models, transform teachers into ideal friends, philosophers, and guides, find solutions to students' problems, keep the class highly interactive, learn alongside students, use a variety of educational strategies and techniques, feel fulfilled and content, feel like you have accomplished something with faith, focus, and fervour, feel more confident, expand your knowledge of truth with satisfaction and meaningful and significant experiences, cultivate positive mindsets, and participate in active class activities, appreciation of new ideas, positive reinforcement, instillation of emotive values, freedom to share life experiences, creation of life situations in the classroom, first-hand experiences, development of curiosity and wonder, class exclusively for students, assistance of guidelines, avoidance of imposing oneself on students, reverence for all, freedom to work and brilliant relationship with students, positive responses to all questions, group discussions, debate organization, encouragement to think and act critically, sensibly, and innovatively, appreciation of creative ideas, growth in students' imagination and thought process, allowing students to disagree critically, confidently, and freely, and selfless protection of their rights.

g) Maintaining a dialogical approach

Teachers should be democratic in their dialogic line of approach, concentrate on fostering positive relationships with students, having a calm demeanour, valuing

and considering each student as unique, opposing ranking, ending the old traditional teaching system, emphasizing equality, the importance of extracurricular and curricular activities, adopting new teaching methods and pedagogies for an engaged class, being patient and sensitive to students' positive responses, encouraging their interest, adhering to educational rules, upholding the values taught, making education about passion and interest rather than grades, enjoying teaching, having good communication skills, and implementing new approaches in a two-way dialogue to teach students from theory to practice, for their dignity and worth, set an example of self-control and honesty in the classroom cultivates a proper attitude, commitment, sincerity, and honesty, with practical application of acquired skills.

h) Promoting agency and empowerment

Establishing a dialogical environment, promoting open communication, cultivating a classroom culture in which students feel comfortable sharing their ideas, queries, and worries, launching peer-to-peer and small group discussions, exposing students to real-world problems that are pertinent to their communities and lives, encouraging them to critically analyse these problems and offer solutions, and promoting inquiry-based learning, combining exercises that foster critical thinking about social, political, and economic issues; pushing students to challenge presumptions and investigate the root causes of societal issues; giving them the chance to reflect on their educational experiences both individually and collectively; taking into account student-led projects; creating group projects; mentoring, peer teaching, integrating social justice themes, implementing service-learning projects, modelling lifelong learning, encouraging self-directed learning, and fostering a supportive environment all help students take charge of their education and milieu.

i) Promoting cultural relevance

Including texts, resources, and examples that represent the various cultures, histories, and experiences of students; giving them the chance to talk about their cultural backgrounds, customs, and experiences; encouraging them to think critically and talk about their cultural experiences and perspectives; creating a classroom environment where students feel comfortable sharing their thoughts and feelings about their cultural identities and experiences without fear of judgment; encouraging them to critically examine societal norms, power dynamics, and issues of inequality that impact their communities; using problem-posing techniques to help students identify and address cultural and social issues that are pertinent to their lives; encouraging them to ask questions and work

together to find solutions, creating lessons that relate academic material to students' cultural contexts and real-life experiences, putting in place projects that let students investigate cultural themes or issues that are important to them, letting students voice their thoughts and opinions on cultural issues, encouraging them to take charge of their education and become community advocates, working with families and communities to improve the relationship between home and school, using a range of teaching strategies that accommodate different learning styles and cultural backgrounds, and integrating various forms of media and technology will help students undoubtedly become more culturally and socially relevant and significant.

j) Promoting problem-posing education

Teachers and students become co-learners who participate in a process of mutual inquiry; students are encouraged to apply their knowledge to solve problems and change their realities; they develop critical and independent thinking skills, shift perspectives, and collaboratively consider options; they engage in theory and practice; they see learning as a tool for understanding and improving their communities; they inspire students to discuss, question, reflect, and challenge the status quo; and they keenly participate in the learning process by understanding concepts that lead to solutions and alternatives to problems of concern.

Interpretations:

- Teachers can foster transformative learning environments that enhance academic learning, integrate the outside world, and foster critical thinking among students, promoting active community participation.
- Teachers are encouraged to avoid physical or psychological abuse of students and emphasize that education for emancipation encompasses both their strengths and weaknesses.
- Teachers can foster critical education through a cycle of reflection, action, and active participation in class activities, promoting critical thinking, motivation, theory and practice, and innovative teaching strategies.
- Teachers can foster a safe, inclusive classroom environment that values diversity, promotes critical consciousness, and empowers students, enhancing academic engagement, identity development, and fostering effective collaboration and learning.
- Teachers have a moral obligation to address students' questions and connect them to practical concerns, fostering critical thinking and consciousness growth.
- Teachers can foster critical, independent, inquiry-based, autonomous, and productive thinking in students for personal growth and social change.

- Teachers can enhance students' autonomy, voice, learning potential, reasoning, and logic abilities in both the classroom and society.
- Teachers can enhance students' academic performance by promoting agency and empowerment, preparing them to become active citizens, self-aware, and contribute to their communities through critical thinking and real-world problem-solving.
- Paulo Freire's pedagogy can enhance classroom cultural relevance, creating an inclusive environment that values diversity and promotes critical consciousness. This approach enhances students' academic engagement, identity, and prepares them for world challenges.
- Teachers can foster critical thinking, analysis, and reflection in students, empowering them to take charge of their education, lives, and communities.

Concluding Remarks:

Paulo Freire's "Pedagogy of the Oppressed" offers a framework for students' emancipation, emphasizing critical consciousness, communication, contemplation, and action. He advocates for a "problem-posing model" in education, emphasizing the importance of classroom design and group processes for genuine empowerment. Freire's theories can empower students to create a more equitable society by promoting critical thinking, collaboration, and social justice. Democratic pedagogy, which encourages students to engage in civic engagement, promotes equality and encourages critical thinking. Balancing academic instruction and intellectual training with introspection and collaboration from educators, institutions, and stakeholders is crucial for fostering these skills. Freire's "Pedagogy of the Oppressed" provides a framework for students to transition from oppression to liberation through critical awareness, discourse, and transformative action. It empowers students to question narratives, challenge gender inequalities, develop resistance strategies, and advocate for their rights, thereby promoting social reform and active participation in learning.

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CREATING AND ASSESSING ECONOMICS CONCEPTS LEVERAGING SOCIAL MEDIA FOR EDUCATIONAL OUTREACH

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Abstract:

This study looks at how economic concepts can be shared in a simple and engaging way using social media. It also explores how people respond to this kind of content whether they find it useful, interesting, and easy to connect with. The focus is on making learning more accessible and seeing how well these efforts reach and involve the audience. The research is carried out in two phases:

Content Creation and Impact Assessment.

In the Content Creation Phase, qualitative methods like brainstorming, mapping out ideas, and refining drafts are used to develop educational material suited for platforms like Instagram, Facebook, and YouTube. The content focuses on structural topic such as Population (Grade 9), Sectors of the Indian Economy (Grade 10) and Introduction to Economics (Grade 9) from CBSE board. The main focus is to present economics in a way that is simple, engaging, and relatable to different kinds of viewers.

The Impact Assessment Phase uses quantitative tools to measure how the content performs looking at things like reach, likes, comments, shares, and other platform analytics. By combining both creation and evaluation, this study gives a well-rounded understanding of how economic topics can be taught outside the classroom.

The findings show that social media has great potential as an educational space. With the right strategies, educators and content creators can make meaningful content that not only spreads knowledge but also keeps the audience interested. This work offers practical tips for making educational content more impactful in today's digital world.

Keywords: *Social Media, Economics Education, Content Creation, Audience Engagement, Digital Learning.*

Introduction:

Nowadays days, technology plays a big role in every part of our lives including education. It marked a turning point in how social media is used. In the present day, social media is primarily used for entertainment and communication, but it is now transforming the way students and teachers interact platforms like Friendster,

MySpace, and Six Degrees came up in the late 1996s, but the real turning point was Facebook in (2004). Following that platforms, such as YouTube, Instagram, Twitter, and TikTok gained widespread popularity, especially among young people with increased access to the Internet and SmartPhones, even students from nation's like India and Indonesia began utilizing these platforms not just for entertainment but also for learning.

Students today are internet natives. They rely on it for clearing doubts, watching educational videos, and staying updated. Teachers are also trying to make learning more relatable by bringing social media into the classroom. Platforms like YouTube simplify tough topics, TikTok offers quick lessons, and apps like WhatsApp and Facebook groups are great for sharing notes or asking questions. Students today engage in learning more imaginatively and cooperatively by producing content, exchanging ideas, and enhancing their digital abilities.

Social media also plays a role in reducing educational inequalities. Not all students have the privilege of attending prestigious schools or affording private tuition, but free online content, virtual study groups, and informative posts make learning accessible to everyone, regardless of location. For instance, economics educators now use platforms like Facebook and Instagram to share current updates, visual summaries, and practical case studies. Naturally, there are drawbacks such as distractions, misinformation, and technological difficulties. However, when used thoughtfully, social media can enhance the learning experience and make it more enjoyable. Personally, I believe it has evolved beyond just a source of entertainment it has become a valuable educational resource. With the right mindset and strategies, it has the potential to positively reshape classroom learning.

Literature Review:

The reviewed studies point out the growing importance of social media as a tool for learning, especially when it comes to teaching economics at various educational stages and in different parts of the world. Findings suggest that platforms like Facebook, YouTube, Instagram, and WhatsApp support better student involvement, group cooperation, knowledge sharing, and quick communication, which benefits both students and teachers. From both the teacher's and student's point of view, social media is seen as a helpful supplement to traditional teaching methods, as it boosts interest, deeper thinking, and active participation. However, problems like privacy issues, limited digital skills, distractions, and uneven access to technology mainly in developing nations like India continue to be major challenges. Even so, evidence from multiple studies points to a positive connection between using social media and improved academic results, as long as it's used thoughtfully, with proper

guidelines and enough support from institutions. Overall, social media offers useful possibilities to make learning economics more engaging, as long as its drawbacks are managed and its advantages used wisely.

Aim of the Study:

The aim of this study is to explore how social media can be used as an effective tool for teaching and learning Economics among students of grades 9 and 10. It also seeks to understand the impact of social media on students' engagement, understanding, and interest in the subject.

Objectives of the Study:

1. To develop engaging and pedagogically effective content for learning Economics to Grade (9&10) students.
2. Utilize social media platforms as a medium to disseminate educational content and promote interactive learning.
3. To evaluate the Outreach and Engagement levels of the Economics content among students and other audiences through social media
4. To assess the Effectiveness of social media as a supplementary education tool for enhancing understanding and interest in Economics concepts

Phase One: Content Creation

In the initial stage of my research, I concentrated on creating educational content that is easy to follow and appealing for students of Grades 9 and 10, especially those studying under the CBSE board. My aim was to explain Economics in a manner that feels real, interesting, and straightforward, using social media platforms like YouTube, Instagram, and Facebook spaces where students already spend time.

To begin with, I picked out important chapters from the textbooks such as Sectors of the Indian Economy (Grade 10), Introduction to Economics (Grade 9), and Population (Grade 9). I spent time reflecting on what usually confuses or bores students in these lessons. Through brainstorming sessions, I came up with ideas, drew rough outlines, and worked on simplifying tough concepts without losing their core meaning. The scripts for the videos went through several edits until the message sounded clear, friendly, and suited for a young audience.

While designing the content, I made sure to include day-to-day examples that students can relate to. For instance, while explaining the three economic sectors, I used a simple story linking a farmer, a cloth factory, and a shopkeeper to show how all sectors are connected. In the Introduction to Economics video, I brought in the village of Palampur, which is already known to students, to help them understand the use of resources. And for the topic on Population, I used situations like the rush in Mumbai local trains to show the impact of high population density, and compared

states like Bihar and Rajasthan to explain how people are spread out across the country.

The structure I followed in each video was simple: I started with an introduction to spark curiosity, explained the main ideas step by step, added familiar and real-life examples, and ended with a short conclusion that brought all the points together. The tone throughout was kept light and conversational so that it doesn't feel too formal or heavy for students.

Working on this phase made me realize how important it is to use the right pace, tone, and visuals when you're trying to teach through social media. It also showed me that students engage more when they see how the topic connects to their daily lives. This phase helped lay the foundation for the next part of my research, where I will explore how students actually respond to the content.

Phase Two: Impact Assessment

Once the videos were ready, I moved on to the second part of my study, which was all about seeing how people reacted to the content once it was shared online. I chose platforms like Instagram, Facebook, and YouTube because they're commonly used by students and have the potential to reach a wide audience quickly.

I posted the videos with short, clear captions and added simple thumbnails so they would catch people's attention. I also used relevant tags and posted them at times when students are more likely to be active, such as in the evenings or on weekends. I tried different formats like posts, reels, and stories to figure out which ones worked best when it came to getting views and responses.

After uploading the content, I kept track of how people interacted with it. I looked at how many views each video got, how many likes and shares it received, and whether people were saving or commenting on the posts. These details helped me understand how far the content was spreading and how many people were actually interested. I also looked at who was engaging whether they were school students, teachers, or just general users curious about the topic.

In addition to this, I personally reached out to a few students and asked them for honest feedback. Many of them said that the examples used in the videos made the subject easier to relate to. Some mentioned they liked the fact that the language was simple and didn't feel too heavy. A few even shared that they never thought Economics could be explained in such a fun and relaxed way.

This entire phase helped me see that social media isn't just a space for entertainment it can also become a powerful tool for learning if used in the right manner. I noticed that when educational content is presented in a creative, student-friendly style, it not only grabs attention but also helps break down complex topics into easier parts.

It also became clear that interaction matters a lot. When students ask questions in the comments or reply to stories, it creates a two-way flow of learning. It turns passive watching into active participation.

Through this phase, I understood the real potential of social media as a support system in education. It has the ability to make learning more engaging and less stressful, especially for subjects like Economics that students often find dull or confusing.

Significance of the Study:

This study holds significance as it explores the role of social media as a learning tool for students of grades 9 and 10, particularly in the subject of Economics. In the current digital age, students are already actively engaged with platforms such as Instagram, YouTube and Facebook. This research aims to understand how these platforms can be effectively used to enhance academic learning and make educational content more accessible, engaging, and easier to understand.

The study emphasizes that social media has the potential to support classroom teaching by offering creative ways to present information, such as through short videos, infographics, and interactive discussions. These methods can help simplify complex concepts and improve student participation and interest. It also highlights the benefits for teachers, who can use these platforms to connect with students in a more relatable manner and promote active learning.

While acknowledging challenges like distractions and privacy concerns, the study suggests that with proper guidance, clear boundaries, and thoughtful integration, social media can become a useful and purposeful educational tool.

By focusing on students' digital habits and learning preferences, this research encourages a shift towards more student-centered teaching practices. It aims to show that learning can go beyond traditional methods, making Economics more relevant, interactive, and effective for secondary school students.

Methodology:

1. Video Creation Process

For this research, I designed animated educational videos on three CBSE Economics topics: Population, Introduction to Economics, and Sectors of the Indian Economy. I wrote easy-to-understand scripts using familiar examples and recorded voice-overs to explain each concept clearly. These were combined with images and simple animations to make the content more engaging and student-friendly.

2. Social Media Platforms

The videos were shared on platforms like YouTube, Instagram and Facebook to observe how well students responded and whether the content helped them understand the subject better. This method allowed me to share academic concepts in a visual and interactive way, making learning more accessible beyond the classroom.

3. Metrics for Engagement Analysis

Results

After uploading the animated videos on social media, it was noticeable that students found the topics more relatable and simpler to grasp. The visual format seemed to make the concepts clearer and easier to recall compared to traditional textbook methods. Real-life examples, like the crowd in Mumbai local trains or village-based activities, helped create a stronger connection between the subject and everyday experiences.

Track engagement and Interaction with Viewers.

Topic- Sectors of the Indian Economy

Posted on 20th April 2025

Instagram:

Views -525

Likes -23

Comments- 4

Watch time- 53m 38s

89.6%- Followers Viewers

10.4%- Non Followers Viewers

Topic- Population

Posted on- 22nd April 2025

Youtube:

Views-9

Likes-0

Comments- 0

Watch time- 0.0

Topic- Introduction to Economy

Posted on- 22nd April 2025

Facebook:

Views-34

Likes-2

Comments- 0

There was also an increase in activity on the posts likes, shares, and comments which showed active interest and involvement. Some viewers shared the videos with peers or reacted with thoughtful responses, indicating that the content was not only being viewed but also valued.

Overall, the animated videos served as an effective add-on for learning, especially for those who benefit more from visuals. The topics in Economics came across as more practical and understandable rather than just abstract theories.

Findings and Discussion:

1. Making Economics topics simple by using daily life examples made it easier for students to relate and understand.
2. Short, crisp videos and visuals helped catch attention and kept learners engaged without making them feel bored.
3. Posting content on platforms like Instagram and YouTube allowed it to spread quickly and reach beyond just the target group.
4. Students interacted through comments, sharing doubts or saying how the content helped them during revision or before tests.
5. Many viewers saved and forwarded the posts, which showed that the material was useful and had practical value.
6. The informal tone and friendly explanations made students feel more comfortable and willing to learn at their own pace.
7. Overall, social media worked well as a supporting tool for learning it didn't replace school, but it definitely made tough topics easier to grasp.

Conclusion:

In conclusion, this study successfully explored how social media can be used as a powerful tool to teach Economics to Grade 9 and 10 students. The content created for platforms like Instagram, YouTube, and Facebook was designed to simplify key Economics concepts such as Population, Sectors of the Indian Economy, and Introduction to Economics in a way that was both engaging and easy to understand. The positive feedback and increased engagement from students demonstrate that when content is presented in a relatable and visually appealing manner, it makes learning more accessible and enjoyable.

The impact assessment phase revealed that social media not only broadened the reach of the content but also encouraged interaction and active engagement. Students found the material helpful, particularly during revision periods, and appreciated the informal approach that made complex ideas more digestible. The high level of engagement, including comments, shares, and saves, highlighted the effectiveness of these platforms in engaging the audience beyond just the classroom.

This research confirms that social media can be an excellent supplementary tool for enhancing understanding and interest in Economics. It supports the idea that learning can be made more interactive, flexible, and enjoyable outside the constraints of traditional classroom settings. While social media cannot replace formal education, it can serve as a valuable complement, enriching students' learning experiences and broadening their access to educational resources.

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COLORS IN EDUCATIONAL SPACES : BUILDING POSITIVE LEARNING ENVIRONMENTS

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Abstract:

This paper reviews the positive effects that colors have on the emotions of people, especially in school settings, and thus, focuses on the design of positive learning environments.

Synthesizing literature, the study describes particular colors and their emotional relatedness and suggests ways of enhancing school environments through effective color design. The integration of theories, such as the Color-in-Context Theory, the Pleasure-Arousal-Dominance (PAD) model, Plutchik's Psychoevolutionary Theory of Emotion, and social learning theories, better explains the way colors elicit certain well-being states and learning outcomes for students. Primary findings are: calming colors such as blues and greens stimulate relaxation and concentration, while vibrant colors such as yellows

enhance creativity and happiness. Social and cultural factors that condition the perception of colors are also included, alongside the argument for the need to create space with personalized and collective color schemes. This review opens up dynamic lighting systems capable of optimizing learning environments by changing colors according to time and activity. Also, it advocates strategic color use toward building supportive, engaging, and

productive learning environments with emotional well-being and learnings among students. This article is a secondary examination of the impact of colors on emotions in schools, their design as good ones in a school, and thus doing literature synthesis in identifying specific colors and emotional connotations before forward steps with suggestions of using effective color designs to improve school environments. There was also mention of social and cultural factors that influence the perception of color which brings in the argument for an inclusive, personalized color scheme. Thus, this paper encourages teachers and educators in creating such spaces for students' cognitive and emotional development, thus creating a wholesome and enriching educational experience.

Keywords: *Emotions, Color Association, School Design, Color Psychology and Learning Environments.*

Introduction:

The interplay between color and emotion has fascinated scholars since *Goethe's Theory of Colours* (Goethe, 1810), which positioned "plus" colors (e.g., red-yellow) as energizing and "minus" colors (e.g., blue-red) as calming. Current research highlights how colored lighting impacts the teaching - learning processes, facilitating an engaging classroom atmosphere.

It is known that colours play a vital role in shaping emotional state, which has a direct impact on cognitive growth and processes such as problem solving, critical thinking, decision making, and memorization.

In educational settings, thoughtful use of colour can enhance concentration and creativity, thereby increasing student engagement and improved learning outcomes. By understanding the psychological and emotional effects of color, educators can design classrooms and

learning materials that serves to diverse emotional needs and enhance academic performance. This meta-analysis seeks to link historical theories with present findings to provide a holistic view of colour-emotion association in the educational field.

Upon knowing the historical and contemporary perspectives of interplay between colors and emotions, *Plutchik's Psychoevolutionary Theory of Emotion* provides a credible ground for understanding the associations between colors and emotions. For instance, Plutchik suggested eight primary emotions that correspond to specific colors in a color wheel reflecting their intensity and relationships (joy, fear, anger, sadness). This theory demonstrated that emotional reactions to colors are evolutionarily based and are psychological structural processes in which (color) environment influences a psychological status, further suggesting that the same colors induce different emotional states. In educational settings. Colour can influence emotions, and Plutchik's model has been used to guide strategic colour selection to induce specific responses to support cognitions for learning and teaching such as attention, creativity, and memory.

Plutchik, R. (1980). Emotion: A psychoevolutionary synthesis. Harper & Row.

Moreover, this study aims to explore the distinctions of individual differences, such as gender and age, accumulate these associations in the student population and provide actionable recommendations to create an inclusive and emotionally supportive teaching-learning environment in schools.

Definitions:

1. Emotions

A conscious mental reaction (such as anger, fear, joy, or love) subjectively experienced as a strong feeling usually directed toward a specific object and typically accompanied by physiological and behavioral changes in the body (*Merriam-Webster*).

2. Color Association

Color associations are the connections people make between specific colors and particular emotions, concepts, or experiences. These associations can be influenced by personal experiences, cultural context, and social learning (*Elliot, 2015*).

3. School Design

School design refers to the intentional creation of learning environments that support educational goals and enhance student outcomes. It encompasses both architectural elements and non-architectural factors that collectively shape the physical and social spaces where teaching and learning occur (*Cardellino & Woolner, 2019; Gislason, 2010*).

4. Color Psychology

Color psychology is the study of how colors affect human behavior and emotional responses. It examines the psychological effects of colors, including their impact on mood, cognition, and perception (*Elliot, 2015*).

5. Learning Environments

Learning environments are the settings where students engage in learning activities, influenced by factors such as lighting, layout, and the overall atmosphere, with color playing a key role in shaping this environment (*Journal of Technology and Science Education, 2024*).

Aim:

To study how color affects emotion in a setting, going further to investigate the possibilities of earning colorful considerations for an enhancement of learning and well-being.

Objectives:

1. To review the literature on color psychology and emotions in different studies..
2. To identify specific colors and emotions associated in school context.
3. To suggest strategies for improving school environments through color consideration.

Review of Related Literature:

This review paper compiles 24 international studies. The selected studies together provide an understanding of how colors affect emotions and how we can create positive learning

environments for students in schools.

1. To review the literature on color psychology and emotions in different studies Research results point to a strong relationship between color and emotional responses.

Evidence found by *Kaya, N., & Epps, H. H. (2004)* suggested that college students were emotionally reacting to colors differently, with primary hues generally tending to elicit the most positive reaction. That is, green can induce relaxation and comfort since it is associated with nature, while green-yellow hues were related with sickness and consequently induce disgust, which illustrates the gist of basic color psychology, whereby natural colors tend to elicit positive emotional states.

In a study of 98 college students, using the Munsell Color System, they also found that being neutral colors, white generated the most positive emotions, while black and gray were also behind white. The researchers explained why certain colors were associated with specific emotions, paving the way for further investigation into color psychology.

However, *Valdez, P., & Mehrabian, A. (1994)* have delved into how saturation, hue, and brightness of color generate emotions based on the PAD model (Pleasure-Arousal-Dominance). In their experiment, it was found that bright color tends to cause pleasurable emotion while highly saturated colors represent high arousal emotions.

According to them, blue, green-blue, and purple are nice colors, while yellow and green-yellow are unpleasant. This elucidates how different combinations of color can result into different emotional states for the environments we design for schools.

According to the researchers, yellow-green, green-blue, and green are some of the most arousing colors, and purple-blue and yellow-red are less stimulating. Moreover, green-yellow relative to red-purple felt more dominant, insights into color-emotion associations that are more subtle.

Mentzel, S. V., et al. (2017) explored the emotionality of colours, discovering an implicit link between red and dominance. Red in relation to dominance may spill over into an impact on feelings and behaviors as a consequence, the study

suggested. In one experiment, participants identified lordly words displayed in red faster and with more accuracy compared to other colors.

The findings from the current study provide further evidence of a robust association between the color red and the dominance construct and its emotional consequences. This is in line with the theory that colors carry implicit associations that have the power to influence our emotional responses and our actions.

According to *Sarkar, A., Chatterjee, A., & Chatterjee, S. article (2017)*, the colour(s) in the background are able to influence how we perceive and prefer colour(s) & also that colour hue generally exerts a stronger influence than brightness or saturation. Moreover, *Widyanto et al. (2020)* examined how colors employed in early-childhood coloring activities can be affected, emphasizing the significance of choosing colors in early-childhood education.

Sarkar, Chatterjee, and Chatterjee's study not only found that the emotions associated with colour were interdependent, but that preferences for colour could be summarised in three dimensions. Moreover, the special and careful selection of colors as indicated in Pratiwi and Budisetyani's paper are needed to be used in early childhood education as colors can affect on children's emotions.

2. To explore how color influences mood and learning, and how it can improve educational environments Color choice is often brought about by mood in *Jonauskaite, D., et al. (2019)*. Joy was very much associated with yellow, whereas yellow-green has been tied to relaxation. Brighter colors would tend to be chosen in a positive mood, while darker tones are the ones chosen in a negative mood. This supports the use of color as a potential way of reflecting and also influencing one's emotional state inside a learning environment.

This study is consistent with the notion that color could be a tool for catering to, as well as potentially altering, emotional states in educational environments, endorsing lighter colors for positive mood and darker colors for negative mood.

The influence of colored lighting on the learning process has been: *Journal of Technology and Science Education, 2024*. Since colored light influenced cognitive and emotional processes of students positively, dynamic color can be applied to create a better learning environment. This resonates with creation of platforms that synergize technology and design to drive educational outcomes.

They rather emphasized the application opportunities for dynamic color in the learning environment and the possibility of it positively affecting both the cognitive and emotional processes of students. Smart classrooms help in

incorporating technology and designing for better educational outcomes through colored lighting.

Resene (2016) added that carefully selected color palettes could create balanced environments which, in turn, positively impact health, alleviate stress, and enhance morale in workplaces ranging from healthcare to offices. In a similar vein, as stated by *The Decision Lab (n.d.)*, the appropriate combination of colors could trigger a variety of emotions and facilitate an effective message structure. This speaks to the potential of color to create supportive and therapeutic domains within the school environment.

Historical views, such as those from Johann Wolfgang von Goethe, classify colors into "plus" and "minus" groups, with "plus" colors including yellow and red-yellow eliciting positive perceptions, while "minus" colors such as blue-red and dark shades have negative implications. Pastel and natural colors have a calming effect and green is considered a stress-reducing color, strengthening the idea that it is just a matter of choosing the right colors and color combinations to make us feel better.

3. To suggest strategies for improving school environments through color consideration

- Use calming colors: Implement soothing blues and greens in areas where relaxation and concentration take place, such as libraries and counseling rooms. These hues are renowned for the calming effects they have that encourage tranquility and focus.
- Explore bold colours: Use cheery, bright colours, such as yellow in creative and artistic spaces (e.g. art rooms, project spaces, etc.) in order to foster creativity and joy. These colors can activate enthusiasm and innovation.
- Thought about cultural and individual differences: There are cultural and individual

differences in liking the colors, so when designing school environments, it is a good idea to keep them in mind to ensure inclusivity and comfort for all students. Using this method accepts that color associations are not universal and that different people and cultures may respond to particular palettes differently.

- Balanced colors: Have spaces visually balanced by the use of different colors. Don't douse a space in one hue — work in complementary shades to create balance.
- Incorporate dynamic lighting: Optimal lighting tailored to the task at hand or the time of day can enhance performance, resources like dynamic

lighting systems are critical dynamic in creating the ideal learning environment. So, for example, use cooler light during study sessions and warmer light when resting.

- Incorporate nature-inspired colors: Use earth tones and natural greens to help students feel as if they are connected with nature, promoting well-being and reducing stress. These colors naturally have a soothing quality to them and make a more welcoming space.
- Zone with color: Use color to distinguish different zones in the school, e.g., write in one color in the quiet place, and in another in the collaborative area. It can also help students to better understand what the purpose of each area is and then adapt their behavior to suit the area.
- Experiment with color combinations: Experiment with color combinations with students and staff before the full-blown color design. Get input from students and staff to gather feedback to ensure positive reception of chosen colors with school community. Involving more views through this participatory design process helps create better designs that work and are more acceptable.

Findings from the Review of Related Literature:

Studies repeatedly show that colours heavily affect emotional responses, with certain colours eliciting certain feelings. Experiments show that primary colours such as green are associated with positive feelings like relaxation and comfort, while colours such as

green-yellow induce negative reactions like disgust. Neutral colors, particularly white, are more likely to elicit positive emotions, and whereas black and grey are slightly less positive but still desired compared to more saturated colors. The affective role of color is also influenced by its saturation and lightness: highly light and highly saturated colors are linked with increased pleasure and arousal. Certain colors are seen as pleasant such as blue and purple, while yellow and green-yellow are commonly seen as less desirable. Red is closely linked with dominance and can affect attitudes towards authority.

Colors actually do influence how we feel and learn in school environments. Light colors like yellow can brighten the mood of the students and make them feel better, whereas darker colors may make them feel depressed. Incorporating colorful lighting and intelligent technology into classrooms can actually help students concentrate and keep them in a better mood.

Choosing the correct colors such as soothing greens and gentle pastels can lower stress and make learning areas more welcoming and cozy.

Introduction of colors in school environments, it's helpful to use calming colors like blue and green in quiet areas where students need to relax or concentrate, and bright colors like yellow in creative areas to boost energy and creativity. It's a good practice to remember that individuals have diverse tastes and cultural associations with color, so engaging students and staff in decision-making regarding color makes the room feel more welcoming. Natural, earthy colors are stress-reducing and make the room more inviting. Color can also be used to distinguish various areas within the school, making students more aware of what each room is for. Finally, trialing color choices with the school community prior to making alterations ensures everyone is happy with the result.

Conclusion:

This is because colours have a significant effect on our emotions and psychological functioning and so their application in school environments can really help in improving the learning experience when employed with intent and care. Knowing emotional connotations of various colors, and including social and cultural backgrounds behind their hamon, thoughtful color schemes contribute to creating positive and supportive spaces for students. The Color-within-the-Context theory and the Pleasure-Arousal-Dominance model are some of the strong-minded explanations for this phenomena. From using calming colors to vibrant hues and dynamic lighting — schools can create environments that encourage well-being, creativity and learning. Need for Studies As we can see, studies are more on color effect on academic career, we need to do more research on long term effects of color design on our developmental phase of lifecycle. Finally, this review calls for knowledgeable and deliberate color use in school design by demonstrating how color efficacy is particular to schools, where design elements can be optimized for improved cognitive and affective outcomes.

Color is very much about atmosphere and emotion and the feel of a place.

- Alex Webb

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PERSONALIZED LEARNING AND DIFFERENTIATION: BUILDING INCLUSIVE AND EFFECTIVE CLASSROOMS

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Abstract:

Introduction:

In today's diverse classrooms, a one-size-fits-all approach to education is no longer sufficient. Personalized Adaptive Learning (PAL) represents a transformative method that tailors instruction to individual learning needs in real time. Unlike traditional methods, PAL adjusts content dynamically based on a student's performance, helping them meet grade-level expectations at their own pace. Alongside PAL, innovative strategies such as differentiation, inclusive instruction, and catering to gifted learners are critical in building equitable and inclusive learning environments.

Need of the Study:

Despite increasing awareness, implementation of PAL and inclusive teaching strategies remains inconsistent across educational settings. As future educators, pre-service teachers must be equipped with an understanding of adaptive and differentiated teaching methods. Investigating their perspectives helps identify gaps in teacher preparation programs and highlights areas for policy and infrastructure development.

Objectives of the Study:

- 1. To understand pre-service teachers' perceptions and awareness of Personalized Adaptive Learning (PAL) and inclusive teaching strategies.*
- 2. To identify challenges and areas for improvement in implementing differentiation practices for diverse and gifted learners in classrooms.*

Methodology:

Sample *Pre-service teachers enrolled in a teacher education program.*

Sampling Technique *Purposive sampling.*

Study Design *Quantitative research design.*

Data Collection Method *Structured survey using a questionnaire.*

Tool *5-point Likert scale ranging from Strongly Disagree (1) to Strongly Agree (5).*

Analysis of Data:

Initial analysis shows that pre-service teachers acknowledge the importance of PAL in promoting student achievement and inclusivity. However, the study also reveals

significant challenges, particularly in the areas of infrastructure support, curriculum modification, and teacher preparedness. While the theoretical understanding of inclusive strategies is present, practical application remains limited.

Conclusion:

The study underscores that Personalized Adaptive Learning is essential for equitable education, but its successful integration requires systemic efforts. Investments in infrastructure, continuous teacher training, and curriculum adaptability are crucial for making inclusive strategies a reality in classrooms. Empowering pre-service teachers with the right tools and mindset will ensure that every learner receives the support they need to succeed.

Keywords: *PAL, Inclusive Education, Pre-service Teachers, Differentiated instructions.*

Introduction:

Inclusive education has become a cornerstone of global educational reform, especially following the ratification of the *United Nations Convention on the Rights of Persons with Disabilities* (UN, 2007). This global commitment has catalyzed a significant shift toward integrating students with special educational needs (SEN) into mainstream classrooms, particularly across Europe. However, the concept of inclusion today extends beyond disabilities to encompass a broad spectrum of learner diversity—shaped by linguistic, socio-cultural, economic, and emotional factors. As Coubergs et al. argue, the increasing heterogeneity within classrooms necessitates the adoption of responsive, flexible, and adaptive teaching practices to ensure equity in learning.

To address these evolving demands, differentiated instruction and personalized adaptive learning (PAL) have emerged as key pedagogical strategies. Differentiated instruction involves modifying the content, process, product, and learning environment based on students' readiness levels, interests, and learning profiles. This approach fosters equitable access by tailoring instruction to the diverse learning needs present in any classroom. Similarly, PAL leverages digital technologies to adjust learning in real time, using student performance data to customize the pace and difficulty of instructional materials. As a scalable solution, PAL enables educators to efficiently address varied academic needs while maintaining individualized support. The foundations of both differentiation and personalization can be traced to longstanding educational frameworks, notably the *Warnock Report* (1978), which first formalized inclusive principles. Although these approaches are now widely endorsed in theory, their practical implementation continues to pose challenges.

Teachers are often required to navigate a wide spectrum of student abilities, learning styles, and backgrounds within a single classroom. In this context, PAL tools can provide meaningful support by offering insights into learner progress and facilitating timely, targeted interventions.

Contemporary pedagogical models such as Universal Design for Learning (UDL), Social-Emotional Learning (SEL), and Culturally Responsive Teaching (CRT) further complement these efforts. These frameworks expand the scope of inclusion by addressing not only academic but also emotional, social, and cultural dimensions of learning. By creating classroom environments that support holistic development, these models promote deeper student engagement and foster a sense of belonging among all learners.

Despite the potential of these inclusive strategies, several systemic barriers limit their effective adoption. These include insufficient digital infrastructure, limited teacher training, language diversity, and resistance to pedagogical change—challenges that are especially acute in under-resourced educational settings. Additionally, large class sizes and rigid curricular expectations often constrain teachers' ability to personalize instruction meaningfully.

Given these constraints, it is vital to examine the perceptions and preparedness of pre-service teachers, who will be the future implementers of inclusive education. Their attitudes, competencies, and understanding of tools like PAL and differentiated instruction will play a crucial role in shaping inclusive classroom practices. This study aims to explore the readiness, awareness, and commitment of pre-service teachers toward adopting these personalized strategies, thereby contributing to the wider discourse on equity and inclusion in education.

Literature Review:

Sharma and Sokal (2016), "Can Teachers' Self-Reported Efficacy, Concerns, Attitudes, and Beliefs Predict Their Inclusive Education Practices?". The study found that teachers who reported higher levels of self-efficacy and more positive attitudes toward inclusive education were significantly more likely to implement inclusive teaching strategies in their classrooms.

Jordan, Schwartz, and McGhie-Richmond (2009), "Preparing Teachers for Inclusive Classrooms". This research highlighted that teachers with a positive perception of students with disabilities tended to employ more inclusive methods. It reinforced the role of teacher beliefs in shaping effective inclusive practices.

MacFarlane and Woolfson (2013), "Teacher Attitudes and Behavior Toward the Inclusion of Children with Social, Emotional and Behavioral Difficulties". The findings emphasized the need for in-service training and a strong inclusive school ethos to

motivate teachers. Teachers were more likely to engage in inclusive practices when supported by a positive school culture and professional development.

Rausch, Karing, and Dörfler (2015). "Teacher Judgment and Student Background: An Analysis of Differential Expectations and Their Consequences", Through the study revealed that teachers' expectations and behaviors varied based on student characteristics such as race or gender, suggesting that implicit bias can affect equity in teaching. It highlighted the importance of teacher awareness in promoting fairness.

Nilholm and Alm (2010). "An Inclusive Classroom? A Case Study of Inclusive Teacher Strategies". Through this case study, researchers demonstrated that inclusive classrooms operated on clearly defined, non-negotiable rules. These rules created a stable learning environment that benefited all students and facilitated inclusive practices.

Putney (2007). "Becoming a Community of Practice in Inclusive Classrooms", Researcher work underlined the value of developing a strong classroom community. Teachers who fostered mutual respect and shared norms were better able to support diverse learners and promote inclusion through collaboration.

Reflection:

The reviewed literature emphasizes the essential role of teachers' attitudes, beliefs, and school environments in successfully implementing inclusive education and differentiated instruction. A consistent finding across studies is that teachers with high self-efficacy, as noted by Sharma and Sokal (2016) and Jordan et al. (2009), are more likely to adopt inclusive practices. Additionally, the importance of professional development and supportive school cultures, highlighted by MacFarlane and Woolfson (2013), suggests that inclusivity requires systemic support. Rausch et al. (2015) point out the impact of unconscious biases on teacher expectations, underscoring the need for equity alongside inclusion. Practical strategies from Nilholm and Alm (2010) and Putney (2007) emphasize creating consistent classroom norms and fostering community to ensure emotionally safe learning environments. Overall, the literature calls for a transformative approach that integrates adaptive teaching methods like Personalized Adaptive Learning (PAL), supported by policies and professional development, to make inclusive education effective and equitable.

Need of the Study:

The Indian education system, particularly in government-run schools, continues to grapple with persistent challenges such as overcrowded classrooms, a shortage of adequately trained teachers, and wide disparities in student learning abilities. These systemic issues undermine the delivery of quality education and limit the ability of

educators to address individual learner needs effectively. In this context, Personalized Adaptive Learning (PAL) presents a promising solution to bridge existing educational gaps and promote inclusive, student-centered instruction.

PAL offers a technology-driven approach that customizes the learning experience for each student, regardless of their background, pace of learning, or academic proficiency. By leveraging data analytics, PAL platforms provide real-time insights into student performance, enabling teachers to monitor progress, identify specific learning challenges, and tailor instructional strategies accordingly. This is particularly beneficial in large or multi-grade classrooms where one-on-one attention is limited. One of the core advantages of PAL is its ability to accommodate diverse learning speeds. Students who grasp concepts quickly can move ahead without being held back, while those who need more time receive the necessary reinforcement and support. This personalized pacing not only enhances academic achievement but also boosts student confidence, motivation, and engagement. Furthermore, the integration of interactive elements—such as videos, quizzes, and gamified tasks—makes learning more dynamic and fosters long-term retention.

Given these advantages, it is essential to investigate how pre-service teachers perceive and understand the implementation of PAL and differentiated instruction strategies. Insights from such investigations can inform the design of teacher training programs, curriculum reforms, and educational policies that aim to create more inclusive and effective classroom environments.

Key Features of Personalized Adaptive Learning (PAL) for Enhancing Student Learning Outcomes:

Personalized Adaptive Learning systems are built on the premise of meeting individual student needs through a combination of digital technology and data-informed decision-making. Several core features contribute to improved student outcomes:

- **Remedial Learning Content**

PAL platforms dynamically adjust instructional materials to align with each student's level of understanding. By targeting specific conceptual gaps, these systems provide tailored support that fosters mastery of foundational concepts before advancing.

- **Adaptive Assessments**

Built-in assessment tools continuously analyze student responses, adjusting the complexity and nature of subsequent questions. This enables real-time feedback and allows learners to engage with content that matches their current ability, fostering deeper comprehension.

- **Data-Driven Insights**

Teachers are empowered with real-time analytics on student progress, enabling them to make informed instructional choices. These insights support differentiated instruction by helping educators modify lesson plans, offer targeted remediation, and design interventions that cater to diverse learning needs.

Together, these features of PAL not only enhance academic performance but also promote equitable learning environments where all students can thrive, regardless of their starting point.

Challenges in Implementing Personalized Adaptive Learning (PAL) :

Despite the significant potential of Personalized Adaptive Learning to transform educational practices, several challenges hinder its widespread implementation, particularly in diverse and resource-constrained settings

- **Limited Digital Infrastructure:** Many schools, especially in rural and underserved areas, lack the necessary technological infrastructure such as reliable internet connectivity, adequate digital devices, and maintenance support required for the effective deployment of PAL systems.
- **Teacher Resistance and Digital Competency Gaps:** Some educators may exhibit resistance toward adopting new technologies due to unfamiliarity, lack of training, or perceived complexity. Limited digital literacy among teachers can further impede the integration of PAL into classroom practices.
- **Language and Content Accessibility:** In a multilingual country like India, language barriers can affect the accessibility and effectiveness of PAL tools, particularly when content is not available in regional languages or lacks cultural relevance.
- **Reluctance to Shift from Traditional Pedagogies:** Both educators and institutions may be hesitant to move away from conventional teaching methods. The shift toward PAL requires a mindset change, ongoing professional development, and institutional support, which are often lacking.

Objectives of the Study:

1. To understand pre-service teachers' perceptions and awareness of Personalized Adaptive Learning (PAL) and inclusive teaching strategies.
2. To identify challenges and areas for improvement in implementing differentiation practices for diverse and gifted learners in classrooms.

Methodology:

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Sampling Technique Purposive sampling.

Study Design Quantitative research design.

Data Collection Method Structured survey using a questionnaire.

Tool 5-point Likert scale ranging from Strongly Disagree (1) to Strongly Agree (5).

Analysis of Data:

Inclusivity in Educational Capacity Building

Questions Responses 21 Settings

Section 1 of 6

Strategies for Equity and Inclusivity in Educational Capacity Building

B I U Link Text

Form description

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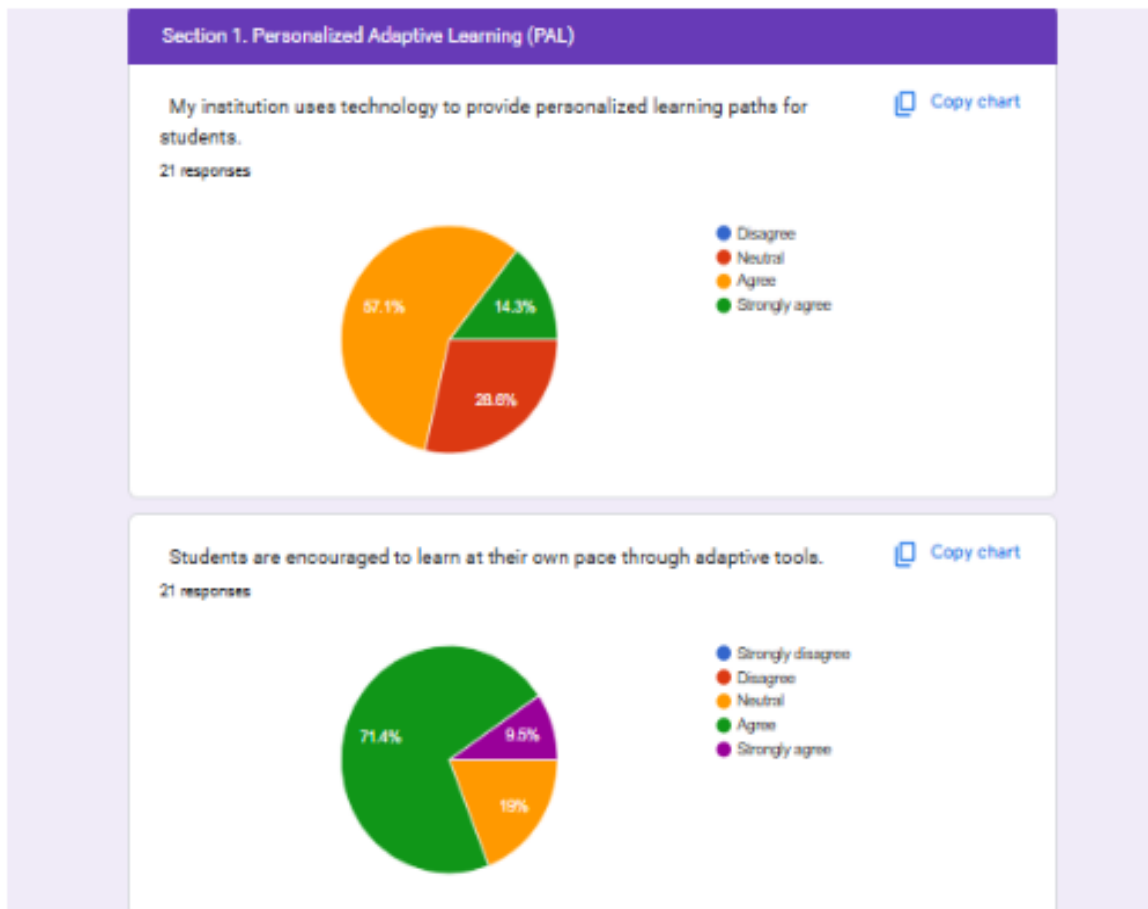
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Full Name *

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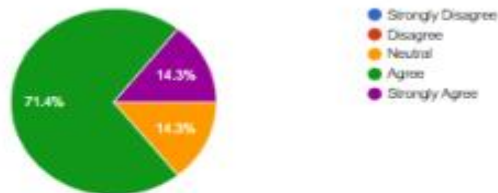
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PAL systems are used to identify and address individual learning gaps.

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21 responses



Teachers are trained to use data from PAL tools to support student growth.

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21 responses

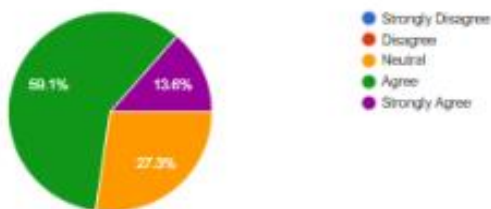


Section 2: Strategies for Reaching Every Learner

Instructional materials are adapted to accommodate learners with different needs.

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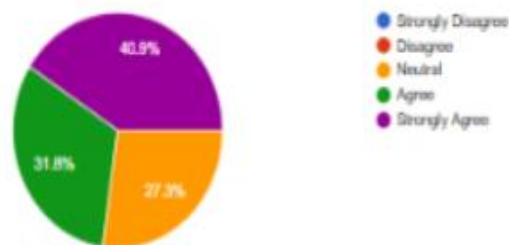
22 responses



Teacher should use a variety of teaching strategies to engage all students.

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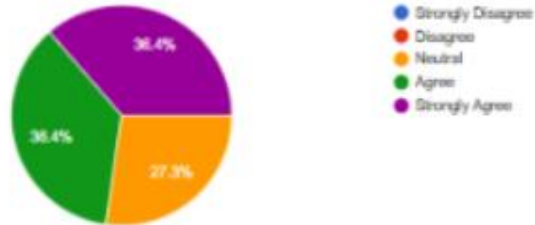
22 responses



Classroom environments are designed to be inclusive and welcoming for all learners.

22 responses

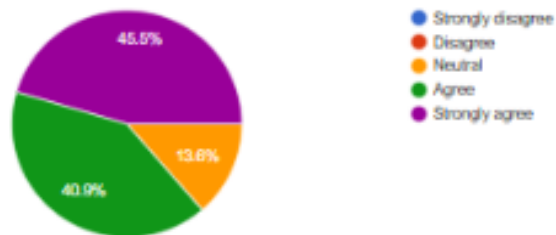
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Regular feedback from students helps improve how we reach each learner.

22 responses

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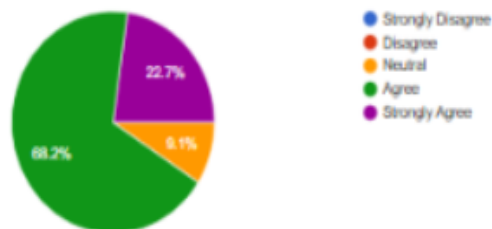


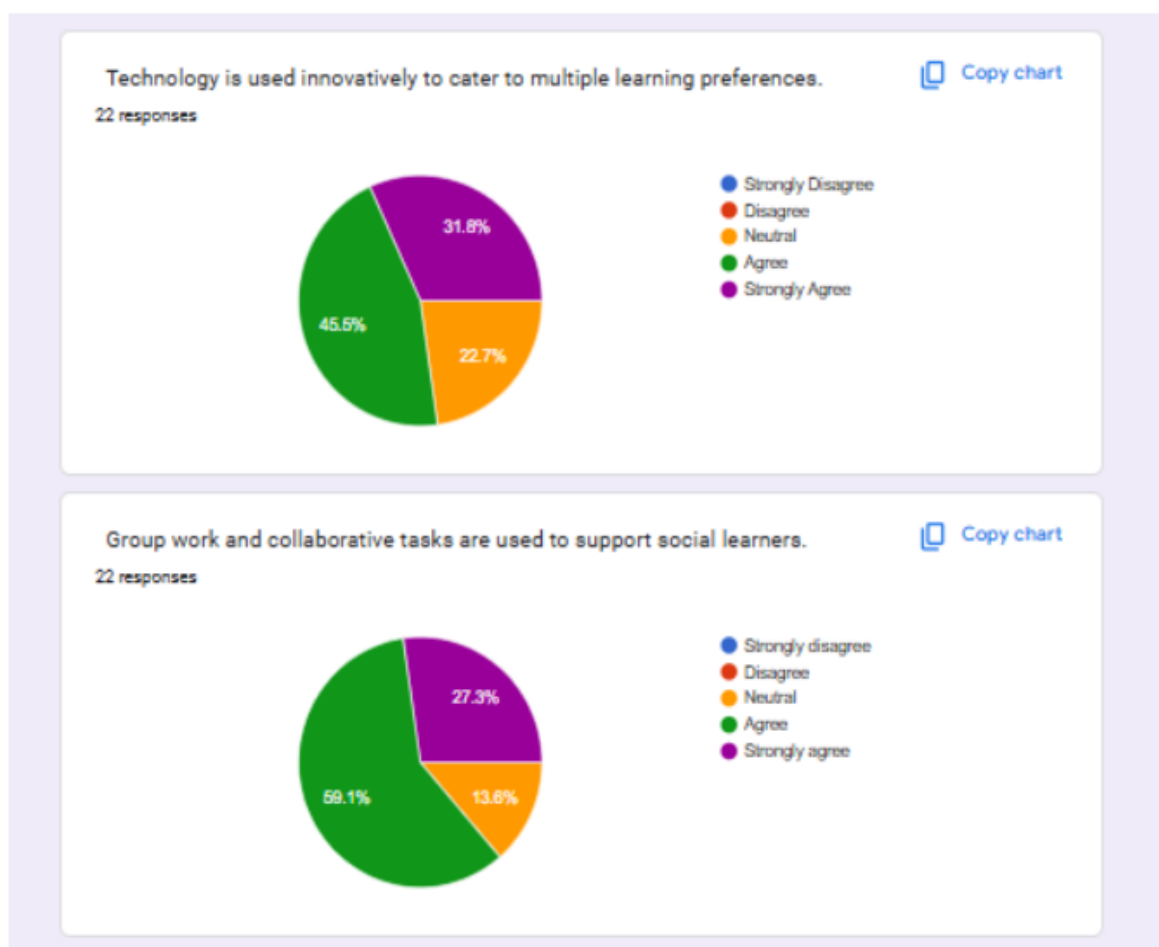
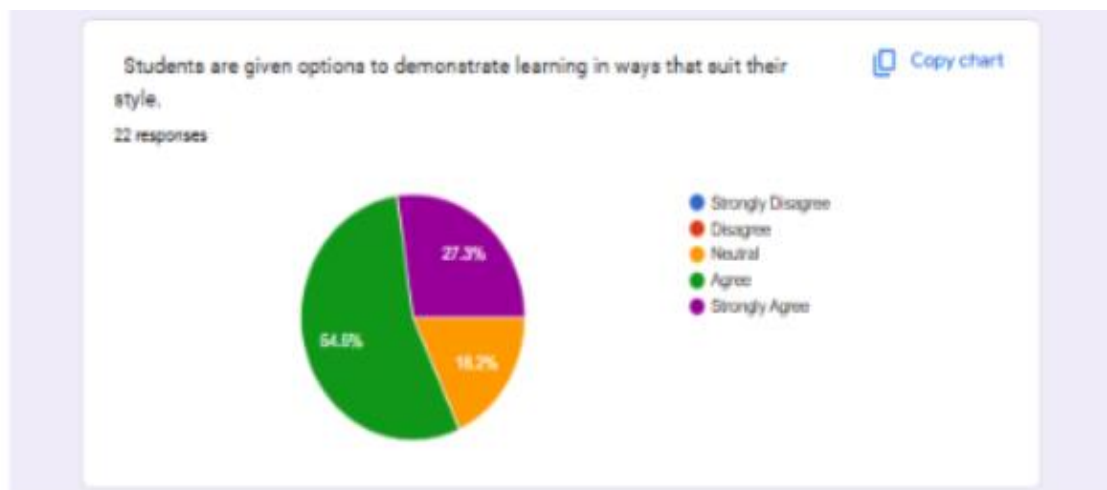
Section 3. Innovative Methods for Addressing Diverse Learning Styles

Teacher should incorporate visual, auditory, and kinesthetic elements in my lessons.

22 responses

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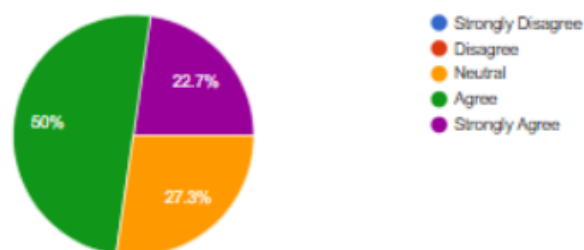


Section 4. Strategies for Differentiation in the Classroom

Lessons are planned with varying levels of difficulty to suit learner abilities.

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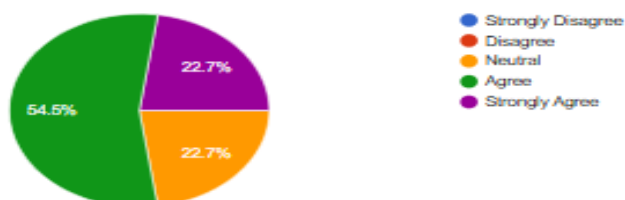
22 responses



Teacher should provide additional support or enrichment activities based on student needs.

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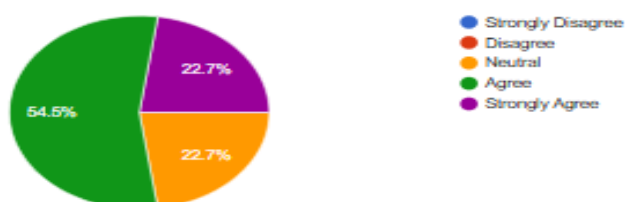
22 responses



Assessment tasks are differentiated to suit learners' strengths and challenges.

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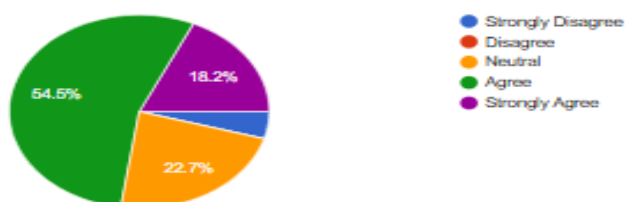
22 responses

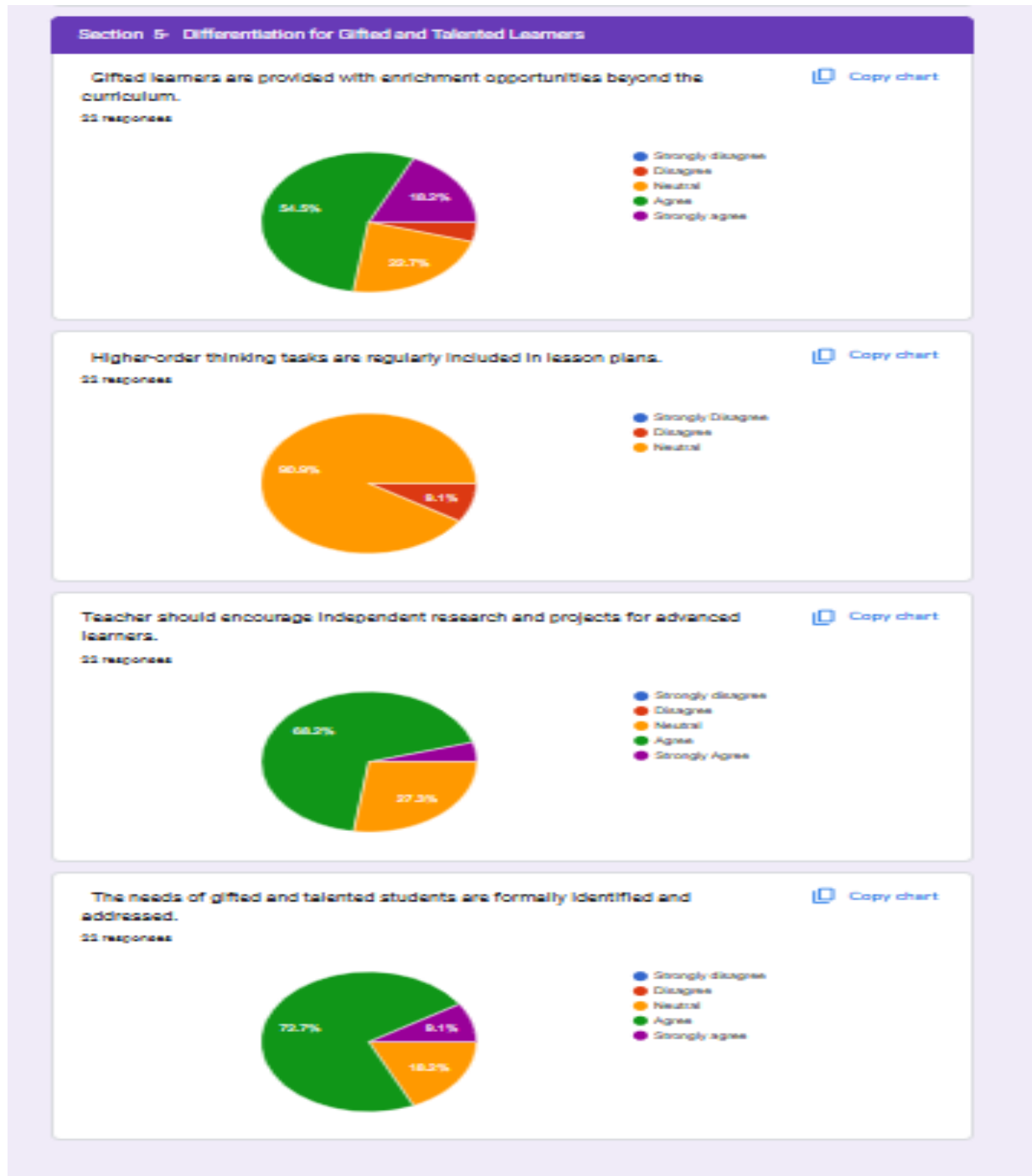


Students are grouped flexibly based on their learning needs and interests.

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22 responses





The analysis of the data presents a generally optimistic perspective regarding the implementation of Personalized Adaptive Learning (PAL) systems and the broader commitment to inclusive education practices. The responses reflect strong agreement with core pedagogical principles associated with personalization, data-driven instruction, and differentiated learning strategies. The following key themes emerged:

1. Personalized Learning Paths

A significant proportion of respondents affirmed that PAL systems are effectively employed to address individual learning gaps, enabling students to progress at their own pace. This underscores the growing emphasis on tailored learning experiences that accommodate the diverse needs of learners.

2. Teacher Training and Data Utilization

There is consensus that teachers are increasingly well-trained in leveraging data from PAL tools to support student development. This reflects a broader trend toward evidence-based instructional planning, where formative assessments and analytics are used to inform teaching strategies and intervention.

3. Flexible Instructional Materials

Respondents consistently supported the practice of adapting instructional materials to meet the varied needs of students. This adaptation affirms the importance of universal design for learning (UDL), ensuring accessibility for all learners, including those with disabilities or language barriers.

4. Varied Engagement Strategies

Many educators confirmed the integration of multimodal teaching strategies—including visual, auditory, and kinesthetic methods—to increase student engagement. This variety reflects a deepened awareness of learning style preferences and the need to maintain learner interest and motivation.

5. Differentiation in Assessment

The data reveals substantial agreement on the use of differentiated assessments, which are tailored to match student abilities and learning profiles. Additionally, flexible grouping of students based on performance or interest was supported as a best practice in fostering personalized and effective learning.

6. Support for Gifted and Talented Learners

There was strong affirmation for the enrichment and extension of learning for gifted students. Respondents emphasized the need for curriculum modifications that go beyond standard expectations, allowing these learners to explore topics at greater depth and complexity.

7. Collaborative and Social Learning

The use of group-based tasks and peer interaction was widely supported. Respondents indicated that collaborative learning encourages critical thinking, communication, and empathy, fostering essential 21st-century skills within inclusive classroom environments.

8. Inclusive Classroom Environments

A shared commitment to creating welcoming and inclusive classrooms emerged clearly in the data. Respondents acknowledged efforts to ensure that classrooms are physically, emotionally, and socially inclusive, accommodating learners from all backgrounds and abilities.

9. Feedback and Continuous Improvement

Educators highlighted the importance of frequent and meaningful feedback to inform instructional adjustments and personalize support for each learner. This aligns with a growth mindset approach, encouraging students to reflect, revise, and improve continuously.

Addressing Neutral Responses:

While the majority of responses were positive, a modest number of neutral responses indicate areas where clarification, professional development, or policy refinement may be needed. These gaps may reflect inconsistent implementation across institutions or varying familiarity with advanced PAL tools and inclusive practices.

Conclusion:

The findings strongly suggest that educators are actively embracing personalized and inclusive teaching strategies, supported by the effective use of PAL systems and differentiated methods. Teachers are well-prepared to interpret student data, adapt materials, and incorporate a range of instructional techniques that accommodate individual differences. The collective focus on engagement, feedback, collaboration, and student voice highlights a robust foundation for personalized education. While some areas may benefit from targeted refinement, the overall sentiment is encouraging and reflective of a forward-looking, equity-driven approach to education.

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EMPOWERING COMMUNITIES THROUGH EDUCATION: THE ROLE OF COMMUNITY-BASED LEARNING IN ADVANCING SOCIAL SUSTAINABILITY

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Abstract:

This paper discusses the transformative power of community-based learning (CBL) as an instrument for empowering communities and promoting social justice. By complementing theoretical knowledge with experience-based learning, CBL creates a mutual learning process between educational institutions and local communities. Active participation, local significance, and collective problem-solving are the approach's key aspects, facilitating learners' immersion in social issues while they develop civic responsibility. Community members, in turn, are made available resources, skills, and opportunities that boost collective agency and resilience. Based on case studies, educational theory, and social development frameworks, the paper illustrates how CBL closes gaps between school and grassroots needs to facilitate more equitable, inclusive, and sustainable social outcomes. Finally, community-based learning stands out as a critical strategy for developing critical consciousness, empowering the marginalised, and promoting significant community change through education.

Keywords: *CBL, Social Justice, Civic Responsibility, Social Inclusion, Social Exclusion, Experiential Learning.*

Introduction:

The modern world is characterised by sophisticated and interdependent issues such as deepening inequities, social exclusion, and the urgent imperative for communities to build resilience in the midst of accelerated transformation. These challenges need innovative and integrated strategies that build social sustainability – the ability of today's and tomorrow's generations to build healthy and habitable communities. Community-based learning (CBL) has proven to be an effective pedagogic approach that has the potential to augment and advance social sustainability objectives significantly. By linking formal education with active participation in the surrounding environment, CBL provides an avenue to empower individuals and build stronger social bonds. The objective of this research paper is to give an all-encompassing overview of community-based learning, exploring its definition, essential

characteristics, its potential to further social sustainability, its advantages for the individual, its drawbacks to implementing it, effective case studies worldwide, the role of education policy and government support, and the success of a range of CBL models across different settings.

Community-grounded literacy is a broad range of educational programs and styles aimed at closing the gap between academic instruction and the life of the surrounding community in society. This method focuses on linking academic material with original institutions, history, literature, artistic heritage, and the natural landscape, leading to a better understanding of the world outside the academy walls. Essentially, CBL balances significant community interaction with purposeful instruction and reflection, where emphasis is placed on complementary literacy, where the community and the scholars both reap benefits from such cooperation. The teaching approach is often rooted in the assumption that deep literacy springs from experience, particularly when given additional support of contextual knowledge, fundamental knowledge, intellectual analysis, and guidance.

Literature Review:

Hernandez Gonzalez, F. (2023)

This paper explores the potential of place-based education (PBE) to advance the goals of sustainability education (SE). As the leading international body promoting SE, UNESCO emphasises the importance of fostering sustainability through three interconnected dimensions of learning: cognitive, socio-emotional, and behavioural. Despite this emphasis, there has been limited research on effective pedagogical approaches that address these dimensions holistically.

PBE has recently gained attention as a comprehensive educational framework that may be particularly suited to supporting SE objectives. To evaluate its effectiveness, this study aims to: (i) examine how cognitive, socio-emotional, and behavioural learning dimensions are addressed in empirical research utilising PBE; and (ii) assess the overall contribution of PBE to enhancing students' awareness and understanding of sustainability.

Tilbury, D., & Wortman, D. (2008)

This paper highlights that progress toward a more sustainable future requires educational initiatives that foster informed, empowered, and equitable societies while supporting opportunities for lifelong learning. Within this context, non-formal community education emerges as a vital component of lifelong learning, playing a key role in raising awareness, fostering partnerships, and inspiring collective action toward sustainability goals.

Rather than conducting an exhaustive literature review, the article offers a critical analysis of current trends in Australian community education practices and programs, focusing on their contributions to environmental and sustainability outcomes. It examines specific programmatic approaches across four key domains: Community Action, Social Marketing, Interpretive Education, and education targeting Communities from Culturally and Linguistically Diverse (CALD) backgrounds.

The study underscores the need for strategic changes to enhance the impact of community education in promoting sustainability. These include redirecting existing funding streams, strengthening the capacity of facilitators, and adopting more innovative and participatory educational methodologies. Such reforms are essential if community education is to play a transformative role in advancing sustainability practices.

Webb, S., & Thi Ngoc Ha, N. (2024)

In this study, the researcher analyses empirical literature regarding the progression the social function of college-based higher education (CBHE). This study provides insights into the social function of CBHE and features of CBHE colleges, students, and lecturers. The review observed an increasing research interest in CBHE and an expansion in the geographical scope of such research as provision has expanded. It also pointed out the social functions of CBHE, such as (i) expanding participation in higher education, (ii) addressing local labour markets' demand for work-ready graduates and community building, and (iii) advancing social justice. While there are differences in the organisation of CBHE across education systems, the review highlighted the widespread agreement that the provision of CBHE is geared towards addressing two policy issues. These are policies to enhance economic competitiveness and productivity through offering learning that is industry-oriented and affordable, and policies to advance social justice and equity by offering supportive learning environments for a specific group of students who would otherwise not benefit from higher education. The review demands watchful policy to maintain the double function of CBHE and to preclude the prioritisation of education for the market.

Kahne and Westheimer (1996)

In this research, the author brought out the differentiation between "charity" and "change-oriented" community interventions. They maintain that though charitable actions provide a relief that is short-term in nature, CBL practices with their roots in systemic change tend to be better in resolving the core causes of social inequality.

Objectives of this study:

- To identify the primary focus of Community-Based Learning (CBL).

- To assess the availability of CBL opportunities in the community.
- To evaluate the impact of CBL on understanding local social issues.
- To examine CBL's influence on learners' empathy and social responsibility.
- To determine the effectiveness of CBL in fostering community collaboration.
- To explore the role of CBL in encouraging civic engagement.
- To explore the personal impact of CBL participation on understanding social sustainability.

Hypothesis:

H1: Participation in CBL increases learners' empathy and sense of social responsibility.

H0: Participation in CBL does not increase learners' empathy and sense of social responsibility.

H1: CBL is effective in fostering collaboration and building relationships within the community.

H0: CBL is not effective in fostering collaboration and building relationships within the community.

H1: CBL experiences motivate learners to become more actively involved in their communities.

H0: CBL experiences do not motivate learners to become more actively involved in their communities.

H1: CBL contributes to the development of skills needed to address social inequalities.

H0: CBL does not contribute to the development of skills needed to address social inequalities.

Limitation of the Study:

This study is subject to limitation of time period and also ignorance of the respondent upto a certain limit. This study is also subject to the collection of samples for primary data collected from Junior college, UG and PG students only.

Methodology:

Research can either be based on Primary data or Secondary data. Primary data with respect to the data, which is the first-hand data directly collected from primary sources, whereas secondary data are the data that is collected and utilised by some other person.

For this research the researcher is employing Primary as well as secondary data for study purpose. Primary data only constitutes most of the study; however secondary data has been employed only for Literature review. For this research 220 respondents have been taken into consideration.

Scope of the study:

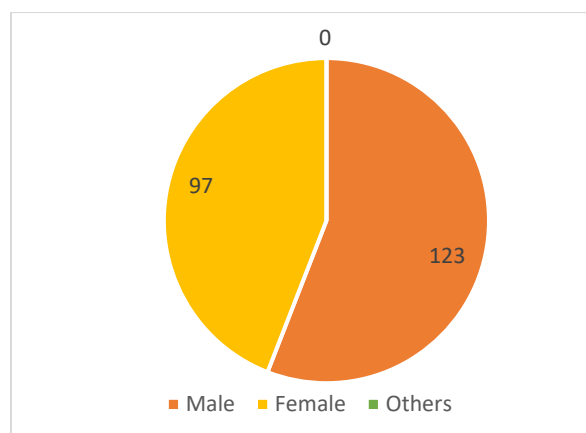
The scope of this study centers on examining the role of Community-Based Learning (CBL) in advancing social sustainability through educational practices rooted in real-world engagement. It seeks to understand whether CBL is primarily viewed as a method for developing practical skills, acquiring theoretical knowledge, achieving academic success, or preparing for standardised tests. The study also explores the availability and accessibility of CBL opportunities within communities, assessing how widespread and inclusive such programs are. A key focus is on the perceived benefits of CBL, including its potential to deepen learners' understanding of local social issues, foster empathy, strengthen social responsibility, and encourage active community involvement. Furthermore, the study investigates how effectively CBL promotes collaboration, builds community relationships, and empowers marginalised groups while also equipping learners with the skills needed to address social inequalities. In addition to these positive outcomes, the research considers various barriers to successful implementation, such as limited funding, lack of awareness, insufficient institutional-community partnerships, and minimal community involvement in program design. Finally, the study includes an exploration of individuals' personal experiences with CBL to gain deeper insight into how such engagement shapes their understanding of social sustainability and their motivation to contribute meaningfully to their communities. Through this comprehensive approach, the study aims to provide a nuanced understanding of CBL's potential and limitations in fostering socially sustainable communities.

Data Collection and Interpretation:

Number of Respondents = 220

Data Interpretation:**1. Gender:**

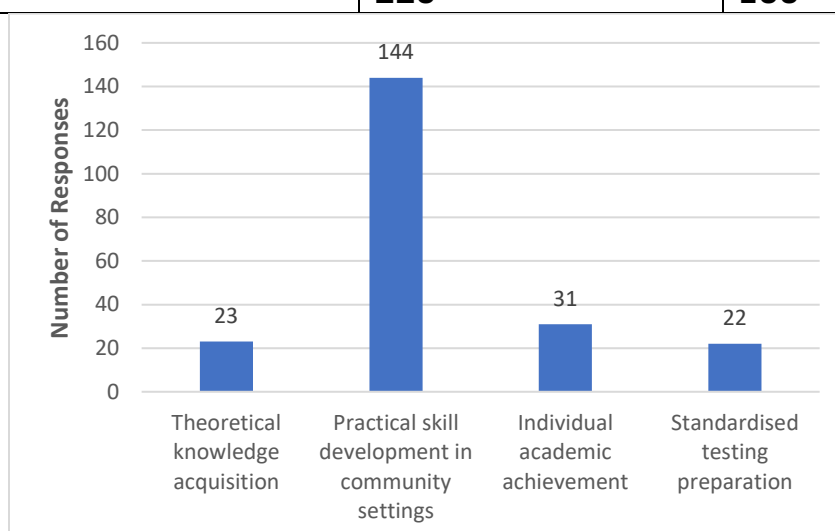
Gender	Number of Responses	Percentage (%)
A) Male	123	55.91
B) Female	97	44.09
C) Other	Nil	00
Total	220	100



This study includes 55.91% males and 44.09% females.

2. In your understanding, does CBL primarily focus on:

Primary focus of CBL	Number of Responses	Percentage (%)
A) Theoretical knowledge acquisition	23	10.45
B) Practical skill development in community settings	144	65.45
C) Individual academic achievement	31	14.10
D) Standardised testing preparation	22	10.00
Total	220	100

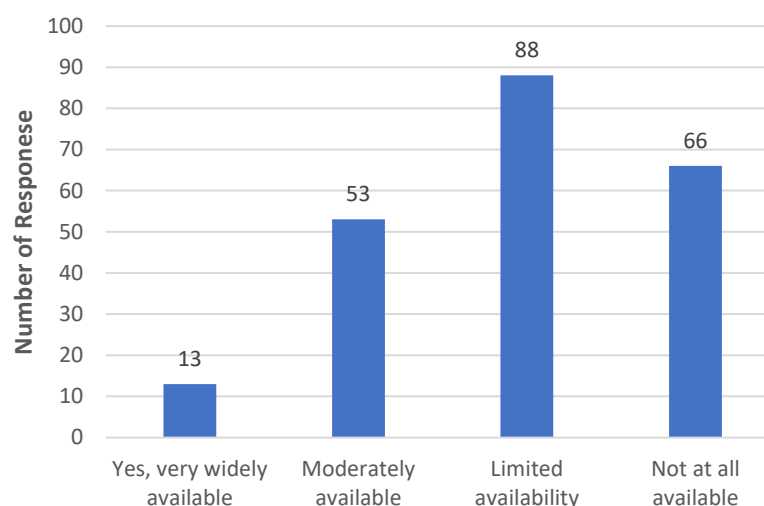


The data shows that 65.45% of respondents believe CBL primarily focuses on practical skill development in community settings. 14.10% think it's about individual academic achievement. 10.45% believe it's about theoretical knowledge

acquisition. 10% think it's about standardised testing preparation. The majority of respondents (65.45%) perceive CBL as focusing on practical skill development in community settings, highlighting its experiential and community-based nature.

3. Do you believe CBL opportunities are widely available in your community?

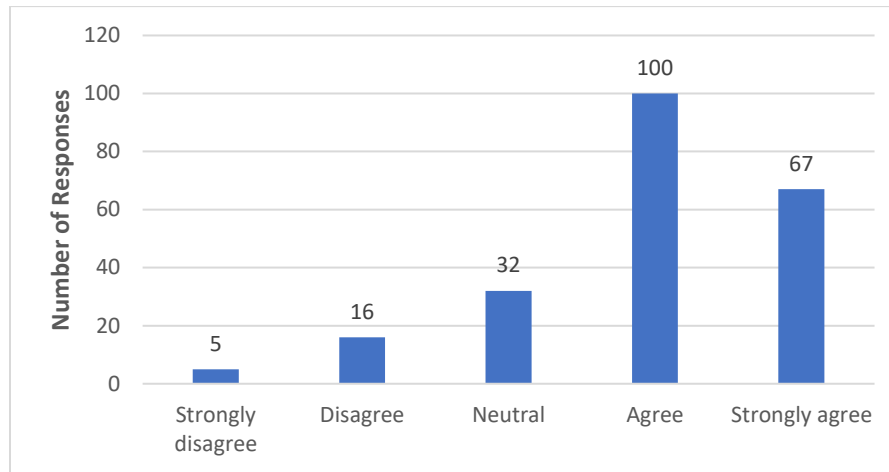
Availability of CBL in community	Number of Responses	Percentage (%)
A) Yes, very widely available	13	5.91
B) Moderately available	53	24.09
C) Limited availability	88	40.00
D) Not at all available	66	30.00
Total	220	100



The majority of respondents (70%) perceive CBL opportunities as either limited or not available in their community, highlighting a potential need for increased access to community-based learning experiences.

4. To what extent do you agree that CBL helps learners develop a better understanding of local social issues?

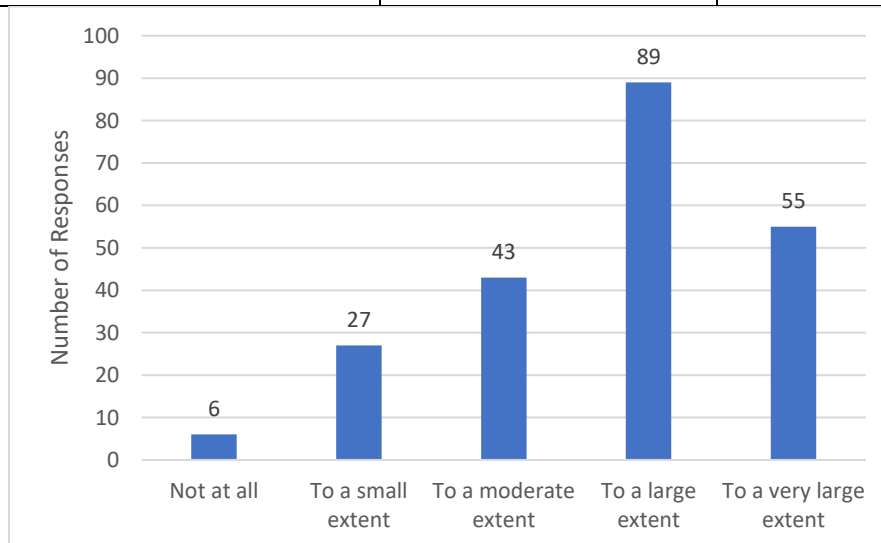
CBL helps understand local social issues	Number of Responses	Percentage (%)
A) Strongly disagree	5	2.28
B) Disagree	16	7.27
C) Neutral	32	14.55
D) Agree	100	45.45
E) Strongly agree	67	30.45
Total	220	100



The data shows that 75.90% of respondents either agree (45.45%) or strongly agree (30.45%) that CBL helps learners develop a better understanding of local social issues. Only 9.55% disagree or strongly disagree. The majority of respondents believe that CBL is effective in helping learners understand local social issues, highlighting its potential to foster community awareness and social responsibility.

5. Do you believe participation in CBL increases learners' empathy and sense of social responsibility?

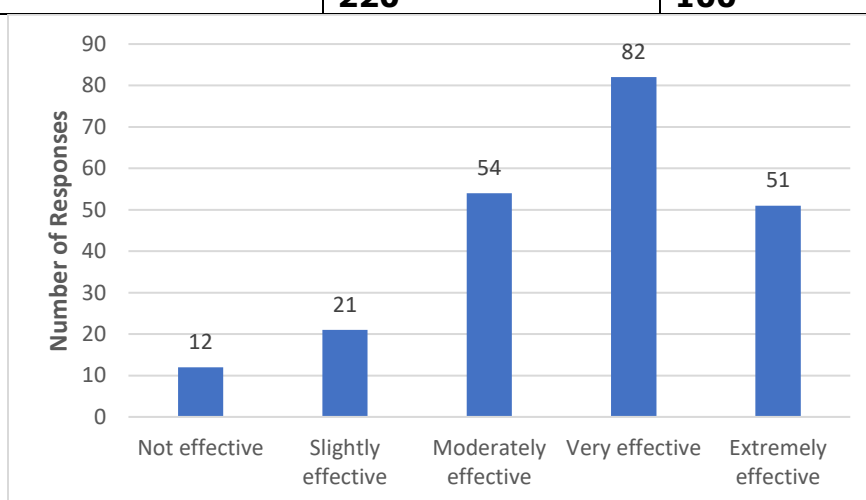
CBL increases empathy and social responsibility	Number of Responses	Percentage (%)
A) Not at all	6	2.73
B) To a small extent	27	12.27
C) To a moderate extent	43	19.55
D) To a large extent	89	40.45
E) To a very large extent	55	25.00
Total	220	100



The data shows that 65.45% of respondents believe that CBL increases learners' empathy and sense of social responsibility to a large extent (40.45%) or To a very large extent (25%). Only 15% believe it has a small or no impact. The majority of respondents think that CBL has a significant positive impact on learners' empathy and sense of social responsibility, highlighting its potential to foster positive social change.

6. In your opinion, how effective is CBL in fostering collaboration and building relationships within the community?

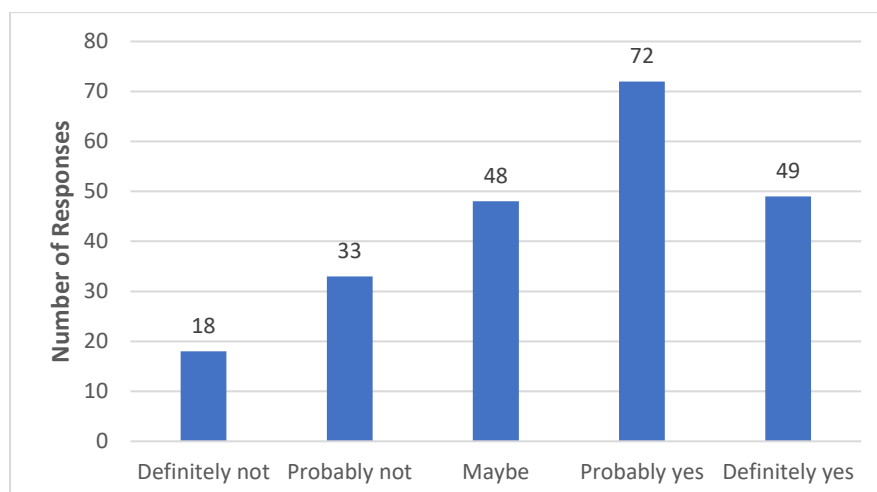
CBL fosters community collaboration	Number Responses	Percentage (%)
A) Not effective	12	5.45
B) Slightly effective	21	9.55
C) Moderately effective	54	24.55
D) Very effective	82	37.27
E) Extremely effective	51	23.18
Total	220	100



The data indicates that CBL is perceived as effective in fostering community collaboration, with 60.45% of respondents rating it as very effective or extremely effective. This suggests that CBL is seen as a valuable approach for building relationships and promoting collaboration within the community.

7. Do you think CBL experiences motivate learners to become more actively involved in their communities?

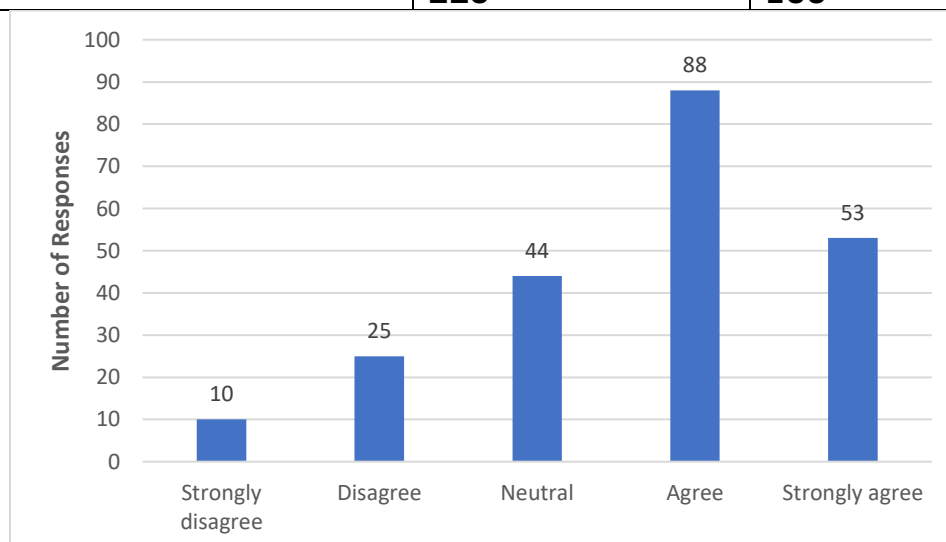
CBL motivates community involvement	Number Responses	Percentage (%)
A) Definitely not	18	8.18
B) Probably not	33	15.00
C) Maybe	48	21.82
D) Probably yes	72	32.73
E) Definitely yes	49	22.27
Total	220	100



The data shows that 55% of respondents believe CBL experiences motivate learners to become more actively involved in their communities, with 32.73% saying probably yes and 22.27% saying definitely yes. 23.18% are uncertain or negative. The majority of respondents think CBL experiences have a positive impact on learners' motivation to engage with their communities, highlighting CBL's potential to foster active citizenship.

8. How much do you agree that CBL contributes to the development of skills needed to address social inequalities?

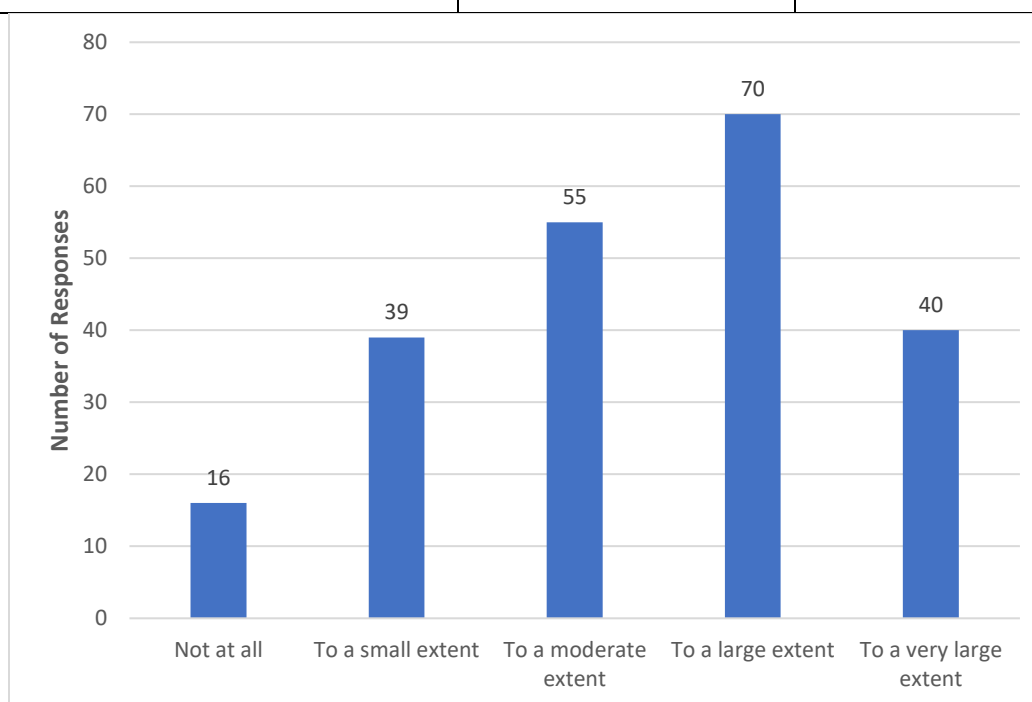
CBL contributes to skills addressing social inequalities	Number Responses	Percentage (%)
A) Strongly disagree	10	4.55
B) Disagree	25	11.36
C) Neutral	44	20.00
D) Agree	88	40.00
E) Strongly agree	53	24.09
Total	220	100



The data shows that 64.09% of respondents agree that CBL contributes to developing skills needed to address social inequalities, with 40% agreeing and 24.09% strongly agreeing. Only 15.91% disagree or strongly disagree. The majority of respondents believe CBL helps develop skills to address social inequalities, highlighting its potential to empower learners to create positive social change.

9. Do you believe CBL can empower marginalized groups within a community?

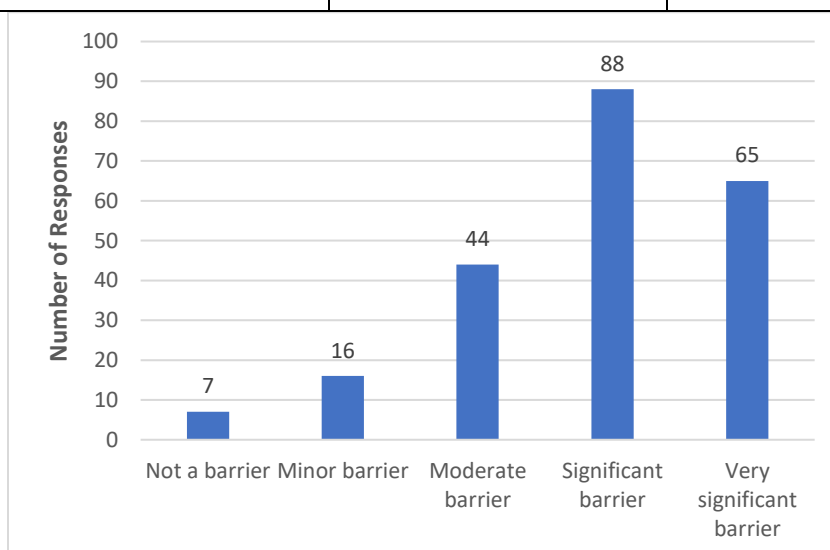
CBL empowers marginalised groups	Number of Responses	Percentage (%)
A) Not at all	16	7.27
B) To a small extent	39	17.73
C) To a moderate extent	55	25.00
D) To a large extent	70	31.82
E) To a very large extent	40	18.18
Total	220	100



The data shows that 50% of respondents believe CBL can empower marginalised groups to a large extent (31.82%) or To a very large extent (18.18%). 25% think it can do so to a moderate extent. The majority of respondents perceive CBL as having the potential to empower marginalised groups, highlighting its potential for positive social impact and community development.

10.How significant of a barrier do you think lack of funding is for implementing effective CBL programs?

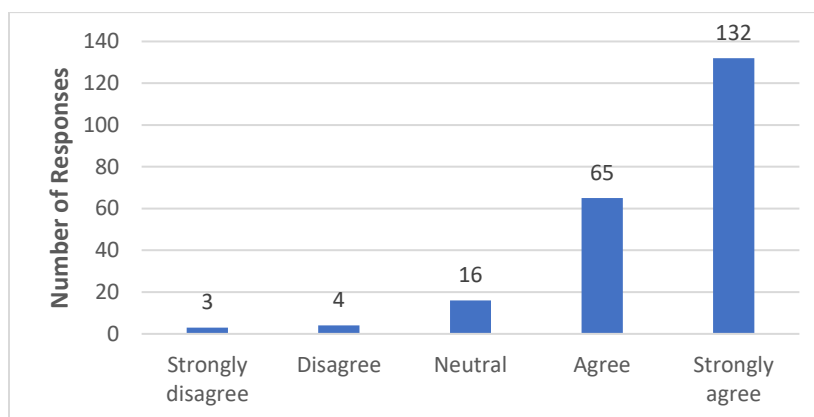
Lack of funding as a barrier	Number Responses	Percentage (%)
A) Not a barrier	7	3.18
B) Minor barrier	16	7.27
C) Moderate barrier	44	20.00
D) Significant barrier	88	40.00
E) Very significant barrier	65	29.55
Total	220	100



The data shows that 69.55% of respondents believe lack of funding is a significant barrier (40%) or very significant barrier (29.55%) to implementing effective CBL programs. Only 10.45% think it's not a barrier or a minor barrier. The majority of respondents identify lack of funding as a major obstacle to implementing effective CBL programs, highlighting the need for increased resources and investment in community-based initiatives.

11.To what extent do you agree that strong partnerships between educational institutions and community organizations are crucial for successful CBL?

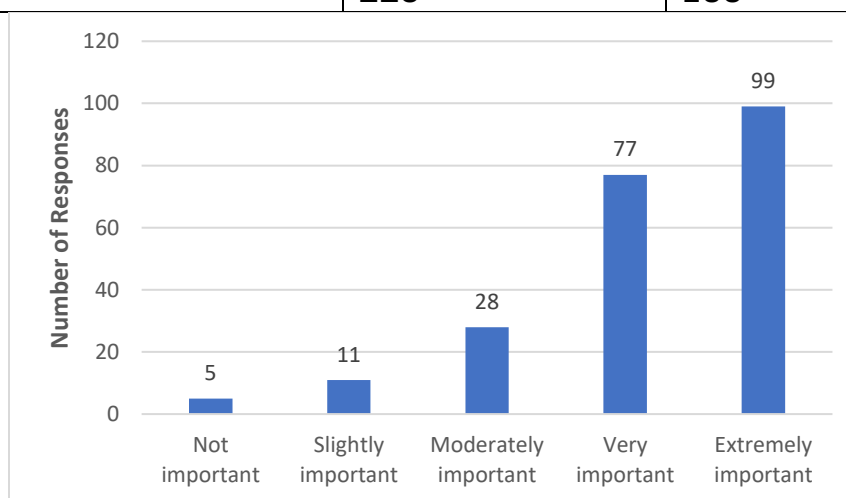
Partnerships are crucial for successful CBL	Number Responses	Percentage (%)
A) Strongly disagree	3	1.36
B) Disagree	4	1.82
C) Neutral	16	7.27
D) Agree	65	29.55
E) Strongly agree	132	60.00
Total	220	100



The data shows that 89.55% of respondents agree that strong partnerships between educational institutions and community organisations are crucial for successful CBL, with 60% strongly agreeing and 29.55% agreeing. Only 3.18% disagree or strongly disagree. The overwhelming majority of respondents recognise the importance of partnerships between educational institutions and community organisations for successful CBL, highlighting the need for collaboration and mutual support.

- 12.** How important do you think community members' involvement is in the design and implementation of CBL initiatives?

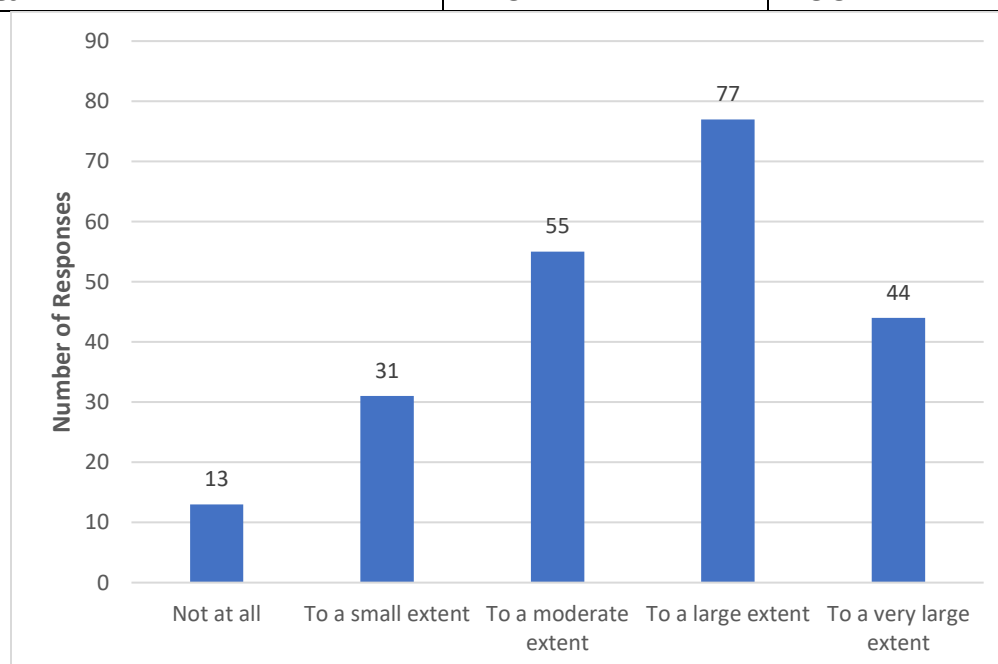
Community involvement in CBL design & implementation	Number of Responses	Percentage (%)
A) Not important	5	2.27
B) Slightly important	11	5.00
C) Moderately important	28	12.73
D) Very important	77	35.00
E) Extremely important	99	45.00
Total	220	100



The data shows that 80% of respondents believe community members' involvement is very important (35%) or extremely important (45%) in the design and implementation of CBL initiatives. Only 7.27% think it's not or slightly important. The majority of respondents emphasise the crucial role of community involvement in CBL, highlighting the need for inclusive and participatory approaches to community-based initiatives.

- 13.** Do you believe a lack of awareness about the benefits of CBL hinders its wider adoption?

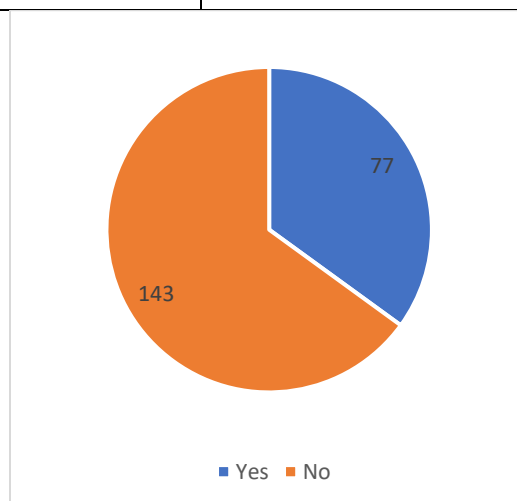
Lack of awareness hinders CBL adoption	Number of Responses	Percentage (%)
A) Not at all	13	5.91
B) To a small extent	31	14.09
C) To a moderate extent	55	25.00
D) To a large extent	77	35.00
E) To a very large extent	44	20.00
Total	220	100



The data shows that 55% of respondents believe a lack of awareness about the benefits of CBL hinders its wider adoption to a large extent (35%) or to a very large extent (20%). 20% think it's a moderate extent. The majority of respondents perceive lack of awareness as a significant barrier to CBL adoption, highlighting the need for increased awareness-raising efforts and education about CBL's benefits.

14. Have you personally participated in any Community-Based Learning activities?

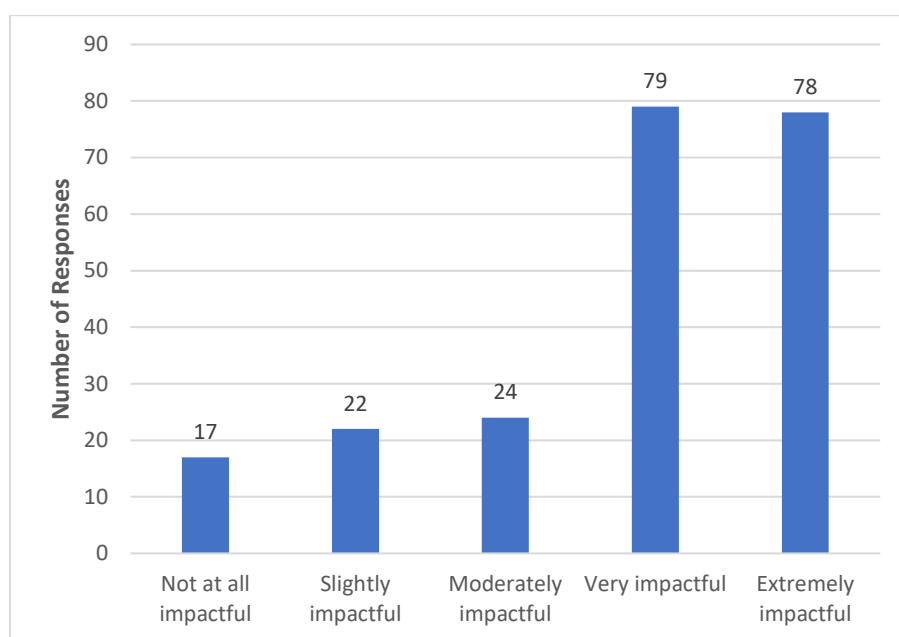
Personal participation in CBL	Number of Responses	Percentage (%)
A) Yes	77	35.00
B) No	143	65.00
Total	220	100



The data shows that 65% of respondents have not personally participated in Community-Based Learning activities. 35% have participated. The majority of respondents lack direct experience with CBL, highlighting a potential gap between perceived benefits and actual participation. This could inform strategies to increase CBL engagement and opportunities.

15. (If yes) How impactful do you believe this experience was in shaping your understanding of social sustainability?

Impact of CBL experience on understanding social sustainability (if participated)	Number of Responses	Percentage (%)
A) Not at all impactful	17	7.73
B) Slightly impactful	22	10.12
C) Moderately impactful	24	11.00
D) Very impactful	79	36.00
E) Extremely impactful	78	35.15
Total	220	100



The data shows that 71.15% of respondents find the CBL experience very impactful (36%) or extremely impactful (35.15%) in understanding social sustainability. 21.12% find it moderately impactful (11%) or slightly impactful (10.12%). 7.73% believe it's not at all impactful. The majority of respondents perceive the CBL experience as having a significant positive impact on their understanding of social sustainability.

Data Summary Table (n=220) :

Question	Option A (%)	Option B (%)	Option C (%)	Option D (%)	Option E (%)
1. Gender	61.50	43.50	-	-	-
2. Primary focus of CBL	10.45	65.45	14.09	10	-
3. Availability of CBL in community	5.91	24.09	40.00	30	-
4. CBL helps understand local social issues	2.27	7.27	14.55	45.45	30.45
5. CBL increases empathy and social responsibility	2.73	12.27	19.55	40.45	25.00

6. CBL fosters community collaboration	5.45	9.55	24.55	37.27	23.18
7. CBL motivates community involvement	8.18	15.00	21.82	32.73	22.27
8. CBL contributes to skills addressing social inequalities	4.55	11.36	20.00	40.00	24.09
9. CBL empowers marginalised groups	7.27	17.73	25.00	31.82	18.18
10. Lack of funding as a barrier	3.18	7.27	20.00	40.00	29.55
11. Partnerships are crucial for successful CBL	1.36	1.82	7.27	29.55	60.00
12. Community involvement in CBL design & implementation	2.27	5.00	12.73	35.00	45.00
13. Lack of awareness hinders CBL adoption	5.91	14.09	25.00	35.00	20.00
14. Personal participation in CBL	35.00	65.00	-	-	-
15. Impact of CBL experience on understanding social sustainability (if participated)	7.73	10.12	11.00	35.00	35.15

Findings of the Study:

- **Focus of CBL** A strong majority believe CBL primarily emphasises practical skill development in community settings.
- **Availability** A significant portion perceives limited or no availability of CBL opportunities in their community.

- **Understanding Social Issues** There's a strong agreement that CBL helps learners grasp local social issues.
- **Empathy and Responsibility** Most respondents believe CBL increases empathy and social responsibility to a large or very large extent.
- **Community Collaboration** A good majority see CBL as very or extremely effective in fostering community collaboration.
- **Motivation for Involvement** Many think CBL experiences likely or definitely motivate greater community involvement.
- **Addressing Inequalities** A large percentage agrees that CBL contributes to skills needed to tackle social inequalities.
- **Empowering Marginalised Groups** A notable portion believes CBL can empower marginalised groups to a large or very large extent.
- **Funding Barrier** Lack of funding is considered a significant or very significant barrier by a large majority.
- **Importance of Partnerships** There's overwhelming agreement on the crucial role of partnerships.
- **Community Involvement in Design** A very high percentage believes that community members' involvement is very important.
- **Lack of Awareness** Many feel a lack of awareness significantly hinders wider adoption.
- **Personal Participation** In this hypothetical scenario, a larger portion has not personally participated in CBL.
- **Impact of Participation** Among those who participated, a significant portion found it moderately to very impactful on their understanding of social sustainability.

Conclusion:

This research offers an introductory examination of the imperative function of community-based learning in driving social sustainability. Through a definition of key terms, the formulation of a hypothesis and objectives, and a description of an investigation methodology, this research seeks to further inform an understanding of how education may empower societies to build a more equitable and sustainable world. The conclusions of the research proposed in this paper will hold important consequences for educators, policymakers, and community organisations working towards harnessing the transformative potential of community-based learning.

Suggestions/Recommendations:

The study highlights the need to expand access to Community-Based Learning (CBL), as many communities lack such opportunities. Limited awareness further hinders

participation, emphasising the importance of outreach and promotion. Funding is a major barrier, suggesting the need for sustainable financial support through partnerships and community initiatives. Strong collaboration between educational institutions, NGOs, and local stakeholders is essential, alongside active involvement of community members in program design to ensure relevance and ownership.

CBL is seen as highly effective in fostering empathy, social responsibility, and understanding of local issues. To deepen impact, programs should include reflection and community action components. The potential of CBL to empower marginalised groups and develop skills to address social inequalities highlights the need for inclusive, supportive approaches. While participation rates remain low, those involved report significant benefits, reinforcing the value of CBL in promoting social sustainability. Continuous evaluation and recognition of participant efforts can further motivate engagement and inform future development.

Scope for Further Study:

Additional future research can elaborate on the long-term social sustainability impacts of CBL, identify the scalability of effective models, and consider the policy's influence on supporting and fostering community-based learning initiatives internationally.

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BUILDING TRANSFORMATIVE CAPACITY FOR SUSTAINABLE DEVELOPMENT THROUGH EXPERIENTIAL EDUCATION

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Abstract:

The role of education towards sustainable development is important. Traditional education systems are limited to the exchange of knowledge, whereas experiential learning is a process that connects students with real-life problems. This method not only builds transformative capacity, but it also sensitizes individuals to their social and environmental responsibilities. When transformative capacity is developed in students through education, they not only bring change in their personal lives, but they also work for the sustainability of society and the environment.

This paper aims to explore how experiential learning can build transformative capacity to achieve sustainable development goals and how its effective use can ensure long-term sustainability.

The main objective of this study is to understand how experiential education can build transformative capacity in students, enabling them to achieve the goals of sustainable development. This process not only promotes personal development but also instills a sense of responsibility towards society and the environment

As a result of this study, it was observed that experiential education has not only helped in the personal development of students but also inspired them to bring about lasting and positive change in society. This method not only gives students the ability to think but also guides them towards understanding the impact of their actions and improving.

Achieving sustainable development not only requires reforming the educational system but also requires connecting students to real-life problems through education. In experiential education, students get an opportunity to solve problems that are related to their society and environment. Through this, we can bring positive change towards sustainable development.

Experiential learning not only changes ways of thinking, but it also influences behavior, habits, and social attitudes. In this seminar, we will analyze the impact of different types of experiential educational methods such as experimental work, workshops, community projects, etc. This paper will seek to understand how these

methods can be effective for sustainable development, social inclusion, and environmental protection in society.

Keywords: *experiential learning, sustainable development, transformative capacity, community empowerment, ecological sustainability, educational methods, educational policies, long-term change, social inclusion.*

Introduction:

In the 21st century, when the whole world is grappling with complex and interconnected problems such as environmental degradation, social inequality, and economic imbalance. Challenges like climate change, resource scarcity, unemployment, educational inequality, and social intolerance are not only affecting our present but are also creating crises for future generations. The solution to these problems cannot be achieved through technological innovations or policy-making alone, but requires a profound ideological and practical change. This change is possible only when education is not considered merely as a medium of information, but as a tool for building a worldview. This is where the role of experiential education becomes significant. Experiential learning not only imparts knowledge but also inspires the application of that knowledge in life, analysis, and the search for practical solutions. It makes the learner sensitive to society, the environment, and themselves, enabling them to become active participants in building a sustainable and just future. The concept of "Sustainable Development" has become more relevant than ever. Sustainable development is not limited to environmental protection, but it is also synonymous with social justice, economic stability and improvement in the quality of life. Sustainable development is not only linked to environmental or economic perspectives but also to social justice and quality of education. Experiential education, in which learning takes place through real-life experiences, can be a means to bring about the necessary changes in society.

Community Empowerment:

Experiential education encourages participation in rural and urban communities. It motivates people to participate in decision-making processes, raise their voices and actively contribute to local development plans.

Ecological Sustainability:

Experiential approaches to education give students a grounded understanding of environmental issues. Through projects such as gardening, waste management, water conservation, etc., students learn the principles of sustainability in a practical way.

Educational Methods and Policies:

The prevailing educational policies need to be made experience-based, student-centered and problem-solving oriented. Elements such as project-based learning, field trips and community service should be incorporated in the curriculum.

Long-term Change:

Real change towards sustainable development is possible only when teaching is not limited to just imparting information but produces lasting changes in values, attitudes and behavior. Experiential education is capable of producing this long-term effect.

Social Inclusion:

The aim of education should not be limited to only a specific class. Experiential education provides inclusive opportunities for deprived communities, children with special needs, and women, thereby promoting equity and equality in society.

In brief, Experiential education, if implemented correctly, can be helpful in achieving the goals of sustainable development. Through this we can develop a learning system that addresses community participation, environmental awareness and social justice in an integrated manner.

Objective of the research:

The main objective of this research is-

- To analyze how experiential education develops transformative capabilities in students and society that are helpful in the direction of sustainable development.
- To develop education as a transformative tool, not just a process of acquiring knowledge.

In this context, experiential education has emerged as an effective medium that makes the learning process practical, reflective and realistic. The research will also look at how experiential education can be effectively implemented in a developing country like India.

Transformative Capacity Definition:

Transformative capacity can be defined in different ways because of the disciplinary plurality on which it draws (e.g. see Wilson et al. 2013; Wolfram 2016; Newton et al. 2017).

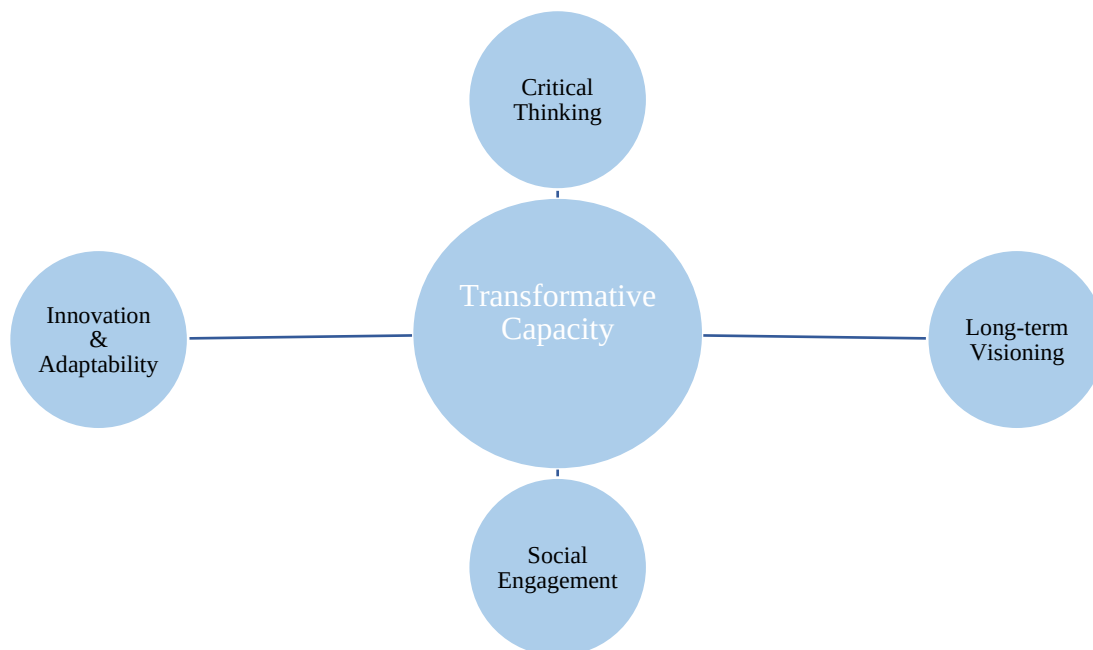
Ziervogel et al. (2016, p. 955), building on the adaptive capacity and organizational development literature, define transformative capacity as “the capacity of individuals and organizations to be able to both transform themselves and their society in a deliberate, conscious way.

This includes the capacity to imagine, enact, and sustain a transformed world and a way of life that is in balance with the carrying capacity of our earth, and where all life flourishes”. Focusing specifically on urban transformative capacity, Wolfram

(2016, p. 126) defines it as “the collective ability of the stakeholders involved in urban development to conceive of, prepare for, initiate and perform path-deviant change towards sustainability within and across multiple complex systems that constitute the cities they relate to”.

Transformative Capacity refers to the qualities and skills that enable an individual, institution, or community not only to deeply identify problems but also to lead them towards creative, sustainable, and long-term solutions. This capacity is not limited to knowledge or information; rather, it empowers changes in perspective, thinking style, and ways of acting.

Some key components of Transformative Capacity include



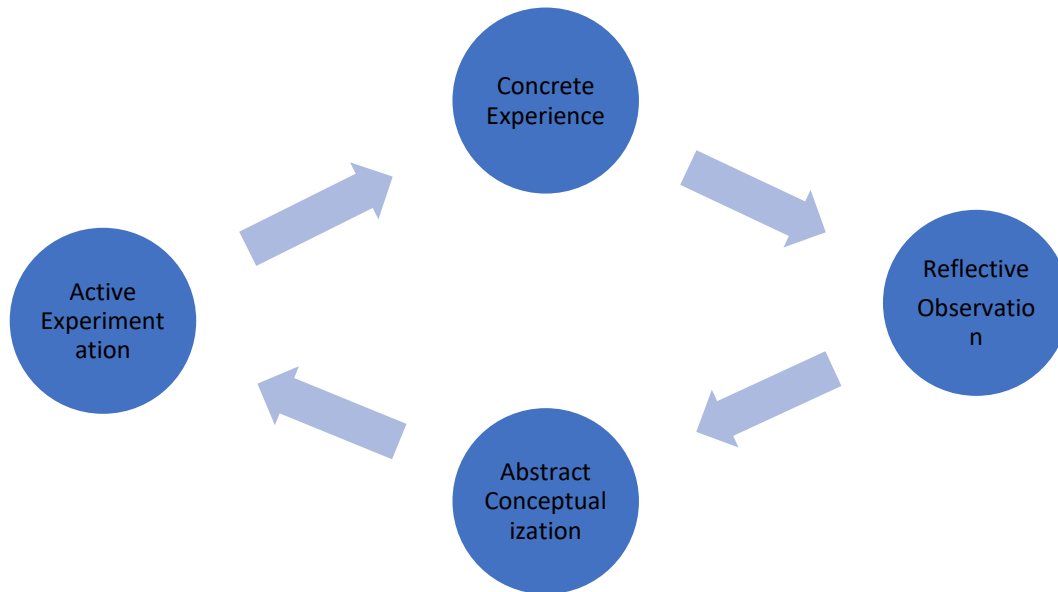
1. **Critical Thinking** Simply accepting the current situation is not enough. Transformative thinking requires individuals to critically examine their biases, assumptions, and socio-cultural structures. This thought process equips individuals to view complex problems from a multi-dimensional perspective.
2. **Long-term Visioning** A key aspect of transformative capacity is that individuals can envision long-term outcomes, rather than just immediate gains. This perspective becomes crucial when planning for sustainable development.
3. **Social Engagement** Change cannot occur through isolated efforts. It requires dialogue, collaboration, and participation with communities, society, and various stakeholders. This social involvement makes individuals responsible for their environment.

4. **Innovation & Adaptability** The final but highly essential aspect of transformative capacity is the ability to adapt oneself to changing circumstances and to find innovative solutions. This trait enables individuals to embrace new ideas, experiment, and learn from failures.

Definition and Principles of Experiential Education:

Experiential education is a pedagogical method in which students learn through direct experiences. It is based on the principle of "Learning by Doing". (Kolb, 1984).

According to David Kolb, experiential learning has four stages:



- Concrete Experience
- Reflective Observation
- Abstract Conceptualization
- Active Experimentation

1. Concrete Experience

In this stage, the student gets direct experience of a real activity or event.

Example Visiting a farm and observing organic farming, working on environmental conservation, doing a field visit on a social problem.

2. Reflective Observation

This stage occurs after the experience, in which the student thinks about what he saw, what he did and how the experience was.

Example: "What did I learn from that experience?", "What did I find different?", "What challenges did I face?"

3. Abstract Conceptualization

Now the student connects his experience and thinking with theories. He reaches general rules or ideas.

Example: “This experience tells me that...” or “This theory helps explain this experience.”

4. Active Experimentation

In the final stage, the student applies his learned knowledge again to a new situation. This new experiment then becomes a new experience and the cycle starts again.

Example: Now the student tries the things learned in a new project.

Key Principles of Experiential Education:

- The learning process is student-centered.
- Knowledge is gained from experience, not just from books.
- Reflection is an important part of learning.
- Learning is a continuous cycle – from experience to thinking, from thinking to experiment.
- The teacher plays the role of a guide, not a controller.
- Learning should be connected to life, real and relevant.

This cycle involves students in a deep learning process and motivates them to apply new concepts in practical contexts.

Sustainable Development: A Holistic Approach

Sustainable development is not limited to economic growth, it also emphasizes social equality, environmental balance and protection of resources for the future. Education has been given a central role in the 17 Sustainable Development Goals (SDGs) set by the United Nations. (UN, 2015).



SDG-4: Quality Education

According to this goal, it is necessary to provide inclusive and equitable quality education to all and promote lifelong learning opportunities for all.

SDG-4 does not only talk about the availability of education, but also gives priority to the quality, equity, access and impact of education. This goal works towards creating a society where every individual has the opportunity to learn, become self-reliant, and contribute to society throughout their lives.

Role of Experiential Education in Sustainable Development:

1. Development of social consciousness and responsibility

When students go to a community and understand the problems there (such as sanitation, water conservation, gender discrimination, etc.), they develop sensitivity and a sense of responsibility towards social problems.

2. Development of problem solving skills

Through experiential activities such as 'project work', 'field work', 'interactive workshops', etc., students identify real problems and find solutions to them.

3. Respect for local knowledge

This method connects students with local traditions, resources and knowledge systems, which leads to the development of sustainable solutions.

4. Environmental awareness

Through activities such as tree plantation, water harvesting, waste management in schools, students develop environmental awareness.

Case Study: Impact of Experiential Education:

Example: 'Eklavya Model School, Jharkhand'

This school has created an innovative curriculum by integrating local tribal communities into education, giving students the opportunity to participate in agriculture, traditional water systems, and craft work. As a result, students have not only become academically competent but have also emerged as leaders in their communities.

Example: 'Workshop with Rag-picker Children – Delhi'

An experiential education program run by an NGO in Delhi involved rag-picker children in a practical way in the process of waste management, sanitation, and recycling. As a result, the children took the initiative to spread awareness in their community.

National Education Policy (NEP) 2020 and Experiential Education

India's National Education Policy (NEP) 2020 marks a historic and revolutionary change in the education sector. This policy prioritizes experiential learning along with promoting knowledge-centric, value-based, and skill-oriented education. The aim of this policy is to lead students not only towards academic success but also to empower them with problem solving, creativity, critical thinking, and life skills.

Experiential education is a teaching method in which students learn 'by doing'. In this, practical experiences such as project work, field work, role-play, innovation labs, arts, sports, and service work are given importance instead of traditional classroom.

Place of experiential education in NEP 2020:

NEP 2020 recommends the implementation of experiential education at every level of education, especially:

Foundational stage

- Play-based learning
- Learning through stories and activities

Secondary and higher secondary levels

- Project-based learning
- Learning based on local contexts
- Interdisciplinary approach

Higher education

- Internships, applied learning, research projects
- Field-based learning
- Experience related to company-industry

Benefits of experiential education:

Active participation- The student does not just absorb information, but becomes a part of the process himself.

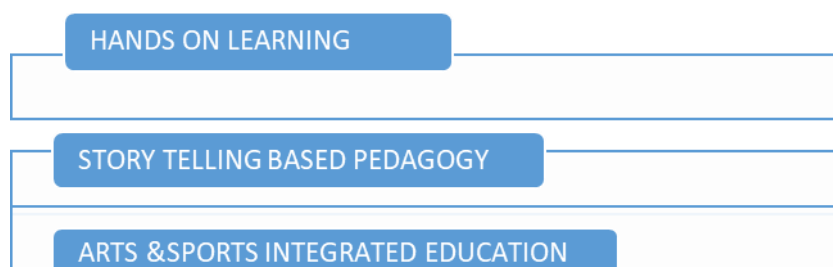
Life skills development- Qualities like leadership, teamwork, problem-solving, communication skills are developed.

Vocational preparation -Students are connected to real-life situations, which prepares them for employment.

Lasting learning Experience-based learning stays in the long-term memory. Creativity and innovation drive the discovery of new ideas and solutions.

Change in the role of teachers

As per NEP 2020, teachers will no longer be mere informers, but will be guides, mentors and motivators. They will have to encourage students to explore, experiment and self-reflect



Experiential education has been given a special place in NEP 2020. According to it: The education system should be made more effective, inclusive, and interesting. Students should be involved in project-based, discovery-based, and play-based learning. The aim of education should be understanding and social utility, not knowledge.

S-Strengths

- Development of practical knowledge:
- Experiential education teaches students the skills to deal with real-life challenges.
- Increase problem solving ability:
- It motivates students to think, understand and find solutions.
- Understanding sustainable lifestyle:
- Effective in teaching the concept of balance of environment, society and economy.
- Increasing interest and participation in learning:
- 'Learning by doing' makes children more active.

W - Weaknesses

- Inadequate training of teachers:
- Many teachers are not able to adopt experiential education methods.
- Lack of resources:
- Rural and government schools lack the necessary equipment and opportunities for experimental learning.
- Traditional assessment method:
- Exam-based assessment system does not accurately measure the impact of experiential education.
- Pressure of time and curriculum:
- Limited time and the burden of completing the curriculum prevent teachers from imparting practical education.

O - Opportunities

- Support of New Education Policy (NEP 2020):
- National policies are in place to promote experiential learning.
- Use of digital technology:
- Making experiential learning accessible through AR/VR, smart classrooms, and online platforms.
- Collaboration with local community and industry:
- Opportunity to develop real solutions by connecting children to local problems.
- Connecting with global Sustainable Development Goals (SDGs):

- Through education, students can be prepared for global citizenship and sustainable thinking.

T - Threats

- Inequity between urban and rural areas:
- Huge difference in quality and resources of education.
- Excessive dependence on technology:
- Digital divide prevents many students from accessing tech-based education.
- Slow pace of innovation:
- Policy changes in government institutions are slow.
- Social and cultural barriers:
- Hesitancy or distrust of new teaching methods in some communities.

Discussion:

At present, when challenges like climate change, social inequality, lack of resources are facing human society, sustainable development has become not just a goal but an imperative. In this context, the role of education becomes extremely important. The traditional education system is mainly based on knowledge transfer, in which students are taught only the textual material, while they are not given a real understanding of social and environmental problems.

Experiential Education works to bridge this gap. It teaches students not only "what to study", but also "how to think", "how to do", and "why to do". David Kolb's Experiential Learning Cycle provides a scientific basis to this process, through which students learn from their experiences, analyze them, connect them with theories and then do new experiments.

During this research, it became clear that when students are directly connected to social and environmental problems, they not only develop the ability to understand the problem, but they also become active towards finding a permanent solution to those problems. Many such examples (such as Eklavya Model School, Jharkhand or workshop with rag picker children in Delhi) prove that through experiential education, children develop a sense of leadership, sensitivity and innovation.

In a country full of diversity like India, where coordination of modern scientific thinking and traditional knowledge system is necessary, experiential education can play the role of an effective bridge.

This study concludes that experiential education is an extremely effective medium to build transformative capacity towards sustainable development. This education system not only develops intellectual development in students, but also inspires them to adopt social responsibility, environmental consciousness and a holistic approach towards life.

Experiential education:

- Connects students with the real problems of society and environment.
- Encourages problem solving and innovation skills.
- Reinforces the values of sustainable lifestyle, social inclusion and environmental protection.
- Make students “responsible change-makers” rather than “educated citizens”.

Although there are many challenges in this direction – such as teacher training, lack of resources, traditional assessment systems, etc. – yet experiential education can be made more comprehensive and effective with the support of the New Education Policy (NEP 2020) and digital technologies.

Ultimately, if we have to realize the Sustainable Development Goals (SDGs), education must be made not just a medium of knowledge, but a tool of transformation. And this is possible only when education is experiential, practical and connected to life.

Conclusion:

Experiential education not only empowers students academically, but also develops social responsibility, environmental consciousness and innovation capacity in them. This education system is extremely effective for achieving the goals of sustainable development. In a diverse country like India, where amalgamation of traditional knowledge and modern science is essential, experiential education can serve as a bridge. This education system not only imparts knowledge to the students but also connects them deeply with their community, society and environment.

This type of education enables students to understand and solve real-life problems, thereby developing a sense of leadership, empathy and responsible citizenship in them. It not only brings about change at the individual level but also inspires long-term and positive change in the society.

This education system can prove to be extremely effective for achieving the Sustainable Development Goals (SDGs). Because it does not focus only on ‘what to study’ but also on ‘how to think’ and ‘how to do’.

In a diverse country like India, where on one hand there is the depth of traditional knowledge and on the other hand the possibilities of modern science, experiential education can act as a bridge. It makes education more relevant, vibrant and result-oriented while striking a balance between tradition and innovation.

Therefore, if we envision a sustainable, inclusive and equitable future, it is essential to make experiential learning an integral part of our education policies, curriculum and teaching approaches.

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TRANSFORMATIONAL LEADERSHIP IN EDUCATION FOR EMPOWERING EDUCATORS AND REFORMING SCHOOLS

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Abstract:

This paper reviews the role of transformational leadership (TL) in shaping educational outcomes at both the teacher and school levels. The paper explores the theoretical foundations of TL, including its four key dimensions and the Transformational Educational Leadership Model (TELM) framework. The review then examines the impact of TL on teacher motivation, performance, efficacy, and commitment, as well as its influence on school culture, character development, inclusion, innovation, and student achievement. Challenges in the implementation of TL, particularly in traditional and resource-limited educational systems, are also highlighted. Drawing on current research, the paper advocates for the integration of transformational leadership into teacher training, professional capacity development programs, and broader educational policy reforms—particularly within the Indian context—to build more inclusive, empowered, and future-ready educational environments.

Keywords: *Transformational Leadership, Teacher Motivation, Teacher Performance, School Culture, Character Development, Inclusive and Innovative Education*

Introduction:

In educational institutions like schools and colleges, transformational leaders - often principals, heads, deans or instructional leaders - play an indispensable role in shaping school culture, motivating teachers and driving innovation. Transformational leaders act not just as managers but as change agents having the capacity to reshape educational institutions into vibrant learning communities. Rooted in the principles of inspiring and empowering followers, transformational leadership emphasizes vision, collaboration, and professional growth. (Leithwood and Jantzi, 1990) (Hallinger, 2003)

Leaders in schools are tasked with great responsibility and their leadership style has an overall impact on teachers, students and the school. Transformational leadership has emerged as a critical paradigm in educational leadership, influencing various dimensions of school effectiveness. (Alzoraiki et al., 2024).

In educational institutions like schools and colleges, transformational leaders - often principals, heads, deans or instructional leaders - play an indispensable role in shaping school culture, motivating teachers and driving innovation. Transformational leaders act not just as managers but as change agents having the capacity to reshape educational institutions into vibrant learning communities. Rooted in the principles of inspiring and empowering followers, transformational leadership emphasizes vision, collaboration, and professional growth. (Leithwood and Jantzi, 1990) (Hallinger, 2003)

Leaders in schools are tasked with great responsibility and their leadership style has an overall impact on teachers, students and the school. Transformational leadership has emerged as a critical paradigm in educational leadership, influencing various dimensions of school effectiveness. (Alzoraiki et al., 2024).

The term transformational leadership was first coined by James V. Downton, who conducted research on charismatic leaders in his work '*Rebel Leadership*' in 1973. In the late 1970s, American political scientist James MacGregor Burns further developed the theory of transformational leadership. (Teza, 2025) Through the lens of political leaders, Burns explored the ideas of those who led positive social change. The authentic transformational leader is not seeking to exploit others, but transcend their own personal interests for the sake of larger goals and the greater good of others. *"Transformational leaders are visionaries who engage with followers' higher-level needs and inspire them to deliver extraordinary outcomes for their organizations."* (Eaton et al., 2024)

Transformational leadership is generally accepted to be a "shared or distributed leadership". (Hallinger, 2003) The ability to drive constructive social change is one of the main characteristics of transformational leaders. With a clear vision, they can motivate their team, igniting change and fostering an atmosphere of excellence.

Research Rationale:

Within the educational context, the adoption of transformational leadership practices has been linked to improved school culture, enhanced teacher motivation, organizational commitment, and improved student outcomes, positioning it as a key driver of positive change in schools. (Ahmad & Rochima, 2021) (Alzoraiki et al., 2024) Therefore, this review aims to synthesize current research on transformational leadership in educational contexts and provide a broader perspective to policymakers, scholars, educators, educational leaders and academics. It explores the theoretical underpinnings, practical applications, strengths and limitations, and future research directions of TL in schools and other educational institutions.

Literature Review:

Transformational Leadership (TL) TL Dimensions

Bernard M. Bass (1985) highlighted four key components of TL. (Alainati et al., 2023) Idealized influence: Leaders are charismatic role models who are respected, admired and trusted and have the ability to inspire their followers. Principals & Department heads evoke admiration embodying ethical behaviour. Contemporary educational research underscores that principals and department heads who act with integrity and ethical leadership positively influence school climate and teacher commitment (Alainati et al., 2023; Cherian, 2024).

Inspirational Motivation:

The leader has the ability to articulate a compelling vision that inspires the follower's fidelity and dedication to the cause. Educational leaders establish a shared vision for academic excellence and community engagement. Modern educational leaders establish shared visions for academic excellence, equity, and community building to motivate both staff and students (Sumampong & Arnado, 2024; Alzoraiki et al., 2024).

Intellectual stimulation: The leader's ability to encourage followers to challenge assumptions and think critically and creatively is understood as intellectual stimulation. Leaders encourage creativity and problem-solving. In schools, supporting teachers try new instructional strategies and engage in professional inquiry. Recent literature highlights the importance of this dimension for fostering a culture of creativity and adaptability in schools, especially in diverse and technology-driven environments (Deng et al., 2022; Lambrecht et al., 2020).

Individual consideration: Leaders must be skilled in appealing to the individuality of their followers. This includes recognizing and giving Attention to individual needs, providing mentorship and supporting growth. Educational leaders bear the responsibility of recognizing teachers' unique talents and providing personalized support. Latest studies show that personalized support and recognition significantly enhance teacher self-efficacy, job satisfaction, and innovation (Sumampong & Arnado, 2024; Francisco, 2019).

Global Trends in Leadership Styles and the Emergence of TL:

The impact of different educational leadership styles has been extensively researched since the late 1980s. Global trends from the late 1980s to early 2010s show that key leadership models such as instructional, transactional, and transformational leadership have gained prominence over time, with transformational leadership becoming increasingly influential in the last decade (Gumus et al., 2018; Leithwood & Poplin, 1992; Cherian, 2024).

Leadership Style	Key Characteristics	Limitations in Education
Transactional	Emphasizes conformity, performance, and rewards.	Might not encourage sustained creativity or teacher independence.
Instructional	Emphasizes content/curriculum and the quality of instruction.	Less emphasis is placed on relationships and more on academic results.
Transformational	Strengthens intrinsic motivation, builds vision, and trust.	Necessitates emotional intelligence and can be demanding to sustain

The emergence of transformational leadership in international educational research marks a significant departure from conventional leadership paradigms in favor of collectivist and decentralized ones that emphasize motivating and enabling stakeholders to promote student achievement and school reform. TL stands out because of its emphasis on empowerment, emotional intelligence, and capacity building—qualities that align closely with the goals of modern education systems (Gumus et al., 2018; Leithwood & Poplin, 1992; Cherian, 2024; Alainati et al., 2023).

TL In Education:

Hallinger (2003) in his paper, *Leading Educational Change: reflections on the practice of instructional and transformational leadership* writes about the conceptualization of transformational leadership and instructional leadership models. He explores how the “definitions of the two models are also evolving in response to the changing needs of schools in the context of global educational reforms.”

“Transformational leadership focuses on developing the organization’s capacity to innovate.”

Unlike instructional leadership, which focuses on direct management of curriculum and instruction, transformational leadership builds organizational capacity for innovation and change, empowering teachers to set goals and develop new practices (Hallinger, 2003; Alzoraiki et al., 2024; Cherian, 2024).

Transformative Educational Leadership Model (TELM) Framework:

The TELM framework by Sumampong and Arnado (2024) unites key transformative leadership dimensions to enhance teacher motivation and educational effectiveness. Its four core dimensions are:

Visionary Leadership: Leaders articulate a clear, future-focused vision, anticipating trends and creating strategies to address challenges. This inspires teachers, providing direction and increasing commitment and passion.

Collaborative Culture:

TELM promotes teamwork, respect, and open communication among staff and stakeholders. By fostering safe collaborative spaces, it builds trust and community responsibility, encourages information sharing, and ensures teachers' contributions are valued.

Empowering Practices:

Leaders grant teachers autonomy, resources, and opportunities to innovate and participate in decision-making and school initiatives. This boosts teacher confidence, professional growth, and investment in the school's mission, positively impacting teaching quality and student outcomes. *Continuous Professional Growth:*

TELM emphasizes ongoing professional development, encouraging leaders to provide learning opportunities that help teachers refine skills, adopt new pedagogies, and adapt to evolving educational needs. This sustains motivation and innovation.

Dynamic and Inspirational Management:

Leaders are flexible, responsive, and passionate, adapting to changing needs and motivating through dedication. This approach fosters a positive school climate, supports resilience, and drives transformational change.

Together, these dimensions create a holistic framework that addresses both structural and emotional leadership needs, supporting sustainable positive change in schools.

Impact of TL on teacher performance, motivation and commitment:

Impact of TL on teacher performance and teacher efficacy:

"Transformational leaders inspire and empower educators toward excellence. Sumampong & Arnado, 2024)

Leadership styles can significantly impact teacher performance. Especially in the 4.0 Education Era, an age characterized by the heavy integration of ICT and AI in education, TL strategies can actually improve teacher performance. For example, Saputra (2022) examines the relation of TL and teacher performance in schools, through the following points:

- i) Principals foster self-confidence, motivation and high expectations to achieve a vision of the future together
- ii) Principals set an example in school attendance
- iii) Principals become inspiration for school members in improving competence, self-development and performance
- iv) Principals become leaders who provide knowledge and ways of thinking in finding information technology-based learning development strategies.

Many studies show that TL helps to inspire educators, driving them towards excellence. By instilling self confidence and providing suitable rewards, the teacher's self efficacy can be improved. (Francisco, 2019) (Sumampong, 2024)

The switch from traditional leadership approaches to transformative ones can help resolve the ineffectiveness of educational leaders. The principal can employ strategic measures like giving subordinates the opportunity to be equal change-makers. (Effendi & Sahertian, 2022) (Saputra, 2022)

Impact of TL on teacher motivation and commitment:

TL exerts a profound influence on teacher motivation and commitment in educational settings. By fostering a collaborative environment and supporting ongoing professional development, school leaders who practice TL help fulfill teachers' psychological needs for recognition, purpose, and growth. This fulfillment is essential for boosting teachers' intrinsic motivation and emotional well-being, which in turn enhances their instructional practices and overall engagement within the school community.

Effective TL behaviors such as idealized influence (leading by example and earning respect), individualized consideration (attending to each teacher's unique needs), and inspirational motivation (articulating a compelling vision) not only strengthen teachers' affective commitment, their emotional attachment and identification with the school, but also predict higher levels of motivation and engagement. When school leaders communicate goals clearly and create a shared sense of purpose, teachers feel valued and empowered, leading to greater willingness to participate, increased job involvement, and alignment between their self-image and professional roles. (Lee & Kuo, 2019),(Sumampong and Arnado, 2024),(Veeriah et al., 2017) .

Furthermore, TL contributes to enhanced teaching effectiveness by promoting integrity and professionalism. Leaders who embody TL qualities inspire educators to adopt higher standards, thereby improving both individual performance and overall educational outcomes. Ultimately, principals' TL is a significant predictor of teachers' organizational commitment, underscoring

the critical role of leadership in cultivating motivated, committed, and high-performing educators. (Ahmad & Rochimah, 2021)(Coskun et al., 2023)

Role of TL in school: TL significantly shapes school culture, particularly by promoting collaboration and professional growth. A positive school culture, led by visionary principals, enhances organizational commitment and reduces teacher burnout. This culture fosters innovation, emotional resilience, and organizational learning, contributing to improved student outcomes and a more effective school system. (Veeriah et al., 2017)

"Principal's transformational leadership is the key to prompt school development."(Yang,2014)

Schools need transformational leaders to solve problems. The principals' leadership skills play an effective role in school development. These skills are displayed in the following aspects - forming ideas, power sharing, experiencing success, building a shared vision, setting clear goals and gaining credence. (Yang,2014)

Role of TL in changing organizational culture:

Transformational leaders are instrumental in creating as 'a paradigm shift' from Type A to Tyze Z cultures in educational organizations. This means transitioning from a top-down power structure approach to an approach that pushes for participative decision making. TL helps in creating and maintaining this collaborative and professional school culture. (Leithwood & Jantzi, 1990a, 1992b)

Role of TL in Inclusive Education:

TL fosters trust, shared vision, and empowerment, essential for inclusive education. (Lambrecht et al., 2022)

Transformational leadership plays a crucial role in fostering inclusive education by creating collaborative environments that support effective implementation of Individualized Education Programs (IEPs). Research from Lambrecht et al. (2022) shows that transformational leadership indirectly enhances IEP quality by establishing structures for collaboration among teachers and specialists. This leadership style emphasizes trust-building, shared vision, and empowerment, which are essential for addressing the diverse needs of students in inclusive settings.

While instructional leadership directly impacts IEP implementation, transformational leadership's effect is mediated through fostering a collaborative school culture. This underscores the importance of transformational leadership in creating inclusive school climates where IEPs are viewed not just as administrative tasks, but as tools for promoting equity and meeting diverse learner needs.

Role of TL in character development:

Principals who adopt TL strategies are effective in optimizing character education programs. Their leadership fosters a supportive environment for moral development, helping shape students' moral values. (Effendi & Sahaertian, 2022)

Reinforcing character education, guided by transformational leaders, addresses ethical conflicts and moral decadence among students.

Schools use strategies to optimize character education programs, which aim to shape students' moral values and reduce moral distortions. The implementation of these programs, led by transformational principals, helps in character formation as a preemptive measure against moral deviations.

TL creates an ethical environment within the school, encouraging students to adhere to societal norms and values.

Effendi & Sahaertian(2022) summarize the major transformational leadership roles of principals in the reinforcement of character education.

1. The Principal uses their expertise to create a positive and motivating school climate, which helps students overcome current and future challenges.
2. The Principal should be a planner, coordinator, supervisor, official, legal expert, gatekeeper, and empowering individual.
3. The Principal plays the role of a change agent;It requires guts on the part of the principal to deconstruct the obstruction to change.

Obstacles or Challenges in developing transformational leadership

Certain potential challenges or obstacles arise that hinder effective TL and the full strength of this leadership style. Systemic factors or a lack of tailored approaches, may prevent more personalized and effective leadership strategies. Coskun et al. (2023)

Yang (2014) highlights key challenges as follows.

- **Lack of Training and Development:** Principals may not receive adequate training in transformational leadership practices. Many leadership programs focus on management rather than transformational skills.
- **Resistance to Change:** Implementing transformational leadership often requires significant changes in school culture and practices, which can be met with resistance from teachers and staff.
- **Bureaucratic Constraints:** School systems with rigid hierarchies and bureaucratic processes can stifle principals' ability to be innovative and empowering.
- **Time Constraints:** Principals are often overburdened with administrative tasks, leaving them little time to focus on developing and implementing transformational leadership strategies.
- **Lack of Support:** Principals may lack support from district leadership or other stakeholders, making it difficult to enact transformational change.
- **Difficulty in Changing Mindsets:** Some principals may have difficulty shifting from traditional, top-down management styles to more collaborative and empowering approaches.
- **Evaluation Systems:** If principals are evaluated primarily on short-term metrics (e.g., test scores), they may be less inclined to invest in long-term transformational leadership initiatives.

- **Inadequate Resources:** Insufficient funding or resources can hinder principals' ability to provide the necessary support and development opportunities for teachers.
- **Principal Turnover:** High turnover rates among principals can disrupt long-term initiatives and make it difficult to establish a consistent transformational leadership approach.

Conclusion and Implications:

The present review highlights transformational leadership as a pivotal model in educational settings, demonstrating its capacity to inspire change, enhance teacher motivation and commitment, and positively influence student outcomes. (Ahmad & Rochimah, 2021; Alzoraiki et al., 2024; Cherian, 2024; Sumampong & Arnado, 2024). The significance of visionary leadership, collaborative culture, and empowering practices is emphasized as foundational for fostering effective educational environments. (Leithwood & Jantzi, 1990; Alainati et al., 2023; Yang, 2014). Principals who embody transformational leadership qualities play a crucial role in elevating teacher performance, cultivating supportive school cultures, and advancing institutional development through strategies that prioritize professional growth and shared vision. (Alzoraiki et al., 2024; Coskun et al., 2023; Effendi & Sahertian, 2022).

Despite these benefits, challenges such as insufficient leadership training, resistance to change, and bureaucratic constraints remain persistent (Gumus et al., 2018; Hallinger, 2003; Bass, 1998).

Overcoming these barriers is essential for principals to successfully build trust, articulate a collective vision, and empower teachers. By acting as change agents and promoting collaboration, principals can optimize character education and better prepare students to meet future societal challenges (Effendi & Sahertian, 2022).

This review further emphasizes the necessity for ongoing professional capacity building among school leaders (Kanesan et al., 2018; Saputra, 2022). Principals are encouraged to develop and refine transformational leadership skills that are responsive to the evolving needs of both teachers and school communities. Individualized support within transformational leadership is recognized as a robust predictor of teacher motivation and innovation (Cherian, 2024; Sumampong & Arnado, 2024). As such, principals should be challenged to foster school innovations and engage in relevant leadership training to enhance teachers' self-efficacy (Francisco, 2019; Veeriah et al., 2017).

In summary, the adoption of transformational leadership holds significant promise for improving educational outcomes and fostering a motivated, innovative teaching workforce (Leithwood & Jantzi, 2000; Alzoraiki et al., 2024; Coşkun et al., 2023). Future research should continue to clarify the distinct contributions of transformational leadership relative to other models and explore its effectiveness across diverse educational contexts using mixed-methods approaches.

Ultimately, transformational leadership emerges as a critical strategy for principals seeking to navigate the complexities of contemporary education and drive meaningful, sustainable reform.

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**A SURVEY ON SELF-EFFICACY AND SELF-REGULATION IN SCIENCE AMONG
UPPER PRIMARY STUDENTS OF SSC AND ICSE SCHOOLS
IN SOUTH MUMBAI**

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Abstract:

The present study is a comparative, descriptive and detailed research aimed at exploring the dimensions of adaptive learning engagement and provides pedagogical solutions to address this issue among students from Grades VI to VIII. The study highlights the growing significance of adaptive learning systems in contemporary education, particularly within science pedagogy, to cater to the diverse needs, learning styles, and academic motivations of students in keeping with the current changes evident in the upcoming generations. A total sample of 300 students was drawn using random sampling from two educational boards—SSC and ICSE—across three standards, equally divided among male and female participants. The data was collected using the validated Students' Adaptive Learning Engagement in Science (SALES) questionnaire, which measures two key constructs: self-efficacy, and self-regulation. The study utilized independent t-tests to assess gender based differences and board-wise variations across each dimension. Results indicated no significant gender differences in most variables across both boards, except in some cases at Grade VIII level in SSC schools, where female students outperformed male students in self-efficacy, and self-regulation. The study concludes that adaptive learning strategies can potentially enhance science education by identifying and addressing individual learning needs, thereby improving motivation, performance, and long-term retention. The research also underscores the need for further exploration into integrating adaptive learning into curriculum planning, teacher training, and policy-making to optimize learning outcomes in diverse educational settings.

Keywords: *Adaptive learning, learning styles, academic motivation, science education.*

Introduction:

Adaptive learning theory follows a teaching approach that tailors the educational experience to the individual learning style of each student. By leveraging data to create a customised program, it considers various abilities and needs, rather than adhering to a predetermined path. This results in a personalized, data-driven learning experience (Sezgin & Yüzer, 2022). Over the last decade, increasing students' participation in science, technology, engineering, and mathematics (STEM) has increasingly become the focus of educational reforms (Education Council, 2015). Adaptive learning engagement is a crucial aspect of fostering students' interest and understanding in science education. Adaptive Learning student learning framework, developed by Singh and Alshammari (2021), which establishes three postulates:

1. Digital technology creates a smart learning environment, enabling efficient, effective, and comfortable personalized learning.
2. Digital technology can provide personalized and flexible learning to improve student performance.
3. The environment greatly influences educational institutions and complements the relationship technology-enabled between personalized digital and adaptive learning and student performance.

Aim:

A Survey on Self-Efficacy and Self Regulation in Science among Upper Primary Students of SSC and ICSE Schools in South Mumbai.

Objectives:

1. To compare self-efficacy across genders and boards.
2. To compare self-regulation capabilities between male and female students of both boards.

Review of Related Literature:

The study presents a comprehensive review of both Indian and global literature related to adaptive learning in science education. Indian studies highlight the benefits of Adaptive Learning Systems (ALS), emphasizing real-time feedback, data driven insights, and their positive impact on student performance, motivation, and engagement. Researchers like Jose et al. (2024) and Aggarwal (2023) underscore how AI and technological integration enhance personalization and streamline content delivery. Gumbheer et al. (2022) explore mobile-based adaptive learning, which promotes social interactivity and contextual learning. Globally, studies by Mohamad et al. (2019) and Vincent-Ruz & Boase (2022) show that adaptive learning, often supplemented by gamification, improves engagement and accessibility, especially in subjects like chemistry. Emotional factors, such as anxiety, are also noted to influence adaptive learning effectiveness. Furthermore, adaptive e learning is

recognized for its capacity to personalize content based on individual learning styles, leading to improved outcomes.

Null Hypotheses:

- (H0) 1a** There is no significant difference between the self efficacy of male and female students of standard 6 SSC.
- (H0) 1b** There is no significant difference between the self efficacy of male and female students of standard 6 ICSE.
- (H0) 1c** There is no significant difference between the self efficacy of male and female students of standard 7 SSC.
- (H0) 1d** There is no significant difference between the self efficacy of male and female students of standard 7 ICSE.
- (H0) 1e** There is no significant difference between the self efficacy of male and female students of standard 8 SSC.
- (H0) 1f** There is no significant difference between the self efficacy of male and female students of standard 8 ICSE.
- (H0) 2a** There is no significant difference between the self regulation of male and female students of standard 6 SSC.
- (H0) 2b** There is no significant difference between the self regulation of male and female students of standard 6 ICSE.
- (H0) 2c** There is no significant difference between the self regulation of male and female students of standard 7 SSC.
- (H0) 2d** There is no significant difference between the self regulation of male and female students of standard 7 ICSE.
- (H0) 2e** There is no significant difference between the self regulation of male and female students of standard 8 SSC.
- (H0) 2f** There is no significant difference between the self regulation of male and female students of standard 8 ICSE.

Tools for data collection:

The tool chosen was students' adaptive learning engagement in science (SALES) questionnaire. The questionnaire was to measures students' motivation and self regulation in science learning. This tool will give teachers a quick, valid, and trustworthy way to collect data from scientific students about their motivation and self-control. This data may then be used to help classroom teachers focus and direct their teaching techniques. Additionally, it could be utilized as a tool for evaluating how well teaching strategies and resources intended to raise the interest, competency, and confidence of the pupils in science as they go through the school system. The reliability and validity of the new students' adaptive learning

engagement in science (SALES) questionnaire were thoroughly assessed through a multi-stage validation process.

Reliability:

Internal Consistency: The Cronbach alpha coefficient was calculated for each factor (learning goal orientation, task value, self efficacy, and self-regulation), and all factors had a Cronbach alpha above 0.90, indicating high internal consistency and thus excellent reliability.

Validity:

Concurrent Validity ANOVA was used to test whether the scales could differentiate between students from different classes. The results were significant ($p < 0.001$), indicating that the scales could effectively distinguish between different groups, thus supporting concurrent validity.

Predictive Validity The scales of the SALES questionnaire showed statistically significant correlations with students' science achievement, supporting the predictive validity of the questionnaire.

Analysis & Interpretation of Data:

Interpretation and Conclusion of Hypotheses H0 1a to 1f – Self-Efficacy

With respect to hypotheses H0 3a to H0 3f, which tested the difference in self-efficacy between male and female students across both educational boards, the analysis revealed that there was no significant difference in five out of six comparisons. These included Std 6 SSC, Std 6 ICSE, Std 7 SSC, Std 7 ICSE, and Std 8 ICSE. The t test results did not exceed the critical value at the 0.05 level of significance, and hence the null hypotheses were retained for these groups. However, in the case of Std 8 SSC, a statistically significant difference was observed, with female students scoring higher in self-efficacy than male students. This suggests that female students of Std 8 SSC exhibit greater confidence in their ability to perform academic tasks in science.

Table	H0	Groups Compared	Mean (Group 1 / 2)	t Stat	t Critical	p-value	Sig.	Conclusion
4.13	H0 1a	Std 6 SSC - M vs F	30.93 / 33.53	-1.27	2.02	0.21	Sig.	No significant difference
4.14	H0 1b	Std 6 ICSE - M vs F	31.84 / 31.00	0.58	2.08	0.57	Sig.	No significant difference
4.15	H0 1c	Std 7 SSC - M vs F	33.72 / 33.53	0.12	2.05	0.91	Sig.	No significant difference
4.16	H0 1d	Std 7 ICSE - M vs F	30.82 / 30.05	0.56	2.02	0.58	Sig.	No significant difference
4.17	H0 1e	Std 8 SSC - M vs F	30.23 / 32.20	-2.06	2.01	0.05	Sig.	Female students scored higher
4.18	H0 1f	Std 8 ICSE - M vs F	32.21 / 28.50	1.76	2.09	0.09	Sig.	No significant difference

Interpretation and Conclusion of Hypotheses H0 2a to 2f – Self-Regulation:

The t-test analysis for hypotheses H0 4a to H0 4f, which evaluated the self-regulation scores of male and female students, indicated that there was no significant difference in five of the six comparisons. These included Std 6 SSC, Std 6 ICSE, Std 7 SSC, Std 7 ICSE, and Std 8 ICSE, where the observed t-values were less than the critical t-values at the 0.05 level of significance, leading to the retention of the null hypotheses. However, a significant difference was found in the case of Std 8 SSC, where the mean score for female students was higher than that of male students, indicating stronger self-regulation skills among female students of this group.

Table	H0	Groups Compared	Mean (Group 1 / 2)	t Stat	t Critical	p-value	Sig.	Conclusion
4.19	H0 2a	Std 6 SSC - M vs F	29.42 / 33.26	-2	2.03	0.05	Sig.	No significant difference
4.20	H0 2b	Std 6 ICSE - M vs F	31.42 / 30.58	0.36	2.12	0.73	Sig.	No significant difference
4.21	H0 2c	Std 7 SSC - M vs F	32.38 / 33.39	-0.72	2.03	0.48	Sig.	No significant difference
4.22	H0 2d	Std 7 ICSE - M vs F	29.00 / 28.90	0.06	2.01	0.95	Sig.	No significant difference
4.23	H0 2e	Std 8 SSC - M vs F	29.90 / 33.55	-3.7	2.01	0	Sig.	Female students scored higher
4.24	H0 2f	Std 8 ICSE - M vs F	27.62 / 28.19	-0.2	2.04	0.84	Sig.	No significant difference

Discussion:

The findings indicate that for most subgroups, there is no statistically significant difference in self-efficacy, or self regulation between male and female students within the same board and grade. The results highlight that self regulation scores varied more noticeably. For example, SSC Grade 8 girls scored significantly higher in self-regulation than boys, indicating potential gender-based differences in managing learning in upper primary levels.

Conclusion:

→ **Self-Efficacy:** Male and female students show similar levels across all grades and boards.

→ **Self-Regulation:** No significant difference across grades and boards, except SSC Grade 8 where females scored higher. Overall, while male and female students show similar results in most areas, some differences appear in higher grades, especially SSC Std. 8. This may be due to teaching methods or students' attention span and readiness to learn.

Future Prospects:

Further research can be conducted to find out the reasons as to why female students have higher levels of learning goal orientation, task value, self efficacy and self regulation compared to the male students of grade 7 and grade 8. Research can also be conducted on higher secondary students about the adaptive learning engagement of college students in science. The same research can be extended to a wider domain of educational boards and include CBSE, IGCSE, and IB boards in the study.

Implementing Adaptive Learning approaches:

Teacher roles and training in adaptive education

→ Identifying students' unique needs

Teachers analyze the information gathered by adaptive learning technology in order to determine what each student needs to meet their learning objectives.

→ Providing instructions and additional support

Teachers give instructions and extra support to pupils who require it after determining each student's unique needs. These instructions and additional services must be tailored to each student's specific needs in accordance with the principles of adaptive learning. In order to promote cooperation, communication, and team building in the classroom, this additional support may take the form of peer tutoring, team teaching, teaching assistants, and interpreters.

→ Integrating adaptive learning into curriculum design

Teachers need to incorporate these components into the curriculum after determining the needs of each student and designing customized exercises for them. This could entail developing a customized curriculum for a set of students with similar requirements and/or learning preferences, or it might include creating a new curriculum for each student.

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DATA DRIVEN INSTRUCTION IN SCHOOLS : A THEORETICAL REVIEW

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Abstract:

This theoretical review explores the core principles and implementation of Data-Driven Instruction (DDI) in educational environments, emphasizing its potential benefits and the complexities it presents. Drawing on international literature, the paper discusses how instructional practices can be informed by student data, the significance of teacher collaboration, and the importance of ethical considerations in data usage. It acknowledges the positive impact DDI can have on enhancing teaching effectiveness and student learning, while also addressing persistent challenges like insufficient data literacy among educators, data privacy concerns, and a heavy dependence on standardized assessments. The review advocates for a learner-centric and contextually grounded approach to DDI, underlining the need for ongoing teacher training, institutional backing, and reflective practice. Furthermore, it identifies a notable gap in existing research regarding the Indian educational landscape and suggests future inquiries to develop models tailored to India's specific educational context.

Keywords: *Data-Driven Instruction, Education, Student Outcomes, Teacher Training, Data Literacy*

Introduction:

In recent years, the integration of technology into education has accelerated data-driven practices aimed at improving student learning outcomes. One such approach is Data-Driven Instruction (DDI), which uses student data to inform instructional planning, identify learning gaps, and drive systemic accountability.

DDI encompasses the collection, analysis, and application of various forms of data - ranging from standardized test scores to formative assessments, behavioral indicators, and even student work samples to improve teaching and learning. This spectrum of data can be used to guide decision-making at the classroom, school and even policy levels. The approach is intended not only to support instructional

planning, but also to foster a culture of reflection and continuous improvement among educators (Mandinach & Gummer, 2016).

The literature on DDI spans a wide array of perspectives, including base studies of teacher practices, examinations of school-wide implementation strategies, theoretical models, critiques of data misuse, and calls for more holistic approaches, while being sensitive to context. This review synthesizes findings from over twenty key academic sources, offering a comprehensive view of how DDI is understood, implemented, and evolving in both theory and practice.

By analyzing the conceptual foundations, benefits, challenges, and future directions of DDI, this review aims to provide educators, researchers, and policymakers with a nuanced understanding of what effective data use comprises. It also highlights the conditions under which DDI can meaningfully enhance teaching and learning, as well as the limitations that must be addressed to ensure effective practices.

Need for the Study of Data-Driven Instruction in Schools:

The Indian education system features vast diversity and scale and faces ongoing challenges in ensuring quality of learning outcomes. Traditional instructional practices often lack personalized feedback and responsiveness that students need. In this context, Data-Driven Instruction (DDI) is a possible approach to enhance teaching effectiveness and student achievement by leveraging student data to inform instructional decisions.

Despite its proven success in various global education systems, DDI is still in its early stages of adoption in India. There is a pressing need to explore its potential in the Indian context, particularly given:

- Struggles with Low Learning Outcomes faced by India, as reflected in national surveys like NAS and ASER
- Geographic, cultural, and socioeconomic disparities contribute to inequities in access and quality of education.
- The National Education Policy (NEP) 2020 emphasizes integrating technology and data to improve learning, making DDI a timely area of focus.
- Teacher professional development in India lacks sustained training in data literacy.
- India's growing EdTech sector presents an opportunity to scale DDI practices across diverse contexts.

A systematic study of DDI can aid in informing policy, practice, and teacher training while paving the way for a more adaptive, equitable, and outcome-oriented education system.

Aim:

The aim of this review study is to examine the theoretical foundations, implementation practices, and professional development dimensions of data-driven instruction (DDI) in education, with an understanding of how conceptual frameworks guide effective data use by educators to aid in creation of relevant models in Indian context.

Objectives:

- To explore literature on DDI frameworks implemented globally and their impact on student outcomes.
- To highlight the experiences of teachers who implement DDI in practice, and institutional support that facilitates or hinders data-informed decision-making in classrooms.
- To evaluate the role of professional development and teacher preparation programs in fostering educators' capacity for effective data use, including the impact of collaborative learning and embedded support structures.
- To assess the documented benefits of DDI
- To analyze challenges, critiques, and ethical considerations associated with DDI
- To understand emerging trends and future directions in DDI.

Literature Review:

• **Theoretical Foundations and Conceptual Models**

A thorough understanding of DDI requires examining the theoretical and conceptual principles that inform it. DDI is not simply a technique but a broader educational model aimed at promoting evidence-based, reflective, and adaptive teaching practices. It is grounded in the convergence of two key domains: organizational theory and the learning sciences. These frameworks help explain how educators interpret student data and incorporate it into instructional planning and pedagogical change.

Organizational theory offers insights into how educational institutions can structure processes that promote data use, such as establishing routines for data analysis and fostering collaborative decision-making environments. Meanwhile, the learning sciences focus on how individuals acquire knowledge, highlighting the importance of cognitive development, feedback, and formative assessment—principles that are central to effective data use in the classroom.

Mandinach and Gummer (2016) argue that teachers must develop "data literacy"—a comprehensive skill set that goes beyond basic data handling. According to their framework, data literacy entails the ability to select meaningful data sources, examine patterns in student performance, and link those insights to instructional

strategies that address diverse learning needs. This process is deeply cognitive and reflective, requiring teachers to engage critically with both the data and their own teaching methods.

Jiang, Huang, and Li (2024) propose a model that presents DDI as an integrated and recurring process. Their framework outlines how educators engage in a structured cycle that includes planning, data collection, analysis, interpretation, and the adaptation of instruction. Key to their model is the recognition of context—effective data use depends on local conditions, including teacher autonomy, resource availability, and student diversity. Their emphasis on feedback loops underscores the need for data-informed teaching to be responsive and evolving. In a similar vein, Mandinach (2012) introduces the idea of a “data-use continuum,” which represents different stages of teacher engagement with data. At one end, teachers may use data in limited or superficial ways, such as reviewing test scores. As they develop greater expertise, they progress toward using data to deeply inform instructional planning and individualize support for students. This continuum underscores the importance of sustained professional development, leadership support, and access to appropriate tools and training.

Drawing from these perspectives, several common themes emerge:

DDI should be seen as a recursive, ongoing process rather than a one-off initiative. Competent data use requires not only technical skills but also a strong foundation in pedagogy and reflective teaching.

The effectiveness of DDI depends on how well it aligns with the specific educational context, including institutional culture, infrastructure, and policy support.

These theoretical foundations are critical for shaping future research, informing educational policy, and designing teacher training programs that aim to embed data use as an essential part of everyday teaching practice.

- **Implementation in Practice: Teacher Use of Data**

Teachers are at the forefront of DDI, yet their ability to engage with data effectively is shaped by a range of practical, cognitive, and systemic factors. Research reveals that while most educators recognize the value of using data to inform instruction, the process is often hindered by a lack of time, training, or access to relevant tools (Schoepp, n.d.; Winesburgh, 2023).

Studies such as those by Wayman (2005) and Schifter (2014) highlight the critical role of data systems and platforms in making student data accessible and interpretable for educators. These tools can facilitate targeted instruction, help identify struggling students, and support differentiated learning. However, without

proper support and training, these systems risk becoming overwhelming or underutilized.

Pella (2012) challenges the narrow conception of “data” as test scores, arguing that teachers should also incorporate qualitative and contextual data such as classroom observations, student writing, and social-emotional indicators. This broader view aligns with teacher-reported practices, as documented by Dunn (2013), who found that educators’ data efficacy and anxiety levels significantly influenced their willingness to use data meaningfully.

Furthermore, the degree to which teachers engage in DDI depends on school culture. Collaborative environments that encourage discussion and reflection on data tend to support deeper and more sustained implementation (Shaw, 2017; Winesburgh, 2023).

- **Professional Development and Teacher Capacity Building in Data Literacy**

Professional development is a recurring theme in the literature on DDI. Studies consistently show that teacher training and support are essential for building data literacy and ensuring effective data use. Mandinach and Honey (2008) emphasize that isolated workshops are insufficient; rather, capacity must be developed through ongoing coaching, collaborative inquiry, and embedded learning.

Schramm-Possinger and Harris (2021) focus on pre-service teacher education, revealing that future educators often enter the profession with limited data skills and minimal exposure to analytical thinking in their coursework. This brings forth the need to include data literacy early in teacher preparation programs.

In professional settings, effective data driven decision making hinges on opportunities for collaborative interpretation of data. Shaw (2017) and Gangadharan (2014) found that when teachers work in teams to analyze data and adjust instruction, both teacher satisfaction and instructional effectiveness increase. Winesburgh (2023) also notes that collaboration reduces anxiety and promotes shared responsibility for student learning.

However, as Marsh (2012) points out, many interventions lack rigorous evaluation, and more evidence is needed on how best to sustain long-term changes in data practices. Simply providing tools or reports does not automatically translate into improved pedagogy. Thereby suggesting that targeted support structures are equally essential.

- **Benefits and Outcomes of DDI**

When implemented effectively, DDI has been associated with multiple benefits at both the instructional and systemic levels. Gangadharan (2014) provides a compelling case study demonstrating how at a classroom-level, DDI led to

improved student outcomes through personalized instruction and formative assessment strategies. Similarly, Shaw (2017) links DDI to increases in teacher collaboration, satisfaction, and instructional precision.

Athanatou and others (2023) highlight that DDI in primary education enhances student engagement and fosters a feedback-rich learning environment. Dogan and Demirbolat (2021) validate an instrument for measuring DDDM in schools, reinforcing its positive correlation with school performance and data-informed decision culture.

Moreover, Schifter and others (2014) show that with proper training, teachers become more adept at identifying learning patterns and instructional gaps, thus increasing their ability to adapt instruction for diverse learners. These findings suggest that data use can bridge achievement gaps and educational equity, when thoughtfully applied.

- **Challenges, Critiques, and Ethical Concerns**

Despite its potential, DDI is criticised in some aspects. Critics warn that the emphasis on data, especially standardized assessments, can narrow curriculum, reduce teacher autonomy, and prioritize compliance over learning (Neuman, 2016; Isaacs, 2021). Neuman refers to this trend as “code red,” cautioning against the reduction of rich, child-centered instruction into numeric outputs.

Isaacs (2021) argues that DDI can perpetuate inequity when data is taken out of context, leading to labelling of students or teacher blame. Similarly, Hamilton and others (2002) note that test-based accountability systems often misrepresent learning and distort school priorities.

Other challenges include the technical complexity of interpreting data (Dunn and others, 2013), the emotional burden of high-stakes environments (Winesburgh, 2023), and limited support structures to help teachers use data meaningfully (Marsh, 2012). These concerns highlight the need for contextual, ethical, and human-centered approaches to DDI.

To maximize the potential of Data Driven Decision Making (DDDM) at administrative levels, administrators must assess the barriers inhibiting teachers from adopting DDDM to improve student achievement, adopt research-based instructional practices, and differentiate instruction (Datnow & Hubbard, 2015; Schildkamp, Karbautzki, & Vanhoof, 2014)

- **Emerging Trends and Future Directions**

The field of data use in education is rapidly evolving, with recent literature pointing toward more integrated, technologically advanced, and context-sensitive approaches. Huang and others (2024) explore the use of ‘learning analytics

dashboards' that support teacher self-regulation and collaborative learning in online environments. These tools allow real-time insights into student engagement and interaction patterns.

Pella (2012) and Mandinach & Honey (2008) advocate for a broadened definition of data, urging educators and developers to consider classroom context, cultural knowledge, and qualitative evidence as essential components of decision-making. This shift is particularly important for culturally responsive and inclusive education.

Marsh (2012) identifies key research gaps, including the long-term impact of data interventions, the influence of leadership styles, and the ways DDI intersects with issues of equity and justice. Future research is also needed on how to build data use into school infrastructure without overwhelming educators or diminishing instructional creativity.

Findings:

Data-Driven Instruction (DDI) in education is grounded in theoretical and conceptual frameworks that position data use as a dynamic as well as continuous process. It asserts that data literacy involves both technical knowledge and reflective thinking, requiring educators to interpret various data types and apply insights to instruction. The models further illustrate that data use ranges from basic access to deeper analytical engagement and emphasizes the need for sustained support, autonomy, and contextual awareness.

In practice, however, many teachers face challenges such as insufficient time, limited access to usable data, and inadequate training, which can hinder effective implementation. This study reveals that data systems are only useful when teachers are trained to interpret and apply information, and this information includes qualitative classroom observations and social-emotional indicators also along with quantitative assessment scores. It is evident that qualitative information such as these offer richer insights.

The school environment plays a pivotal role in terms of providing collaborative cultures to encourage more meaningful engagement with data. Professional development emerges as a critical factor in building capacity where traditional workshops fall short. Instead, ongoing coaching, team-based analysis, and embedded learning opportunities are more effective in reducing data-related anxiety to enhance instructional practices.

When implemented effectively, DDI is linked to numerous benefits, including improved student outcomes, more precise teaching strategies, greater teacher satisfaction, and stronger school-wide performance.

A risk, however, posed by some is over-reliance on standardized data, which may reduce teacher autonomy and lead to inequities, particularly when data is misused or used out of context. Emotional stress, technical barriers, and ethical concerns are among other roadblocks that need to be taken into consideration as an ongoing responsibility that accompanies the boons of DDI.

Looking ahead, emerging trends suggest that to realize the full potential of DDI, education systems must prioritize sustained support through training of pre and in-service teachers, ethical considerations. It can become an effective tool for targeted learning and differentiated learning to improve the overall learning outcome of students.

Recommendations:

The study examines literature for theoretical aspects of DDI and brings out the limited availability of literature, research or case study in this area with context to Indian schools. The researcher recommends observation studies, case studies and data collection from Indian schools to explore further to what extent is DDI integrated in Indian schools and further develop effective models that can be implemented, aided by studies of global institutions who have implemented DDI.

Conclusion:

The literature on data-driven decision making brings forth its promises and challenges. While it has the potential to transform instruction and improve outcomes, its success depends on how it is implemented, supported, and understood. The most effective models emphasize contextual data use, collaboration, and sustained professional learning through teacher training.

Moving forward, there is a need to continue to refine existing models through investment in high-quality professional development. With that, DDI can fulfill its potential as a tool for meaningful educational improvement instead of a mechanism of compliance and control.

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EXPERIENTIAL LEARNING STRATEGIES IN PRE-SERVICE TEACHER EDUCATION: ALIGNING WITH THE IMPLEMENTATION OF NEP 2020

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Abstract:

The National Education Policy (NEP) 2020 represents a transformative shift in India's educational landscape, emphasizing holistic, learner-centered, and experiential pedagogies. A cornerstone of these reforms is the reimagining of teacher education to equip future educators with practical, reflective, and adaptive teaching competencies. This paper investigates the integration of experiential learning strategies within pre-service teacher education programs, examining their alignment with NEP 2020 objectives.

Utilizing a quantitative descriptive survey approach, the study collects data from pre-service teachers at Bombay Teachers' Training College (BTTC) to evaluate the frequency, perceived impact, and challenges of experiential practices such as peer teaching, teaching simulations, internships, and reflective exercises. Findings underscore the efficacy of these approaches in enhancing theoretical understanding, classroom confidence, and teaching skills, while also identifying institutional and procedural barriers to implementation. The study concludes with recommendations for optimizing experiential learning within teacher education to foster reflective and competent practitioners aligned with the NEP 2020 vision.

Keywords: *Experiential Learning Strategies, Pre-Service Teacher Education, Internships, NEP 2020.*

Introduction:

The NEP 2020 advocates for comprehensive reforms in India's education system, with particular focus on revitalizing teacher education. It recognizes the need to transition from traditional didactic methods toward dynamic, experiential approaches that foster critical thinking, creativity, and adaptability among pre-service teachers. Experiential learning—rooted in direct experience, reflection, and action—bridges the gap between theoretical constructions and real-world classroom practice.

This study explores the current landscape of experiential learning in pre-service teacher training, seeking to understand its implementation, effectiveness, and alignment with NEP 2020 goals. It further examines the challenges faced by teacher education institutions in integrating experiential strategies and offers evidence-based suggestions to strengthen these practices.

Background of Study:

Historically, teacher education in India has been marked by rigid curricula and lecture-based delivery, often failing to prepare educators for the complexities of contemporary classrooms. NEP 2020 challenges this paradigm, calling for constructivist and practice-oriented pedagogies that encourage reflective inquiry and adaptive teaching.

Experiential learning, informed by the works of educational theorists like John Dewey, David Kolb, and Jean Piaget, offers a cyclical model comprising concrete experience, reflective observation, abstract conceptualization, and active experimentation (Kolb, 1984). This model provides a scaffold for teachers to internalize and apply pedagogical knowledge in diverse contexts.

Despite its theoretical appeal, practical challenges—including infrastructural limitations, inadequate mentor support, and time constraints—continue to hinder the full realization of experiential learning in teacher preparation programs. This study investigates these dynamics in the specific context of BTTC, Mumbai.

Research Question:

1. What experiential learning techniques are currently utilized in pre-service teacher education programs?
2. How do these techniques align with the vision and objectives of NEP 2020?
3. What are the perceptions of pre-service teachers and teacher educators regarding the effectiveness of experiential learning?
4. What institutional and pedagogical barriers affect the implementation of experiential learning?
5. What best practices can be adopted to enhance experiential learning in line with NEP 2020?

Objectives:

1. To identify and describe experiential learning techniques employed in teacher education programs.
2. To assess their congruence with NEP 2020 pedagogical directives.
3. To analyze stakeholder perceptions (pre-service teachers and educators) regarding experiential learning.
4. To investigate challenges in operationalizing experiential methodologies.

5. To propose contextually relevant best practices for improving experiential learning delivery.

Review Literature:

Kolb's Experiential Learning Theory (ELT):

David A. Kolb's Experiential Learning Theory (1984) is foundational to the understanding of how individuals learn through experience. His model posits a four-stage learning cycle:

- Concrete Experience
- Reflective Observation
- Abstract Conceptualization
- Active Experimentation

According to Kolb, effective learning occurs when a learner progresses through all four stages, continuously cycling through experience and reflection. In teacher education, this model helps pre-service teachers connect pedagogical theory with real classroom practice. McCarthy (2010) expanded on Kolb's theory through the 4MAT model, which integrates right- and left-brain processing to support varied learning styles in teacher training environments.

John Dewey's Pragmatic Constructivism:

John Dewey (1938) emphasized "learning by doing" and argued that education should be grounded in real-life experiences that are meaningful to the learner. Dewey's experiential approach aligns with constructivist views, wherein learners construct knowledge through active engagement. His work laid the groundwork for integrating community-based learning, reflective practice, and problem-solving in teacher preparation. Dewey's principles resonate with NEP 2020's call for flexible, learner-centered, and experiential pedagogies.

Experiential Learning in Diverse Classrooms:

Piercy and Caldwell (2011) examined how modeling experiential learning in teacher education improves engagement in diverse and multicultural classrooms. Their study highlights the importance of reflective discussions, simulations, and cultural immersion exercises in helping pre-service teachers internalize inclusive and adaptive teaching strategies. Such models are particularly relevant to India's socio-cultural diversity and NEP 2020's focus on equity and inclusion.

Microteaching and Teaching Simulations:

Microteaching has emerged as a widely adopted experiential method in teacher education. Elias (2018), in a study conducted at the Eritrea Technology Research Institute, demonstrated that microteaching significantly enhances instructional skills, classroom confidence, and reflective abilities among diploma students.

Participants developed a more nuanced understanding of lesson planning, feedback integration, and student engagement, suggesting microteaching as an essential element of experiential teacher training.

Service Learning and Community Engagement:

Service learning represents another vital facet of experiential education. Sider (2008) argued that engaging teacher trainees in service-oriented projects fosters social responsibility, civic engagement, and cross-cultural empathy. These experiences help future educators understand the societal impact of education and develop a holistic view of their professional roles.

Similarly, Ramadoss (2020) explored the integration of biodiversity and environmental education into teacher training programs. The study found that experiential modules involving nature-based projects enhanced environmental awareness, sustainability attitudes, and interdisciplinary teaching practices. These outcomes align closely with NEP 2020's environmental consciousness and life skills objectives.

Reflective Practice in Teacher Development:

Schön (1983) introduced the concept of the "reflective practitioner", emphasizing that effective teachers continually evaluate their teaching decisions, respond to classroom dynamics, and adapt their methods. Reflective journals, case studies, and peer discussions are widely used to promote reflective thinking in teacher education (Hatton & Smith, 1995). These practices deepen self-awareness and professional identity formation—central aims of NEP 2020.

Barriers to Implementing Experiential Learning:

Despite its benefits, several studies report challenges in implementing experiential learning. Research by Korthagen et al. (2006) found that institutional constraints—such as rigid curricula, inadequate faculty training, and lack of infrastructure—often hinder the integration of experiential pedagogies. Mentor inconsistency and unclear expectations further diminish the effectiveness of experiential approaches (Zeichner, 2010). These findings underscore the need for systemic reform and policy alignment, as advocated by NEP 2020.

Methodology of Research design:

In order to examine the function of experiential learning in teacher education, this study used a quantitative descriptive survey approach. Understanding how experiential learning activities affect pre-service teachers' professional development, classroom management, teaching confidence, and capacity to put theory into practice was the main goal.

Sample:

For this research, the researcher has decided to gather samples from Pre-service teachers enrolled in teacher education programs, particularly from Bombay Teachers' Training College (BTTC). The in-service teachers from Early Childhood Education Program (ECEP), Bachelor of Education (B.Ed.), and Diploma in Elementary Education (D.El.Ed.), made up the target population.

Sampling Method:

This study used the target model for learning and practical experiences among participants. This approach aims to actively participate in various experiments. This model consists of over 50 participants and is currently registered in B. Es. Or BTTC's ECEP program. The rescue questionnaire has been used to collect data. This tool covers large objects with the closing scale and license participants, experiential learning methods and experiments and perspectives.

Types of experiential learning exercises that were taken part in

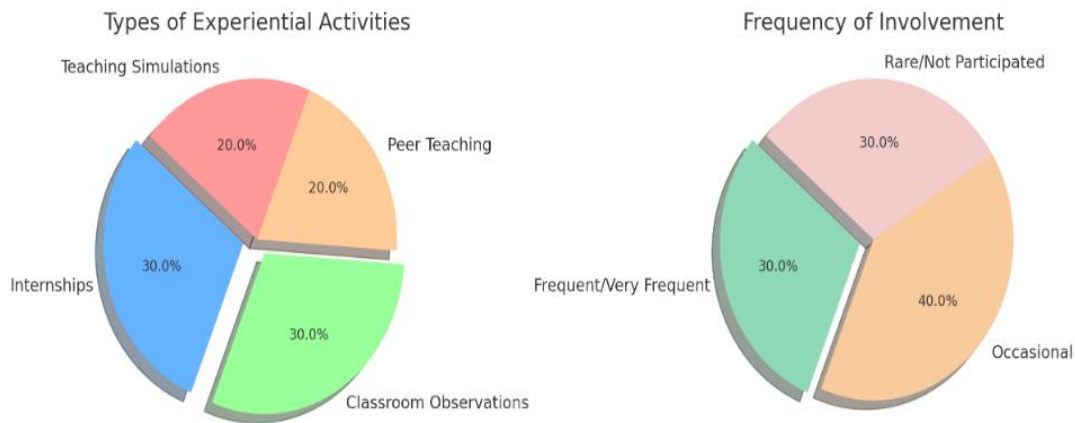
- Frequency of participation
- Perceived efficacy in communication, classroom management, topic understanding, and student engagement
- The level of support obtained from supervisors and mentors
- Problems encountered when participating in experiential learning
- Overall evaluation of the teacher education program's inclusion of experiential learning

Administration With guarantees of secrecy and anonymity, the questionnaire was sent to the chosen participants either electronically or physically. Throughout their training, participants were urged to provide truthful responses based on their real-world experiences.

Summary of Results and Findings:

- **Participating in Experiential Education:** More than 90% of participants responded that they have taken part in peer teaching, teaching simulations, classroom observation, and school internships. The most prevalent were internships and classroom observations.
- **Consistency of Involvement:** Thirty percent claimed frequent or very frequent activity, compared to about forty percent who participated occasionally. Program restrictions or schedule conflicts were cited as reasons for the low participation rate.
- **Impact on Confidence and Theory:** More than 70% concurred that theoretical concepts were made clearer by experience learning. Following practical experiences, almost 75% of participants felt more comfortable giving classes.

- **Development of Educational Skills:** Lesson planning, communication, classroom management, and student participation all improved, according to the participants. This progress was mostly attributed to mentor input.
- **Adaptability and the Different Needs of Students:** Numerous students gained the ability to modify their teaching methods in response to the requirements of their pupils, underscoring the importance of real-world experience in developing responsive instruction.
- **Integration of Theory and Motivation:** Through experience learning, over 80% felt inspired to improve as teachers. The majority gave the theory-practice integration a good to excellent rating, however some people thought it might be better.
- **Challenges Experienced:** During early teaching experiences, common difficulties included nervousness, time limits, a lack of direction, and ambiguous expectations.
- **Encouragement from Mentors:** The majority of participants said that mentors were very helpful, especially when they were interning. Some received only mediocre or erratic assistance.
- **Suggestions and Its Effectiveness:** Almost 90% suggested extending or continuing experiential learning. Its overall efficacy in preparing aspiring teachers was graded as good to excellent.



Interpretation of Results:

- The study's findings highlight experiential learning is important to teacher preparation programs.
- Pre-service teachers who participated in a variety of practical experiences, including simulations, school internships, and peer teaching, frequently reported

gains in their classroom confidence, teaching abilities, and capacity to apply theory to practice.

- The frequency of experiential learning is strongly related with outcomes including improved lesson planning, classroom management, and student engagement techniques, according to the findings. Higher confidence and a better ability to apply theoretical information in real-world situations were indicated by those who were exposed more frequently.

In addition, an important factor to participants' development during experiential learning was the assistance of mentors. Supervisors' opinions and support enabled pre-service instructors to evaluate their methods and make gradual improvements. But occasionally, obstacles like nervousness, time restraints, and unclear instructions prevented these encounters from providing their full potential.



Limitations of the Study:

Although the results are instructive, it is important to note a few limitations:

- **Sample Size and Scope:** Because the study was limited to one institution (BTTC), the findings may not be as applicable to other teacher education institutions.
- **Self-Reported Data:** Participants' self-evaluations, which may be affected by social desirability or personal bias, were the basis for the survey.
- **Absence of Longitudinal Data:** Although the study gives a glimpse of pre-service teachers' experiences, it doesn't monitor how experiential learning affects their teaching careers over the long run.
- **Uneven Participation:** Comparative insights may have been influenced because some participants had limited access to specific activities (such as micro-teaching or community-based teaching).

Summary of Key Findings:

1. High involvement in experiential learning initiatives, including teaching simulations and school internships.
2. Regular engagement was associated with improved communication skills, classroom management, subject knowledge, and confidence.
3. Students' ability to enhance their teaching methods was greatly aided by mentor support.
4. It was believed that experiential learning was very successful in inspiring students and assisting them in putting theory into practice in authentic classroom environments.
5. Anxiety, a lack of direction, time limits, and ambiguous expectations were among the difficulties.
6. Most students suggested that teacher education programs incorporate experiential learning more heavily.

Conclusion and Suggestions:

This study reaffirms the pivotal role of experiential learning in the professional development of pre-service teachers. Methods such as peer teaching, teaching simulations, classroom observations, and school internships significantly contribute to the enhancement of pedagogical skills, conceptual understanding, and self-efficacy. These experiential practices foster reflective and adaptive teaching, aligning well with the transformative vision of the National Education Policy (NEP) 2020, which advocates for learner-centered, holistic, and competency-based teacher education.

Despite its demonstrated benefits, the effective implementation of experiential learning requires systemic support. Organized supervision, structured mentorship, clear instructional expectations, and emotional scaffolding must be embedded within teacher education programs to maximize the value of experiential practices. Challenges such as anxiety, time constraints, inadequate mentorship, and ambiguity in execution must be addressed through institutional reforms and faculty training. The findings from this study, supported by strong positive feedback from participants, endorse the broader and more systematic incorporation of experiential learning strategies into teacher education curricula. Such integration not only prepares teachers for the demands of contemporary classrooms but also advances the core objectives of NEP 2020.

Looking ahead, several directions for future research emerge. Longitudinal studies are needed to examine the sustained impact of experiential learning on in-service teaching performance and student outcomes. Comparative studies across

institutions or countries can offer cross-cultural perspectives on implementation models and effectiveness. Further, research into the roles of school mentors, supervisors, and institutional leadership can illuminate the enablers and barriers to effective experiential learning.

In addition, experimental or quasi-experimental designs could help establish causal relationships between specific experiential strategies and learning outcomes. Investigating the role of digital tools and blended modalities in facilitating experiential learning also presents a promising avenue, especially considering increasing technological integration in education.

By pursuing these lines of inquiry, future research can contribute to the refinement of experiential learning frameworks and strengthen their alignment with national educational priorities.

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EXPLORING THE ATTITUDES OF PRE-SERVICE TEACHERS TOWARDS ONLINE PROFESSIONAL DEVELOPMENT COURSES

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Abstract:

With NEP 2020 emphasizing continuous professional development, Online Professional Development (OPD) courses offer flexible, accessible training for teachers. This study explores pre-service teachers' attitudes towards OPD, focusing on relevance, effectiveness, and challenges in a digitally evolving education landscape. Using a quantitative survey of teacher trainees, the study examines factors like digital literacy, motivation, perceived benefits, course design, and institutional support. While many appreciate the convenience of OPD, concerns persist around limited interaction, motivation, hands-on practice, and course quality. Positive attitudes correlate with strong digital infrastructure, prior tech use, and practical course content. Participants also favoured blended learning models combining online and face-to-face elements. The study highlights the need for engaging, practical OPD design and digital readiness in teacher training programs to better equip future educators for both physical and virtual classrooms.

Keywords: *Pre-Service Teachers, Online Professional Development (OPD), Attitudes and Perceptions, Virtual Learning, Blended Learning, NEP – 2020*

Introduction:

In recent years, teacher education has been reshaped by the integration of technology into learning environments. A key development has been the rise of Online Professional Development (OPD) courses, offering flexible, accessible, and cost-effective training. Initially designed for in-service teachers, OPD is now being incorporated into pre-service teacher education programs.

The success of OPD depends not only on content quality but also on participants' attitudes. Positive perceptions can boost motivation and learning, while negative

ones may hinder engagement. For pre-service teachers still forming their professional identity, OPD experiences can shape future development habits.

Despite the growing use of online platforms in teacher education, little research has examined pre-service teachers' attitudes towards OPD. Understanding what they find valuable or challenging can help improve the design and delivery of such programs.

Background Information:

Teacher education is undergoing major transformation with the expansion of technology in professional development. The National Education Policy (NEP) 2020 highlights the need for continuous professional development and advocates for online and blended learning to provide scalable, high-quality training. NEP 2020 calls for teacher education programs to produce pedagogically skilled, technologically adept professionals. It encourages integrating MOOCs, webinars, e-content, and platforms like NCTE, NCERT, and DIKSHA into foundational training.

As institutions adopt these recommendations, understanding pre-service teachers' engagement with OPD becomes crucial. Their attitudes can influence the success of such initiatives and shape their commitment to lifelong learning. Yet, research in this area remains limited. Investigating their perceptions, challenges, and satisfaction can inform better-designed, more effective OPD courses.

Statement of the Problem:

This study aims to explore the **attitudes of pre-service teachers towards online professional development courses**, in the context of NEP 2020's vision for technology-driven, future-ready teacher education.

Research Questions:

- What is the attitude of pre-service teachers towards online professional development courses?
- What factors influence their attitudes towards online professional development?
- How do pre-service teachers perceive the usefulness and effectiveness of online PD platforms?
- What challenges or barriers do pre-service teachers face when participating in online PD courses?
- Do attitudes towards online PD differ based on demographic variables such as gender, age, year of study, or prior exposure to online learning platforms?
- To what extent do pre-service teachers prefer online PD over traditional face-to-face professional development formats?
- Are there differences in attitudes based on gender, year of study, or previous experience with online learning?

Research Objectives:

Based on the topic and research questions, the objectives for the study are developed as:

1. To examine the overall attitudes of pre-service teachers towards online professional development courses.
2. To identify key factors influencing these attitudes, such as perceived usefulness, ease of access, and engagement.
3. To explore the perceived effectiveness and relevance of online PD courses for professional growth.
4. To investigate the challenges or barriers faced by pre-service teachers in engaging with online PD.
5. To analyse the relationship between demographic variables (e.g., gender, year of study, prior online learning experience) and attitudes towards online PD.
6. To compare the preferences of pre-service teachers between online and traditional professional development formats.

Significance of the Research:

As teacher education aligns with digital advancements and NEP 2020 goals, understanding how pre-service teachers perceive online learning is essential. This study explores their readiness, awareness, and digital competence, offering insights into both the potential and challenges of Online Professional Development (OPD). By highlighting factors that support or hinder engagement, the findings can guide teacher education programs, policymakers, and course designers in creating more effective, accessible OPD experiences. Ultimately, this research supports the development of a digitally prepared and confident future teaching workforce.

Literature Review:

Darling-Hammond, Hyler, and Gardner (2017), in their international research report *Effective Teacher Professional Development* published by the Learning Policy Institute, identify key characteristics of effective professional development (PD), including a strong content focus, active learning, collaboration, and sustained engagement. These components are shown to enhance teacher practice and student achievement. For educators in South Mumbai, these insights are especially valuable in guiding the design and selection of online PD programs that are contextually relevant and tailored to the needs of both in-service and pre-service teachers.

Dede, C., Ketelhut, D. J., Whitehouse, P., Breit, L., & McCloskey, E. M. (2009), *A Research Agenda for Online Teacher Professional Development*, the authors propose a comprehensive research agenda for online teacher professional development (OTPD), highlighting key areas that require deeper investigation, such

as scalability, effectiveness, and contextual adaptation. Their framework aims to inform future studies and improve the quality and design of OTPD programs. This agenda is particularly useful for institutions in regions like South Mumbai, as it can help develop research-based and contextually relevant professional development programs for educators.

Prestridge, S. (2017), Examining the Shaping of Teachers' Pedagogical Orientation for the Use of Technology, this study investigates how teachers' pedagogical beliefs and orientations are shaped by their experiences with technology in professional development (PD) contexts. It reveals that meaningful integration of technology in PD depends not just on access to tools but on how these tools align with teachers' evolving pedagogical frameworks. For educators and policymakers in South Mumbai, the findings underscore the importance of designing online PD programs that support reflective practice and pedagogical alignment with digital tools.

Smekens Educational (2021), 9 Benefits of Online Professional Development for Teachers, this online article highlights nine key advantages of online professional development (PD), such as flexibility, on-demand accessibility, and the ability to personalize learning experiences. These features allow teachers to engage in PD that fits their individual schedules and needs. For educators in South Mumbai, this format is especially advantageous, as it accommodates diverse time constraints and learning preferences among both in-service and pre-service teachers. The article emphasizes how technology-enabled PD can foster continuous, self-directed professional growth.

Methodology:

This study adopts a quantitative, survey-based approach to examine pre-service teachers' attitudes towards Online Professional Development (OPD) courses. Participants included students enrolled in teacher training programs (B.Ed., D.El.Ed., and ECEP) at a teacher education institute. Data was collected via a Google Form questionnaire comprising multiple-choice and Likert scale questions to ensure ease of participation.

The survey explored readiness for online learning, familiarity with platforms like SWAYAM and DIKSHA, and comfort with tools such as Kahoot, Padlet, and Google Meet. It also examined challenges influencing negative attitudes, including poor internet connectivity, low motivation, and limited digital skills. Responses were analysed using basic statistical methods, primarily percentages, to identify key trends shaping pre-service teachers' perceptions of OPD.

Data collection Methods:

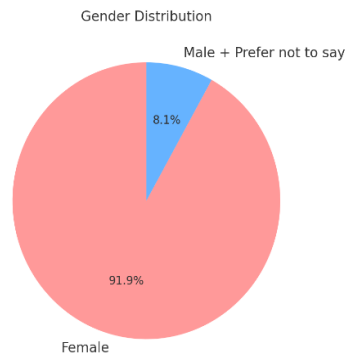
Population and Sample:

The population for the study comprises pre-service teachers studying in colleges or universities of education. To ensure a diverse representation of responses, stratified or purposive sampling techniques were employed. The sample size ranged from 100 to over 300 participants, depending on the level of access and the overall scope of the research.

Data Collection and Analysis:

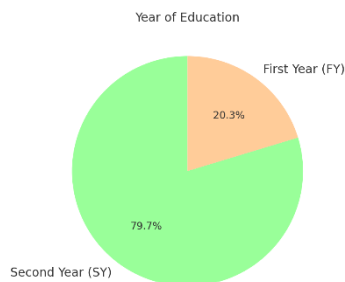
A structured questionnaire was used to gather data from B.Ed., D.El.Ed., and ECEP students of BTTC. Descriptive statistics such as mean, standard deviation, and frequency were used to analyze and interpret the data.

Demographic Analysis:



The survey participants were predominantly females, making up 91.9% of the total responses, while the remaining 8.1% comprised males or individuals who preferred not to disclose their gender. In terms of academic standing, most respondents (79.7%) were second-year students, with only 20.3% in their first year. This distribution indicates that the findings primarily reflect the perspectives of more experienced students, who are likely to have had more exposure to both traditional and online learning environments.

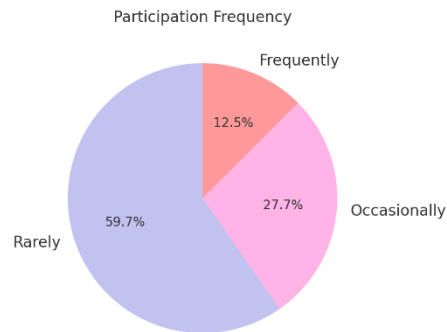
2. Readiness for Online Learning



Most participants demonstrated a strong level of readiness for online learning. A majority agreed or strongly agreed that they were self-motivated, comfortable with

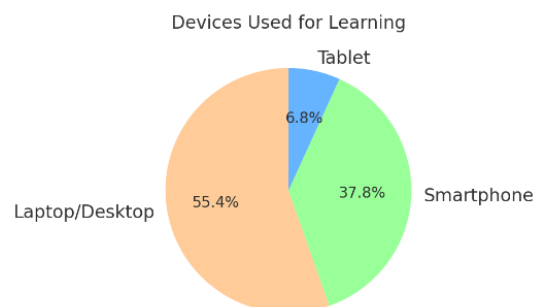
self-paced learning, had designated spaces free from distractions, and could manage their time effectively. However, issues such as maintaining focus during long sessions and navigating online platforms still posed moderate challenges. While many preferred flexible scheduling, the transition from structured classroom environments to independent learning demands further support and adaptation.

3. Awareness and Digital Competence



The survey revealed a significant gap in awareness regarding nationally available digital platforms such as SWAYAM, NISHTHA, and DIKSHA. In contrast, students were more familiar with general-purpose tools like Google Meet, Zoom, and Microsoft Teams. The competence levels reported for these tools were generally moderate, suggesting that while students are adapting to digital environments, there is room for improvement in platform-specific training and exposure to educational technologies aligned with national educational initiatives.

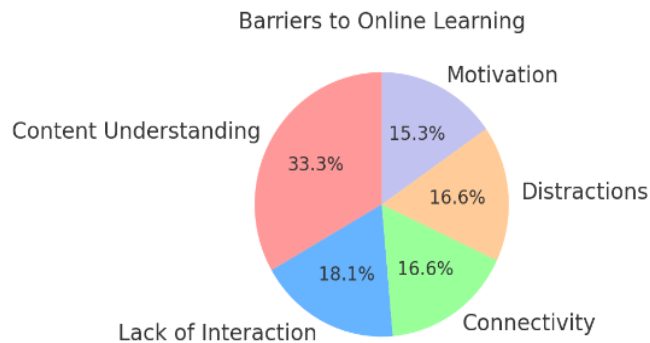
4. Attitudes Toward Online Courses



Attitudes toward online learning were largely positive but nuanced. Many students acknowledged the role of online courses in developing 21st-century teaching skills and enhancing professional development. Preferences leaned towards blended learning, combining online and offline experiences, over fully virtual models. While students recognized the cost-effectiveness and future potential of online education, many remained neutral or unconvinced about its equivalency to traditional classroom

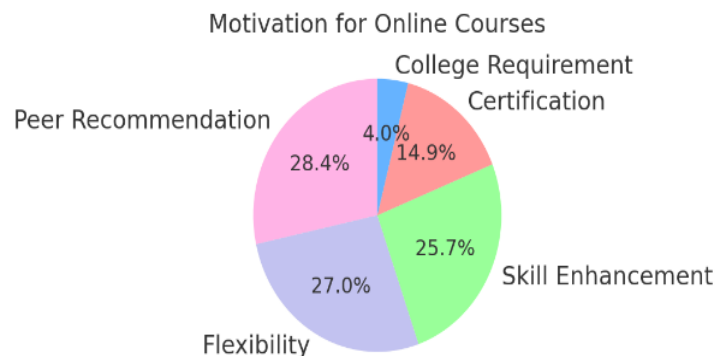
learning, particularly due to perceived limitations in personal connection and engagement.

5. Barriers to Online Learning



Despite the positive outlook, students reported several barriers that hinder their online learning experience. These included technical difficulties, limited internet or device access, and distractions at home. A significant number of respondents also cited struggles with motivation and feelings of isolation, compounded by a lack of interaction with peers and instructors. These issues highlight the importance of improving the design and support structures of online programs to create more engaging and socially connected learning environments.

6. Overall Perception and Motivation



Engagement in online learning activities was found to be relatively low, with 58.1% of students participating rarely and only 12.2% frequently. Motivating factors for taking online courses varied, with peer recommendations (28.4%) and flexibility (27%) ranking highest, followed by skill enhancement and certification. The most used devices for accessing courses were laptops or desktops (55.4%), while smartphones also played a significant role. These findings underscore the importance of making online courses more engaging and accessible while leveraging peer influence and practical benefits to boost participation.

Results and Findings:

This survey explored the attitudes of pre-service teachers towards online courses for professional development. The findings highlight strong motivation, growing digital competence, and a clear preference for flexible and blended learning environments—balanced against challenges related to access, interactivity, and self-motivation.

1. Motivation & Participation

70% of respondents are self-motivated and plan to take more online courses.

The primary motivators are skill enhancement, certification, and flexibility, reflecting a strong professional development mindset.

However, most participate occasionally (58%), indicating inconsistent engagement—likely influenced by course design, institutional mandates, or personal circumstances.

Finding: Pre-service teachers are intrinsically motivated and value online learning, but more consistent engagement may require structured integration or incentivization.

2. Preferences & Learning Style

69% prefer flexible schedules, while 65% Favor blended learning models that combine online and offline modes.

Though 70% are comfortable with self-paced learning, 46% report struggling to stay motivated in such formats.

Finding: There is a desire for autonomy and flexibility, but too much self-direction without support can lead to reduced motivation. Blended models and pacing support are key.

3. Accessibility & Environment:

66% have reliable internet, and 58% have dedicated, distraction-free study spaces.

Still, 15% report poor connectivity, and 34% cite home distractions as a major challenge.

Smartphones are the primary device for over half of the participants (56%).

Finding: While most learners have access, the quality of the learning environment and devices can impact their experience and performance.

4. Digital Tools & Platform Competency:

Participants report strong competency with Google Meet and Zoom (>85%).

However, tools like Padlet, Kahoot, and Mentimeter are much less familiar, with fewer than 25% feeling competent.

Finding: While general video conferencing skills are well developed, interactive tool usage is limited, indicating a need for targeted digital pedagogy training.

5. Awareness of Educational Platforms

Coursera, Udemy, and DIKSHA have relatively high awareness (60–70%).

National platforms like SWAYAM, NISHTHA, and NCERT courses are underutilized, with over 50% of participants unaware or only somewhat aware.

Finding: There is a clear knowledge gap regarding government-provided educational resources, suggesting a need for better promotion within teacher education programs.

6. Perceived Effectiveness

70% believe online courses effectively support professional development.

66% report improved 21st-century teaching skills, and 75% feel more confident using digital tools.

Cost-effectiveness is acknowledged by nearly 70% of participants.

Finding: Online education is largely seen as effective and empowering, especially in building digital skills and providing affordable access to learning.

7. Challenges & Emotional Barriers

41% feel isolated in online learning environments.

60% believe that lack of interaction reduces course effectiveness.

44% experience technical difficulties, and 46% struggle with motivation.

Other common challenges include distractions, poor internet, and difficulty understanding content.

Finding: Emotional and environmental barriers significantly affect the learning experience. Adding interactive elements, peer support, and instructor engagement could reduce isolation and improve learning outcomes.

Conclusion:

Pre-service teachers view online courses as beneficial and necessary for professional growth, showing strong motivation, a preference for flexibility, and increasing digital confidence. However, to ensure equitable and effective learning experiences, institutions must address technical challenges, motivational support, content clarity, and interactive design especially for learners who rely on smartphones or face environmental distractions.

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A STUDY OF AWARENESS AND ATTITUDE OF PRE- SERVICE TEACHERS TOWARDS POCSO Act

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Abstract:

Protection of Children from Sexual Offences (POCSO) Act, 2012, was introduced to protect children from sexual abuse and exploitation. Pre-service teachers, as future educators, play a vital role in recognizing and reporting such cases. Therefore, it is important for them to have a clear understanding of and a positive attitude towards child protection laws. This study focuses on evaluating the awareness and attitude of pre-service teachers regarding the POCSO Act. A descriptive survey design was used, with participants drawn from a teacher training institute. Data were gathered online through a structured questionnaire that included scales to measure both awareness and attitude. The findings reveals that pre-service teachers have general awareness but lack clarity on key provisions. Although the majority expressed a positive attitude towards teachers' role in preventing abuse, they also reported low confidence in identifying abuse and fear of legal consequences when reporting. This indicates a gap between attitude and practical readiness, suggesting more proper training in teacher training program.

Keywords: *POCSO Act, 2012, Child Sexual Abuse (CSA), Legal Literacy, Teacher Education, Mandatory Reporting.*

Introduction:

POCSO Act, 2012 that is introduced by the Government of India aims to protect children under the age of 18 from sexual abuse, harassment. This act emphasis child friendly courts, speedy trials and to establish special courts. According to National Crime Research Bureau Report 2022, around 53,874 cases related to crimes against children were reported, and a large proportion (over 45%) were under sexual offences categories (including rape, sexual assault, and harassment). Most of perpetrator's are known to the child that are either family members, friends, neighbour's, school staffs and trusted adults. To keep children safe and to protect them from such abuses, its responsibility of both parents and teachers because they

are in the closest contact. Thus, teachers play a pivotal role in safeguarding children as their also caretakers who often serve as the first point of contact when a child is in distress. It is important both pre- and in-service teachers should be aware of POCSO Act and their legal and ethical responsibilities.

This study aims to evaluate how aware pre-service teachers are of the POCSO Act and what their attitudes toward it are. Gaining insight into these areas can help highlight shortcomings in teacher education programs and support the creation of training modules that equip future educators to promote and protect child rights and safety in schools.

Background:

To address such problems, the Government of India has introduced the POCSO Act 2012, which provides a legal framework to protect children under the age of 18, irrespective of their gender, from sexual abuse and harassment. It provides child-friendly and special codes for speedy trials and imposes strict penalties for offenders. One of its most important features is mandatory reporting, which is imposed on everyone, including teachers. Because this legal responsibility for reporting suspected cases of abuse is also on teachers. So, teachers as well as pre-service teachers should have awareness and a positive attitude.

To address such problems, the Government of India has introduced the Protection of Children from Sexual Offences (POCSO) Act in 2012. This Act provides legal protection of children under 18 years., irrespective of their gender. It protects from sexual abuse, sexual harassment and pornography. It emphasizes on child friendly procedures, speedy trials, and it also imposes strict penalties for offenders. One of its most important features is mandatory reporting, which holds any person — including teachers — legally responsible for reporting suspected cases of abuse.

Teachers both pre-service teachers and in service are important part for prevention of abuse. As future educators, their awareness of the law and their attitudes toward implementing it in school are important for children safety. However, previous studies and anecdotal evidence suggest that many teacher trainees are either unaware of the Act or lack the confidence to act upon their knowledge due to fear of legal entanglement or emotional discomfort. The teacher training program often legal and psychological aspects of child protection, it is crucial to study the awareness and attitude of pre-service teachers about POCSO Act. It will help us understand for designing effective teaching training intervention so future educators can teach as well as protect children. This research aims to contribute in the current state of awareness and attitude of pre-service teachers regarding the POCSO Act,

and by recommending ways in which teacher education can be improved to promote a culture of protection and accountability.

Significance of the Research:

The protection of children from sexual abuse is not only a legal responsibility but also a moral and professional duty of educators. As the first line of defence in many cases, teachers hold a important role in recognizing signs of abuse and reporting it to authorities. This makes it necessary that pre-service teachers to be aware of the laws governing child protection, particularly the POCSO Act, 2012. However, there exists a gap in knowledge and preparedness among pre-service teachers.

This research is significant for several reasons:

1. **Child Protection in Educational Setups:** By measuring the level of awareness and attitude among pre-service teachers, this research can help administration, teachers in protecting children from sexual offences, thus contributing to the creation of safer school environments.
2. **Identify the shortcomings in teachers training:** The findings can uncover whether current teacher training programs can address child protection laws. If awareness and attitude is low among pre-service teachers, it reflects the gap in their curriculum, thus including the reform of integration of legal literacy and child rights education.
3. **Encourages Policy and Training Development:** Policy makers, teacher training programs, can use the study as a guide to create focused workshops, orientation sessions, and awareness campaigns that cover teachers' legal obligations under the POCSO Act.
4. **Empowers Pre-Service Teachers:** Pre-service teachers understanding their own attitudes and awareness levels can encourage them to seek further knowledge and take steps in fulfilling their role as teacher.
5. **Contributes to Research and Literature:** Limited research is being done particularly in the Indian context thus this study adds to the knowledge. Particularly in the fields of child safety, education, child rights and protection etc. By studying awareness and attitude of pre-service teachers, it throws light on sensitive and important issue, thus it play a crucial role in fostering a culture of accountability, empathy, and legal awareness in India's education system

Review of Literature:

Brown A. (2008). Pre-service teachers' understanding of child abuse and their professional role in child protection. Children Australia, 33(1), 1648.

This research aims to find pre-service teachers' understanding of child abuse and their preparedness to deal with the signs, symptoms, and disclosures of child abuse. It highlights the necessity for teachers to be aware and prepared. However, the findings suggest that pre-service teachers have poor awareness of child protection laws. This research also emphasizes the need to include relevant content in undergraduate teacher education programs.

Fernandes, M., Lobo, D. J., & Nayak, B. S. (2023). Knowledge of child sexual abuse and attitudes towards reporting it among teachers and parents of children studying in selected primary schools of Udupi Taluk, India. ResearchGate.

This research aims to find the knowledge of child sexual abuse and attitudes towards reporting it among the primary teachers and parents of children studying in Udupi Taluk, India. A descriptive survey design was adopted. The findings revealed that 50% of teachers had average knowledge and 50% had good knowledge about child sexual abuse. Regarding their attitude towards reporting child sexual abuse, all teachers had a favourable attitude. Whereas among parents, 80% had average knowledge about child sexual abuse, and the majority (76%) had a favourable attitude towards reporting it, while the remaining 24% had unfavourable attitudes towards reporting child sexual abuse. Parents' knowledge about child sexual abuse doesn't strongly affect their attitude toward reporting it. However, teachers' knowledge is linked to their prior awareness and the presence of a school counsellor, while parents' knowledge is influenced by their education and marital status.

Tenorio, A. A. (2024). Pre-service teachers' awareness and attitudes toward child protection policies. TWIST, 13(2).

The study examined pre-service teachers' awareness and attitudes toward the Child Protection Policy (CPP). It used a descriptive-correlational research design with 100 pre-service teachers at a university in Laguna. The findings showed that factors such as the course of study, civil status, interest in seminars, and other demographic factors had weak or mixed correlations with awareness. However, those who had experience reading the CPP policy and its inclusion in the curriculum (training) showed a strong positive correlation with awareness and attitudes.

Meena, R., & Jaiswal, S. (2024). To assess knowledge of the parents and teachers regarding sexual offences among school children. Journal of Nursing Research, Patient Safety and Practise, 4(03), 8–16.

The study aims to assess the knowledge levels of parents and teachers regarding sexual offenses among school children in the Sheopur district to help design future educational training programs. A cross-sectional survey of 200 participants from various clusters within Sheopur district was conducted using a questionnaire. The findings revealed that 67% of teachers had poor knowledge of child sexual abuse, with none demonstrating good knowledge, whereas 71% of parents had average knowledge and 11% had good knowledge. The demographic analysis indicates that differences in awareness levels are influenced by age, gender, education, and occupation. Despite having higher educational qualifications, teachers showed lower awareness of child sexual abuse, highlighting the need for specialized training.

1. What is the level of awareness among pre-service teachers about the POCSO Act, 2012?
 - o (e.g., Do they know the key provisions, reporting duties, and legal implications?)
2. What are the attitudes of pre-service teachers towards child protection and their responsibilities under the POCSO Act?
 - o (e.g., Do they feel confident in reporting? Do they believe the law is necessary and effective?)
3. Does the level of awareness and attitude differ based on demographic variables like gender, age, or academic background?
 - o (e.g., Do female teacher trainees show higher concern or awareness levels?)
4. Have pre-service teachers received any formal training or orientation about the POCSO Act during their teacher education program?
 - o (e.g., Through workshops, seminars, curriculum modules, etc.)
5. What are the sources of information for pre-service teachers regarding the POCSO Act?
 - o (e.g., Academic institutions, media, government programs, peer discussions?)
6. What challenges or barriers do pre-service teachers perceive in implementing the POCSO Act in real school settings?
 - o (e.g., Fear of legal involvement, lack of institutional support, emotional discomfort)

Methodology:

- Research Design: Descriptive survey method.
- Population and Sample: Pre-service teachers from teacher training institutions (B.Ed., D.El.Ed. ECEP students).
- Sampling Technique: Random or stratified sampling.

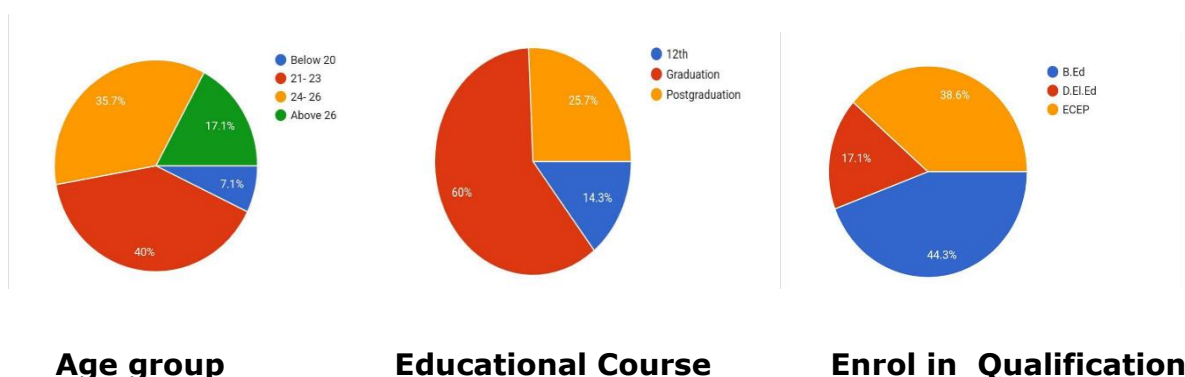
- Sample Size: 75 participants.

Tools Used:

Self-developed Awareness and Attitude questionnaire (statements on a 5-point Likert scale).

- Statistical Techniques: Descriptive statistics (mean, SD),

Analysis and Interpretation:



- 1} A total of **75 pre-service teachers** responded to the question: *"Have you received any training or orientation related to POCSO Act."* The responses were distributed across; Yes, No, May be.

Awareness Level	Frequency	Percentage
Yes	4	81.4%
No	11	7.1%
Maybe	25	11.4%
Total	75	100%

Interpretation:

The data reveals that a majority of the pre-service teachers (81.4%) reported that they have received training or orientation related to the POCSO Act, indicating a high level of awareness among the respondents. However, 11.4% responded "Maybe", which suggests they were uncertain and possibly lack clarity about whether their training explicitly covered the POCSO Act. And, 7.1% of the participants stated they had not received any training, revealing a gap that still exists in teacher education programs regarding awareness of child protection laws.

- 2} A total of 75 pre-service teachers responded to the question: *"Are you aware of the legal consequences of not reporting a known or suspected child abuse"* The responses options were; Yes, No, Maybe.

Awareness Level	Frequency	Percentage
Yes	31	44.3%
No	14	20%
Maybe	25	35.7%
Total	75	100%

Interpretation:

These findings reveal's that respondents that is pre service teacher's majority 55.7% either lack awareness or are unsure of the legal responsibilities mandated by the POCSO Act. This indicates that many are unsure about mandatory reporting and its legal consequences.

- 3}A total of **75 pre-service teachers** responded to the question: "*Rate your awareness about the POCSO Act*" The option of the responses were Very high, High, Moderate, Low, No awareness.

Percentage	
Very high	5.7%
High	30%
Moderate	50%
Low	12.9%
No awareness	1.4%
Total	100%

Overall, the data reveals that while most pre-service teachers possess at least a moderate level of awareness (85.7%), only a minority (35.7%) rate their awareness as high or very high. This indicates a need for more comprehensive training and orientation because pre service teacher are not confident and feel they are no fully aware of POCSO Act.

- 4}A total of 75 pre-service teachers responded to the question: "*Teachers play an important role in preventing child sexual abuse.*" The responses were:

Percentage	
Strongly Disagree	2.9%
Disagree	0%
Moderate	22.9%
Agree	25.7 %
Strongly Agree	48.6%
Total	100%

The data reflects that the pre service teachers have a positive attitude towards preventing child abuse that is 74.3% agree that teachers play a important role in prevention. However, the presence of moderate responses also indicates a need for further reinforcement through training and awareness programs, so that all pre-service have positive attitude in child protection. 47.1% reveals that they lack confidence in identifying signs of abuse and 52.9% fear legal complications when reporting cases.

Limitations of the Study:

- **Small Sample Size:** The study was on 75 pre service teachers, which do not represent the entire population of pre-service teachers so generalization might not be possible.
- **Geographical Constraints:** The sample consists of limited number of pre service teacher's and education institutions which may have affected the generalizability of the findings.
- **Lack of deeper understanding:** This study did not use qualitative method so it might lack deeper understanding of participants' attitudes, beliefs, and personal experiences.
- **Questionnaire Limitations:** The awareness and attitude questionnaire was self-developed. While efforts were made to ensure its validity, it may still lack the refinement and reliability of standardized instruments.
- **Time Constraints:** The data collection was carried out within a limited time frame. The time limitation might have affected the dept and breadth of the research paper in participation availability.

Suggestion for Future Research:

1. Research should be conducted on awareness and attitude even with in-service teachers to understand how much teachers actually know and what are their attitudes for identifying and reporting abuse.
2. Research should have a greater number of participants from different geographic regions for generalization.

Conclusion:

In conclusion, while pre-service teachers have a positive attitude in protection of children against child abuse. Majority of pre service teacher reveals that they lack confidence in identifying signs of abuse, fear legal complications when reporting cases. This indicates a gap between positive attitude and practical readiness. Therefore, there is a need for better training, legal clarity, and support systems.

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**A STUDY ON THE USAGE OF ARTIFICIAL INTELLIGENCE ON SECONDARY
AND HIGHER SECONDARY SCHOOL STUDENTS IN RELATION TO DECISION
MAKING, LAZINESS AND SAFETY IN EDUCATION**

Ms. Pranjal Ashok Gupta

Research Scholar, M.A Education

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Abstract:

Artificial Intelligence has spread like a web of a spider across the entire spectrum of education. Its impact is significantly witnessed in different behavioural tendencies of the students. The researchers in the present study attempted to trace if the usage of Artificial Intelligence has its correlation on loss of Decision Making, Laziness and Safety in Education among school students. The study was conducted on 131 students of secondary and higher secondary school using the quantitative research approach using the ready-made questionnaire from Ahmad et al. (2023). Using Person's correlation 'r', the findings of the present study suggested that there is a positive, substantial and a significant relationship between artificial intelligence and decision making, a positive, moderate and a significant relationship between artificial intelligence and human laziness and a positive, low and a significant relationship between artificial intelligence and safety in education scores of secondary and higher secondary school students although the study was delimited to the city of Mumbai, in the SSC and CBSE board only. In conclusion, it was revealed that increased exposure to AI appears to correlate with a decline in essential human attributes such as independent decision-making and self-motivation and augment attributes such as laziness and marginally impact a sense of safety in education. While students may embrace AI, it must be accompanied by deliberate pedagogical strategies by the school systems to encourage critical engagements, active learning participation and strengthening digital responsibility and safety awareness. Without this balance, there is a risk that AI may unintentionally erode foundational student competencies essential for lifelong learning and responsible citizenship in a tech-driven world.

Key words: Artificial Intelligence, Decision Making, Laziness, Safety in Education Secondary & Higher Secondary School Students.

Introduction- Understanding Artificial Intelligence

Artificial Intelligence (AI) represents a field of computer science focused on developing systems that simulate human intelligence processes such as learning, reasoning, and decision-making (Russell & Norvig, 2020). AI technologies operate through algorithms that enable machines to process data, identify patterns, and make informed decisions with minimal human intervention. Its subdomains include machine learning, which improves performance through experience, and natural language processing, allowing machines to understand and respond in human language (Sarker, 2021).

Experts predict that AI systems may eventually surpass human cognitive capabilities, particularly in terms of speed, accuracy, and data analysis. This evolution is observable through classifications such as Narrow AI, which handles specific tasks, General AI, capable of performing broader human-like functions, and Superintelligent AI, which could exceed human intelligence across diverse domains including reasoning and creativity (Goertzel & Pennachin, 2007). AI is widely applied in sectors like healthcare, finance, education, transportation, and security, making it an integral part of modern technological ecosystems.

Artificial Intelligence in Education:

The integration of AI in educational settings has brought transformative changes, offering both opportunities and challenges. AI-enhanced education involves adaptive learning platforms, automated assessment tools, and intelligent tutoring systems that cater to diverse learner needs (Luckin et al., 2016). These technologies promote personalized learning, facilitate real-time feedback, and allow educators to tailor instruction based on individual progress.

Despite its advantages, the use of AI in education also raises concerns regarding ethical implications, data privacy, and the reduction of human interaction. The digital divide may widen if equitable access is not ensured. Moreover, biases inherent in AI systems and over-reliance on algorithmic decisions could adversely affect learner development. The fusion of AI with augmented and virtual reality is poised to further revolutionize learning by providing immersive, interactive experiences (Zawacki-Richter et al., 2019).

While AI can analyze vast educational datasets to guide policy and practice, it is crucial to balance technological efficiency with the preservation of human cognitive and emotional skills in learning contexts among the learners specifically in the schools.

AI and Decision-Making in Education:

Decision-making is a core component of human cognition and autonomy. In the AI context, decision-making refers to the algorithmic processes that analyze data inputs to suggest or enact outcomes (Binns, 2018). In education, this often translates into systems that recommend study materials, suggest interventions, or even predict student performance.

However, concerns are emerging that increased dependency on AI tools might inadvertently reduce students' ability to think critically and make independent academic choices. Studies have shown that AI systems are now being used in strategic decision-making processes, with human input gradually decreasing (Brynjolfsson & McAfee, 2017). This shift could potentially suppress students' natural problem-solving instincts, promoting passive reception of information rather than active engagement.

As AI systems handle increasingly complex educational decisions, it is vital to question whether students are developing or diminishing their decision-making capacities in this digitally mediated environment.

AI and Laziness:

Laziness in educational contexts refers to a lack of motivation or effort to engage in cognitively demanding tasks. It may be expressed through procrastination, reduced initiative, and avoidance of challenges (Steel, 2007). With AI offering instant answers, auto-generated content, and automated problem-solving, students might begin relying heavily on these tools rather than cultivating understanding through effort.

The convenience of AI may lead to decreased intellectual struggle, which is often essential for deep learning. This over-reliance can add to the surface-level engagement, undermining long-term academic and character development of the students. Therefore, it is important for in education to discern how AI tools are influencing students' intrinsic motivation and learning behaviours.

AI and safety in Education:

Safety in educational environments extends beyond physical well-being to encompass digital security. In this study, safety in education refers specifically to protection from risks such as identity theft, data breaches, spamming, and financial loss due to AI tool usage. With students increasingly interacting with digital platforms, safeguarding personal data and online behavior becomes paramount. AI plays a significant role in enhancing security through facial recognition, threat detection, and surveillance systems (Buchanan, 2020). Predictive analytics may help identify emotional distress or behavioral issues, enabling early interventions.

However, student awareness of these digital safety measures often remains low (Martin, et al, 2023). Many learners engage with AI-driven platforms without fully understanding the implications of data sharing, cyber threats, or algorithmic monitoring. Thus, while AI has the potential to create safer and smarter learning ecosystems, students must be educated about digital citizenship and the ethical use of AI to truly benefit from these advancements.

To delve deeper into the pre-defined understandings of AI in education among secondary and higher secondary school students in relation to laziness, decision making and security in education Banerjee, Kumar and Bajpai (2017) conducted a comparative analysis of decision-making strengths between AI and the human mind, exploring how experience and reasoning impact decisions. Their study found that experience plays a big role in how decisions are made. AI need to use reasoning to make good decisions and avoid mistakes. Human decision making can suffer in stressful situations, so AI can help improve decision when people are under pressure. This gives a base to the study conducted by Ferreira and Monteiro (2021) who attempted to trace the human-AI relationship in decision-making, particularly the role of AI in justifying decisions and integrating especially in business contexts. It was found that AI designs are based on understanding the interaction between humans and AI. Also, decision-makers need to consider the broader societal impacts of their choices and ensure that AI's role is both clear and transparent. In the domain of education in relation to AI and decision making, Ahmad et al. (2023) studied the impact of artificial intelligence (AI) on human behaviour and decision-making and the results suggested that AI can improve educational experiences, and it must be managed carefully to avoid negative impacts on students' cognitive and behavioural development. Castillo-Acobo et al (2023) studied the application and impact of AI in higher education at the University of Lima, Peru and they found that AI enhances higher education but has limitations such as job displacement, need for Investment, careful evaluation in the teaching and learning process. In relation to the limitations listed by Castillo-Acobo et al (2023), Salido (2023) delved into understanding the impact of AI-powered learning tools on students' understanding and academic performance and the findings suggested that AI has Enhanced Learning of the students and it could significantly transform education. She also concluded how crucial it is to responsibly integrate artificial intelligence into education, while preserving the core principles that underpin education. Duggal (2024) took on to study the advantages and disadvantages of AI and the results suggested improved efficiency, automation, accuracy, 24/7 operation, digital assistance, new inventions, handling repetitive tasks, daily life integration. Also, a lack of creativity, ethical

concerns, promoting laziness, lack of emotions, limited improvement and creativity and reliability was traced. Lastly, Sarwar, Saima, and Gul (2024) undertook a study on AI's role in secondary and higher secondary education and found that AI improved efficiency, accuracy, and automation but raised concerns about creativity, ethics. It offered benefits in digital assistance and daily life but has limitations in complex, creative tasks as well.

Despite these benefits, through the reviews conducted in India and abroad, there are certain concerns in the usage of AI among students. AI information may be easily accessible to the provider and students without reading proper terms and conditions of the AI service may accept it and may be subject to security concerns and other human limitations of laziness, and loss of decision making.

Need of the study:

Therefore, the need of the study is to examine the usage of AI and its implication on loss of their own decision making, laziness and how do the students especially the secondary and higher secondary school students look towards security concerns.

Aim and Objective of the present study :

The aim of the study is to ascertain a correlation between the usage of AI in relation to decision-making, laziness, and safety in education for secondary and higher secondary students

Following are the objectives of the study-

1. To ascertain a correlation between usage of artificial intelligence and decision-making scores among secondary and higher secondary school students.
2. To ascertain a correlation between usage of artificial intelligence and laziness scores among secondary and higher secondary school students.
3. To ascertain a correlation between usage of artificial intelligence and safety in education scores among secondary and higher secondary school students.

Methodology:

To gain a deeper understanding on the use of artificial intelligence in relation to decision making, laziness, and safety in education, the researchers in the current study used a quantitative research approach and adopted the survey research method. The present study included 131 secondary and higher secondary school students of which, 53 are female and 78 are male students using the purposive sampling technique. A ready-made questionnaire from Ahmad et al. (2023), was adapted where AI measures were taken from Suh and Ahn (2022), decision-making loss from Niese (2019), laziness from Dautov (2020), and safety and security issues from Youn (2009). Cronbach's alpha and composite reliability values were > 0.7 . while for the convergent validity, all the constructs have AVE values > 0.5 , indicating

that all the constructs are convergently valid and the reliable. The data was collected through the online mode via google form which was distributed to various secondary and higher secondary school students to elicit the required data. After the data was collected, it was analysed using Person's correlation 'r'.

Results:

Descriptive analysis of secondary and higher secondary school students about the usage of artificial intelligence in relation to decision making, laziness and security in education.

Table 1- Descriptive Analysis

Dimensions	Sample size	Mean	Median	Mode	SD	Skewness	Kurtosis
Artificial Intelligence	131	23.56	24	24	4.44	-0.21	1.18
Decision Making (loss)	131	16.65	16	16	2.90	0.21	2.65
Laziness	131	12.29	12	12	3.11	-0.06	-0.09
Safety in education	131	15.95	15	15	3.47	-0.11	1.20
Overall	131	68.47	68	71	10.56	0.09	4.57

The mean, median and mode are in the ascending order for Artificial Intelligence, whereas for decision making, laziness, security in education and overall, it is in the descending order.

The distribution is slightly positively skewed for decision making and overall, and slightly negatively skewed for artificial intelligence, laziness, and safety in education. The kurtosis for artificial intelligence, decision making, safety in education and overall are 1.18, 2.65, 1.20 and 4.57 respectively, which are more than zero hence it refers to leptokurtic distribution. In contrast, the kurtosis for laziness is -0.09 which is less than zero and hence, it refers to platykurtic distribution.

1. Correlation between artificial intelligence and decision making

Hypothesis: There is no significant relationship between usage of artificial intelligence and decision making among secondary and higher secondary school students.

Table 2- Relationship between artificial intelligence and decision making

Sample	Degree of Freedom (N – 2)	Tabular 'r' value		Coefficient 'r'	Level of Significance	Variance 100 r ²
		0.05	0.01			
131	129	0.172	0.23 0	0.669	0.05	44.75%

The obtained value of 'r' = 0.669, between artificial intelligence and decision-making scores of secondary and higher secondary school students, is greater than the tabulated value of 'r' at 0.05 level of significance. Therefore, the null hypothesis is rejected. There is a positive, substantial and a significant relationship between artificial intelligence and decision-making scores of secondary and higher secondary school students. 44.75% of the variance in the scores of artificial intelligence of students is associated with decision making.

2. Correlation between artificial intelligence and laziness

Hypothesis: There is no significant relationship between usage of artificial intelligence and laziness among secondary and higher secondary school students.

Table 3- Relationship between artificial intelligence and human laziness

Sample	Degree of Freedom (N – 2)	Tabular 'r' value		Coefficient 'r'	Level of Significance	Variance 100 r ²
		0.05	0.01			
131	129	0.172	0.23 0	0.477	0.05	22.75%

The obtained value of 'r' = 0.477, between artificial intelligence and human laziness scores of secondary and higher secondary school students, is greater than the tabulated value of 'r' at 0.05 level of significance. Therefore, the null hypothesis is rejected. There is a positive, moderate and a significant relationship between artificial intelligence and human laziness scores of secondary and higher secondary school students. 22.75% of the variance in the scores of artificial intelligence of students is associated with human laziness.

3. Correlation between artificial intelligence and safety in education

Hypothesis: There is no significant relationship between usage of artificial intelligence and safety in education among secondary and higher secondary school students.

Table 4- Relationship between artificial intelligence and safety in education

Sample	Degree of Freedom (N – 2)	Tabular 'r' value		Coefficient 'r'	Level of Significance	Variance 100 r ²
		0.05	0.01			
131	129	0.172	0.230	0.209	0.05	4.36%

The obtained value of $r = 0.209$, between artificial intelligence and safety in education scores of secondary and higher secondary school students, is greater than the tabulated value of r at 0.05 level of significance. Therefore, the null hypothesis is rejected. There is a positive, low and a significant relationship between artificial intelligence and safety in education scores of secondary and higher secondary school students. 4.36% of the variance in the scores of artificial intelligence of students is associated with safety in education.

Discussions and Conclusion:

In the present study it is found that there is a positive and a substantial correlation between AI and decision making. These findings may imply that students who heavily rely on AI tools are not merely using them as supportive aids, but may gradually begin to outsource critical cognitive tasks—such as information filtering, option weighing, and final decision-making—to these systems. AI technologies, especially those that provide suggestions, answers, or automated choices (like predictive text, content recommendations, or even academic tools), reduce the mental effort required to process, analyze, and choose among alternatives. Over time, this habitual dependence on algorithmic support may lead students to become less confident and less practiced in independent decision-making. They may prefer relying on machine-generated outputs rather than engaging in thoughtful deliberation. This cognitive offloading can gradually weaken their internal capacities for their own thinking, problem solving. In the educational context, this shift can have significant implications. While AI can undoubtedly augment learning by providing quick access to information and enhancing productivity, it may unintentionally discourage deep engagement and active learning, especially when

students begin to accept AI outputs uncritically. Hence, the study's findings raise important questions about the balance between AI integration and cognitive development. School education needs to equip students with metacognitive awareness to help them understand when to use AI support effectively and when to engage their own thinking skills. Failure to bring this balance could contribute to a generation of learners who are digitally fluent but cognitively dependent.

With respect to AI in education and laziness, it is found that there is a positive, moderate, and significant relationship between them. This finding echoes the concerns raised by Duggal (2024) and Sarwar, Saima, and Gul (2024) about AI potentially promoting laziness. This is possible because AI tools automate tasks that previously required effort and time. By making these tasks easier and more efficient, AI can lead students to rely heavily on technology, thus, reducing their motivation to perform tasks manually. This reliance on AI might encourage more passive behaviour and contribute to increased laziness. However, this relationship is relatively weak because not all students respond to AI in the same way. In addition, the education system of students of secondary and higher secondary levels continue to engage them in productive activities, that does not involve the utilization of AI. The moderate relation also attributes that certain students are motivated themselves to actively engage in work despite the presence of AI. Therefore, while AI can influence laziness, its impact is moderated by various individual and dependent factors.

Lastly, in the present study, it is found that secondary and higher secondary school students have a positive, low, and significant relationship between artificial intelligence and safety in education. This suggests that as students' interaction with AI increases, their awareness or perception of safety particularly in terms of digital risks also slightly improves. The low strength of the correlation implies that while a relationship exists, AI exposure alone does not strongly influence how safe or unsafe students feel regarding data security and online risks in education. On one hand it could be elaborated that students who are more familiar with AI tools may also develop a basic understanding of privacy settings, data usage policies, and cyber hygiene practices, either through usage or through exposure to digital literacy initiatives. Their comfort with AI may make them more alert or more trusting of how these tools manage data. However, the other side of the findings revealed that there is a relatively small percentage of variance for this correlation and hence students' safety concerns or perceptions in relation to AI could also be influenced by other factors such as parental guidance, school policy on data protection, digital literacy education, or previous experiences with online threats. It also signals that students

may not yet be fully aware of the hidden or long-term implications of AI use on their digital privacy and security, pointing to a knowledge gap in critical AI literacy.

In conclusion, while AI offers promising educational enhancements, it also introduces emerging cognitive and behavioural challenges. Increased exposure to AI appears to correlate with a decline in essential human attributes such as independent decision-making and self-motivation, even as moderately contributes to laziness and it marginally contributes to perceived safety in education. The study emphasized the need for balanced AI integration in educational settings. While AI should be embraced by learners for its capacity to personalize learning and improve efficiency, it must be accompanied by deliberate pedagogical strategies by the school systems to encourage critical engagements, active learning participation and strengthening digital responsibility and safety awareness. Without this balance, there is a risk that AI may unintentionally erode foundational student competencies essential for lifelong learning and responsible citizenship in a tech-driven world.

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EXPLORING SCIENCE-RELATED ACTIVITIES ON CBSE SCHOOL WEBSITES IN MUMBAI: A CONTENT ANALYSIS

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Abstract:

In the digital age, school websites have emerged as vital platforms for communication, representation, and the promotion of academic initiatives. They offer a transparent and accessible space for disseminating important information to students, parents, and the broader community. Beyond routine administrative updates, these websites reflect a school's vision, showcase achievements, highlight programs, and present innovative practices, playing a crucial role in shaping public perception and fostering engagement in both academic and co-curricular spheres.

This study presents a content analysis of CBSE-affiliated school websites in Maharashtra, with a specific focus on science-related representation. A total of fifty CBSE board schools from Mumbai and Navi Mumbai were selected via the official CBSE website. The research aims to investigate how science-related activities are portrayed in the public digital domain by various institutions.

The study primarily examines the promotion of a wide range of science-focused activities, including the establishment of advanced science laboratories, the use of modern equipment and tools, participation in science clubs, the organization of science exhibitions and fairs, educational visits to advanced science facilities, investment in innovative projects, and involvement in STEAM (Science, Technology, Engineering, Arts, and Mathematics) initiatives. Additionally, it emphasizes the recognition and celebration of student achievements in the field of science.

The findings highlight a significant digital divide in the representation of science education, underlining the need for equitable and enthusiastic digital promotion across all types of educational institutions. These insights contribute meaningfully to broader discussions on educational equity, the encouragement of STEAM education, and the integration of a strong digital presence within school systems. By identifying successful strategies, innovative practices, and areas for improvement, this research offers valuable implications for policymaking and curriculum development.

Keywords: *CBSE, STEAM, Content analysis, Website, Science Related Activities*

Introduction:

Background of the Study:

School websites play a crucial role in public engagement and communication in the digital age. They reflect a school's values, highlight achievements, and provide access to academic and co-curricular information. When schools have a well-maintained website, they can connect with students, parents, and the community at large.

Science education holds a key place in school curricula, encouraging critical thinking, innovation, and curiosity. Activities such as science fairs, lab work, student projects, and STEAM initiatives help students develop practical skills and a scientific mindset. The Central Board of Secondary Education (CBSE) supports a balanced curriculum that promotes both academic and co-curricular development. However, the way individual schools represent their science-related efforts online often varies, influenced by factors such as resources, priorities, and digital capacity.

Mumbai and Navi Mumbai are home to a wide range of CBSE-affiliated schools, offering a useful context to explore these differences. This study focuses on analyzing the science-related content on the websites of fifty CBSE schools in these cities. The aim is to identify trends, highlight good practices, and suggest ways schools can enhance their digital presence in promoting science education.

Content Analysis:

Content analysis is a qualitative and quantitative research method used to examine the presence, frequency, and patterns of specific words, themes, or concepts within textual, visual, or digital content (Chong et al., 2021). Within the CBSE schools setting of instructive teach, it is especially valuable in assessing how schools' websites display themselves online.

School websites serve as an important channel for sharing information and showcasing achievements, and their design and content play a crucial role in shaping public perception.

Analyzing the content of these websites helps researchers assess not only the type of information being communicated but also the emphasis placed on certain subject areas, including science. This strategy permits assessment of how regularly science-related activities are highlighted, the profundity of data shared, and the generally perceivability of science instruction inside the school's advanced character.

This study applies content analysis to the websites of fifty CBSE-affiliated schools in Mumbai and Navi Mumbai, focusing specifically on science-related content. This includes examining the presence of dedicated sections for science activities, updates about science fairs and exhibitions, references to laboratory infrastructure, student

participation in science clubs or STEAM initiatives, and acknowledgment of student achievements in the field of science. By reviewing both the frequency and quality of this content, the study seeks to identify patterns in digital communication and understand the level of emphasis placed on science education.

Evaluation through content analysis also helps identify inconsistencies, outdated information, or gaps in representation, which may indicate disparities in digital practices among schools. It further provides insights into how schools can improve the visibility and accessibility of their science-related programs online.

Review of Literature:

Research into how schools use their websites shows that, while these platforms are great for sharing information, they don't always do a great job of showcasing science education. For example, **Kaur & Gupta (2019)** found that while many schools use their websites to highlight their academic successes, science programs often get left out. **Lee et al. (2020)** discovered that schools with a focus on STEM tend to showcase science-related projects and competitions, but this isn't something that all schools do. On the other hand, **Chong et al. (2021)** noted that private schools are usually better at keeping their science content fresh and up-to-date compared to public schools. **NCERT (2020)** also pointed out that urban schools tend to have more resources and better digital representation than their rural counterparts.

Overall, the literature suggests that there's a real gap when it comes to schools properly showcasing their science programs online, especially in places like India.

Criteria for Content analysis:

1. Science Club – Presence and details of science club activities
2. Science Fairs/Exhibitions – Information about organization and participation
3. Participation in Olympiads/Competitions – Updates on student involvement in contests
4. Dedicated STEAM Section – Visibility of STEAM-related initiatives or platforms
5. Science Lab Facilities – Details about infrastructure and lab updates
6. Science Activities in Photo Galleries – Frequency and relevance of uploaded visuals
7. External Collaboration – Information on partnerships and collaborative efforts
8. Science Achievement Recognition – Highlighting awards or student accomplishments
9. Innovative Science Projects – Showcasing original student projects and innovations
10. Use of Inclusive & Motivational Language – Tone and inclusiveness in science-related content.

Statement of the Problem:

Websites for schools are crucial channels for information exchange and institutional focal reflection. These online platforms are used by CBSE-affiliated schools to emphasize their academic accomplishments and attributes in addition to providing information. Numerous initiatives, including scientific fairs, lab work, innovation projects, and STEAM programs, are used to promote science education, which is a vital component of the school curriculum.

However, it seems that different school websites offer science-related content differently. While some institutions make a big deal out of their science programs, others don't have clear or thorough representation. Research on how schools convey their science teaching activities online is few, despite the growing significance of digital visibility.

This study aims to analyze the content of CBSE school websites in Mumbai and Navi Mumbai, focusing specifically on the representation of science-related activities. The findings will help identify gaps, best practices, and ways to strengthen the digital portrayal of science education in schools.

Objectives of the Study:

1. To study the presentations of science-related activities on the official websites of selected CBSE affiliated schools in Mumbai and Navi Mumbai.
2. To identify the types of science initiatives displayed on school websites by CBSE affiliated schools in Mumbai and Navi Mumbai To assess the quality and frequency of science-related updates displayed on school websites by CBSE affiliated schools in Mumbai and Navi Mumbai.
3. To compare variations in digital representation displayed on school websites by CBSE affiliated schools in Mumbai and Navi Mumbai.
4. To suggest areas of improvement needed in showcasing science activities online.

Scope of the Study:

The study is limited to the official websites of fifty CBSE-affiliated schools located in Mumbai and Navi Mumbai. Schools from other regions are not included.

The focus is on how science-related activities are presented on these websites. Areas examined include science fairs and exhibitions, laboratory infrastructure, innovative projects by students, the presence and activities of science clubs, and STEAM (Science, Technology, Engineering, Arts, and Mathematics) initiatives.

Only information available on official websites has been considered. No data was collected through interviews, surveys, or field visits. The study aims to assess the visibility and documentation of science education through digital platforms used by schools in the selected region.

Delimitation of the Study:

The study is limited to CBSE-affiliated schools in Mumbai and Navi Mumbai. Schools outside these areas are not included.

The research is based only on the content available on official school websites. No interviews, surveys, or school visits were conducted.

Table: List of fifty CBSE-affiliated schools located in Mumbai and Navi Mumbai

Sr No	List of CBSE Schools in Mumbai	Address	Type	Website
1	Al Barkaat Malik Muhammad Islam English School	kurla (W), Mumbai - 400070	Private	https://www.albarkaatmumbai.edu.in
2	ORCHIDS The International School - CBSE School in Masjid Bunder	Masjid Bandar, Mumbai, 400009	Private	https://www.orchidsinternationalschool.com/mumbai-branches/masjid-bunder
3	Navy Children School	Colaba, Mumbai 400005	Private	https://www.ncsmumbai.com/
4	Army Public School Mumbai	Colaba, Mumbai 400005	Public	https://www.apsmumbai.com/
5	Gopi Birla Memorial School	Malabar hill, Mumbai 400006	Private	https://www.gbmschool.co.in/
6	MahaPragya public school	Kalbadevi Rd, Mumbai, 400002	Public	https://www.mahapragyapublicschool.com/
7	Chhabildas English Medium School	Dadar West, Mumbai - 400028	Private	https://www.chhabildascbseschool.com/
8	Kanakia International School	Chembur, Mumbai 400043	Private	https://kanakiaschools.org
9	PM Shri Kendriya Vidyalaya No.1	Colaba, Mumbai 400005	Public	https://no1colaba.kvs.ac.in/
10	MPS Kane Nagar CBSE School	Antop Hill (E) Wadala Mumbai 400037	Public	https://kanenagar.mumbaipublicschools.in/
11	MPS Shankar Bhavani CBSE School	Dadar West, Mumbai - 400028	Public	https://bhavanishankar.mumbaipublicschools.in/

12	Atomic Energy Central School - 4	CBD Belapur New Mumbai	Private	http://www.aees.gov.in
13	K.M.S. English Medium School	Parel, Mumbai 400012	Private	https://kmsenglishmediumcbse.com/
14	Rajhans Vidyalaya	Andheri west, Mumbai 400058	Private	https://rajhans.bkham.edu.in
15	R.N. Podar School	Santacruz, Mumbai 400054	Private	https://podarinternationalschool.com
16	Matoshree Kashiben Vrajlal Valia International Vidyalaya (MKVVIV)	Borivali West, Mumbai 400092	Private	https://mkvvivschool.in
17	Sheth Karamshi Kanji English School (SKKES)	Mulund West, Mumbai 400080	Private	https://skkeschool.com/
18	R.N. Podar School	Andheri West, Mumbai 400053	Private	https://ashokacademy.org/
19	Atomic Energy Central School No. 2 (AECS-2)	Anushakti Nagar, Mumbai 400094	Public	https://aecsmum2.ac.in/
20	Atomic Energy Central School No.3 (AECS-3)	Anushakti Nagar, Mumbai 400094	Public	https://aecsmum3.ac.in/
21	Ryan International School	Kandivali East, Mumbai 400101	Private	https://www.ryangroup.org
22	Gopal's Garden High School (GGHS)	Borivali (East), Mumbai 400066	Private	https://gopalsgarden.com/
23	Orchids The International School (OTIS)	Thane (West), Mumbai 400607	Private	https://www.orchidsinternationalschool.com/mumbai-branches/thane
24	Podar International School	Powai, Mumbai 400076	Private	https://www.podareducation.org/school/powai
25	Orchids The International School	Malad West, Mumbai 400064	Private	https://www.orchidsinternationalschool.com/mumbai-branches/malad/

26	SSL English School	Parel, Mumbai 400012	Private	https://www.sslschool.in/
27	Shri Harshad C. Valia International School	Andheri (West), Mumbai 400053	Private	https://shcvaliaintschool.in/
28	Balmohan Vidyamandir	Dadar (West), Mumbai 400028	Private	https://www.balmohan.org/
29	Orchids The International School	Vikhroli East, Mumbai 400083	Private	https://www.orchidsinternationalchool.com/mumbai-branches/vikhroli
30	RBK Global School	Chembur East, Mumbai 400043	Private	https://rbkei.org/
31	P E S Central School	CBD Belapur, Navi Mumbai 400614	Private	http://www.pescschool.org/
32	Apeejay Education	Nerul, Navi Mumbai 400706	Private	https://www.apeejay.edu/nerul
33	DAV Public School	Nerul, Navi Mumbai 400706	Private	https://davnerul.com/
34	Delhi Public School (DPS)	Nerul, Navi Mumbai 400706	Private	https://dpsnavimumbai.edu.in/
35	New Horizon Public School	Airoli, Navi Mumbai 400708	Private	https://www.nhpsairoli.com/
36	Bal Bharati Public School	Kharghar, Navi Mumbai 410210	Private	https://bbpsnavimum.balbharati.org/
37	Amrita Vidyalayam	uinagar (West), Navi Mumbai 400705	Private	https://nvmb.amritavidyalayam.org/
38	Don Bosco Senior Secondary School	Nerul (W), Navi Mumbai 400706	Private	https://www.donbosconerul.edu.in/
39	Nalanda Public	Mulund (East), Mumbai 400081	Private	https://www.nalandapublicschool.org/

40	V.P.M.S B.R.Tol English High School	Mulund (East), Mumbai 400081	Private	https://www.vpmbrtol.co.in/
41	SSPM's Sri Sri Ravishankar Vidya Mandir	Borivali (East), Mumbai 400066	Private	http://ssrvvm-borivali.org/
42	Billabong High International School	Malad (West), Mumbai 400095	Private	https://www.billabonghighschool.com/mumbai-malad/
43	Manav Mandir's Smt. Nandkumar Rasiklal P. Seth Multipurpose High School	Malabar Hill, Mumbai 400006	Private	-
44	Rizvi Springfield High School	Khar West, Mumbai 400052	Private	https://rizvispringfieldcbse.edu.in/
45	The Somaiya School	Vidyavihar (East), Mumbai 400077	Private	https://tss.somaiya.edu/
46	New Bombay City School	Ghansoli, Navi Mumbai 400701	Private	https://nbcscbse.in/
47	VIBGYOR High School	Borivali West, Mumbai 400092	Private	https://www.vibgyorhigh.com
48	Atomic Energy Central School No. 1 (AECS-1)	Anushakti Nagar, Mumbai 400094	Private	https://aecsmum1.ac.in/
49	Kendriya Vidyalaya Koliwada	Antop Hill, Mumbai	Public	https://koliwada.kvs.ac.in/
50	HVPS International School	Andheri West, Mumbai 400053	Private	https://www.hvpsinschool.com/

Methodology of the Study:

This study uses the content analysis method to evaluate science-related content on the official websites of 50 CBSE-affiliated schools in Mumbai and Navi Mumbai. A structured checklist was prepared to assess various elements such as science clubs, lab facilities, exhibitions, and STEAM activities.

1. Selection of Sample

The selection of CBSE-affiliated schools for this study is based on the official list of recognized schools provided by the Central Board of Secondary Education. Schools located in Mumbai and Navi Mumbai were chosen to ensure a diverse representation from both urban and suburban areas. A mix of private and government schools was included to capture variations in the digital representation of science-related content across different school types.

2. Sample Size

The sample size for the study consists of fifty CBSE-affiliated school websites selected from Mumbai and Navi Mumbai. The schools were chosen based on their listing on the official CBSE website. The selection includes a mix of private and government institutions

1. Findings of the Study:

Limited Representation of Science Clubs

The majority of schools (76%) do not showcase science club activities on their websites. Only 4% provide detailed content, and 20% briefly mention the existence of science clubs.

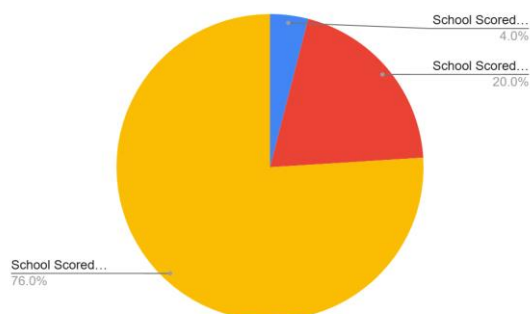
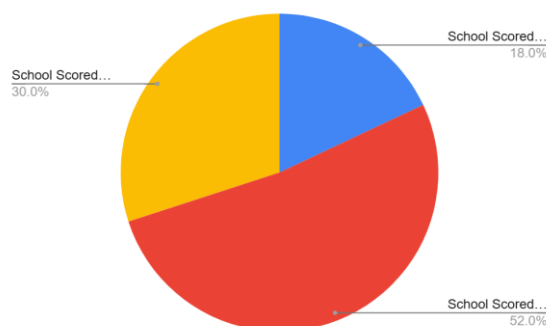


Figure no 1: Content Criteria initiatives in Science Clubs

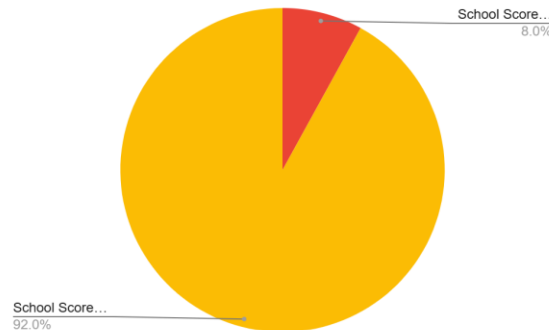
Partial Documentation of Science Exhibitions

While 72% of schools post about science exhibitions and fairs, only a small fraction (20%) offer comprehensive details about these events.



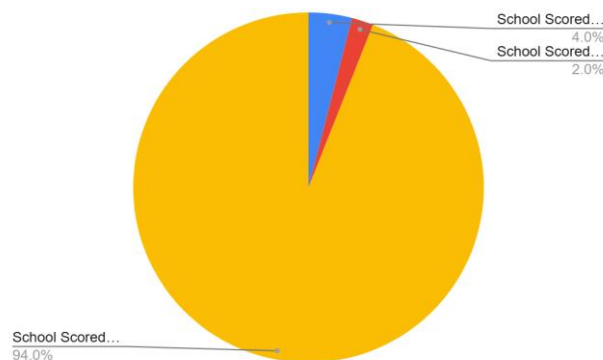
Lack of Updates on Olympiads and Competitions

A significant 92% of schools do not provide updates on participation in science olympiads, competitions, or innovative projects, suggesting a major gap in representing academic involvement.



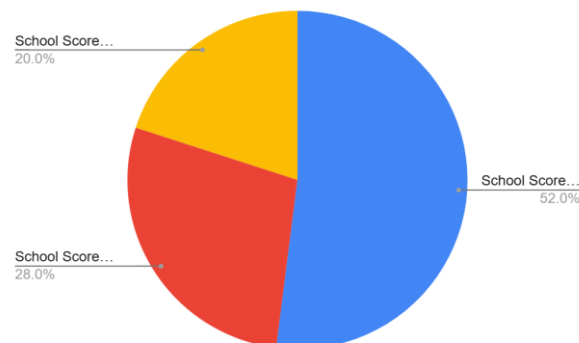
Underrepresentation of STEAM Education

Nearly 94% of schools lack a dedicated section or content related to STEAM initiatives, indicating a missed opportunity to highlight interdisciplinary science education.



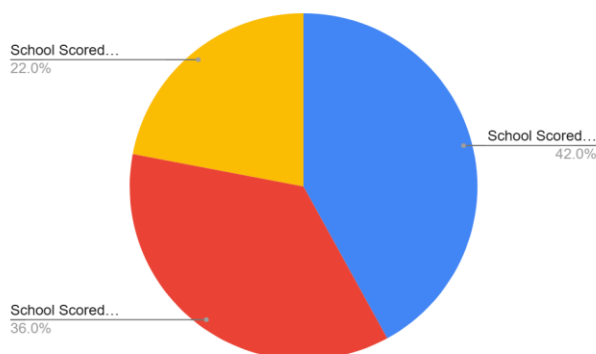
Basic Information on Science Labs Available

Around 80% of schools publish information about their science laboratories and infrastructure, though 20% still fail to provide any such updates.



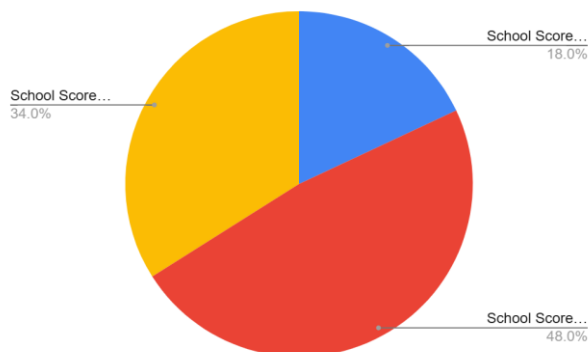
Inconsistent Gallery Updates for Science Activities

Though 78% of schools use their galleries to display science-related activities, only 42% update this content regularly.



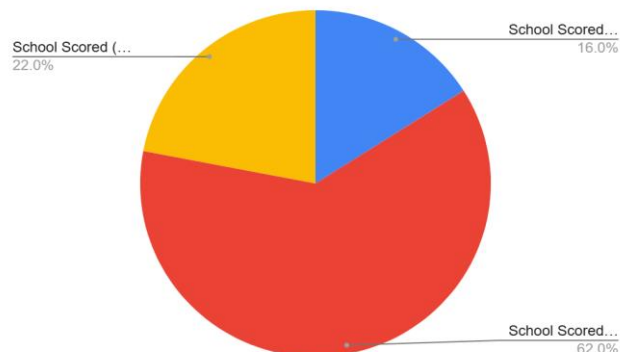
Insufficient Information on Collaborations

About one-third (34%) of schools do not mention collaborations or partnerships in the field of science education, limiting transparency and recognition of external engagement.



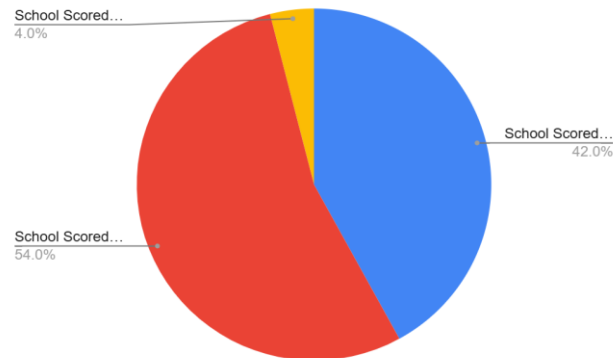
Good Visibility of Student Achievements

A positive 78% of schools highlight science-related achievements of their students, promoting success and motivation.



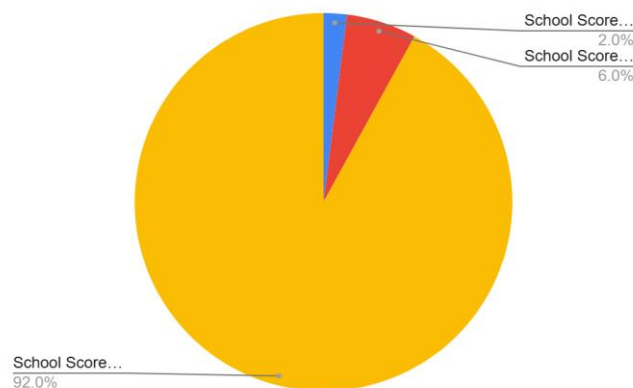
Encouraging Use of Motivational Language

Most schools (96%) use inclusive and inspiring language in their science content, positively shaping student perceptions.



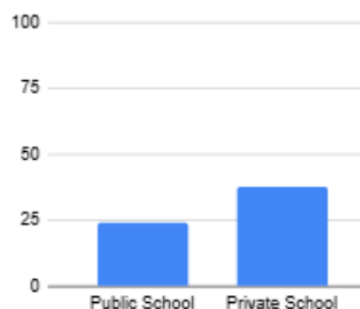
Science Competitions and Innovations Overlooked

Over 90% of school websites do not feature updates on science competitions, olympiads, STEAM projects, or student innovations, even among otherwise well-maintained sites.



Private Schools More Digitally Active

Private CBSE schools maintain and update their science-related content more frequently—about 15% more—compared to public CBSE schools.



2. Interpretations of Findings

Science Club Representation:

The study reveals that only a small proportion (4%) of CBSE school websites provide detailed information about their science club activities. While 20% of the schools acknowledge the existence of a science club, the majority—approximately 76% do not include any reference to such activities on their websites.

Science Exhibitions and Fairs:

Content related to science exhibitions and fairs is present on about 72% of the school websites. However, within this group, only 20% provide thorough and well-structured details about these events, indicating a lack of depth in the majority of presentations.

Participation in Olympiads and Competitions:

A notable gap exists in the documentation of participation in science olympiads and competitions. Around 92% of schools do not share this information online. This trend extends to the coverage of innovative student science projects, which are also largely unrepresented.

STEAM Education Representation:

There is minimal evidence of dedicated platforms or sections highlighting STEAM-related activities. Approximately 94% of the schools fail to feature any structured representation of their STEAM initiatives, suggesting an underutilization of the digital medium to promote interdisciplinary science education.

Science Laboratory Facilities:

Information on laboratory infrastructure is shared by nearly 80% of the schools. However, 20% of the websites do not mention or update any content related to science laboratories or associated developments.

Science Activities in Photo Galleries:

Photo galleries showcasing science-related events and activities are available on 78% of school websites. Of these, only 42% regularly update the galleries, which raises concerns about the consistency and timeliness of digital content.

Information on Collaborations:

About 34% of schools do not disclose any partnerships or collaborative efforts related to science education. The absence of such information limits the visibility of external engagement and resource sharing.

Science Achievement Recognition:

Approximately 78% of the websites highlight student achievements in science. While this is a positive indicator, the level of detail and frequency of updates vary across institutions.

Use of Inclusive and Motivational Language:

Encouragingly, 96% of school websites use language that is motivational and inclusive, contributing positively to the representation of science education and fostering an encouraging digital atmosphere for students.

Comparison Between Public and Private CBSE Schools:

The comparative analysis indicates that private CBSE schools are more consistent in maintaining and updating their websites. On average, their science-related content is 15% more current and detailed than that of public schools.

Neglect in Showcasing Science Competitions and Innovations:

Despite having well-maintained websites in some aspects, more than 90% of schools fail to include updates on science competitions, olympiads, innovative projects, or STEAM-based initiatives. This indicates a widespread neglect in digitally showcasing some of the most dynamic aspects of science education.

Conclusions:

The study of CBSE-affiliated school websites in Mumbai and Navi Mumbai shows clear differences in how science-related activities are presented online. While some schools provide information on science clubs, exhibitions, and student achievements, many lack detailed or updated content. Important areas such as participation in science olympiads, innovative projects, and STEAM-related activities are missing on the majority of websites. Although most schools use motivational and inclusive language, the limited information on collaborations and updates reflects a missed opportunity to promote science education through digital platforms. Private schools are generally more regular in updating their websites compared to public schools. These findings suggest the need for a more consistent and organized approach to representing science education on school websites. This study looked at how science-related activities are shared on the websites of CBSE schools in Mumbai and Navi Mumbai. We found that while some schools do a good job of showcasing science clubs, exhibitions, and student achievements, many others are missing detailed or up-to-date content. Important areas like participation in science olympiads, student projects, and STEAM activities were often not mentioned at all.

Most schools use positive and motivating language when talking about science, which is a good thing for student engagement. However, the lack of detailed information about collaborations with other institutions or external projects is a missed opportunity. Private schools, in general, seem to be better at keeping their websites updated with relevant science-related content compared to public schools. These findings suggest that schools need to be more consistent in how they present science education online. There's room for improvement in making science education

more visible and accessible, especially when it comes to activities like science fairs, projects, and competitions.

How This Study Contributes to School Education and the School System

1. **Making Science Education More Visible:** This study shows that there's a real opportunity for schools to promote their science programs better online. By sharing more about science fairs, projects, and Olympiad participation, schools can engage students more effectively, spark interest in science, and create a more dynamic learning environment.
2. **Supporting Educational Policy:** The results of this study can help shape educational policies that encourage schools to improve how they use their websites for communication. Clearer guidelines for showcasing science activities online could help schools make better use of digital tools to connect with students and parents.
3. **Fairer Representation Across School Types:** The study also highlights a gap between private and public schools when it comes to digital engagement. Private schools tend to update their websites more regularly, which means public schools might need more support to improve their online presence. By addressing this, we can ensure that all students have access to well-represented science programs, regardless of their school's resources.
4. **Boosting Engagement with Parents and the Community:** When schools share detailed information about science activities online, it encourages parents and the wider community to get involved. This helps create a stronger connection between the school and its stakeholders, and can motivate students to get more involved in science, knowing their efforts are being celebrated.
5. **Opening Doors for Further Research:** This study also paves the way for more research into how schools can use digital platforms to represent different subject areas. It's not just about science—it's about ensuring that all subjects are showcased in a way that captures students' interest and fosters a love of learning.

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A COMPARATIVE STUDY OF SELF-REGULATED LEARNING LEVELS BETWEEN ELEMENTARY AND SECONDARY PRE-SERVICE TEACHERS

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Abstract:

The present study compares the Self-Regulated Learning (SRL) levels of Elementary (D. El. Ed.) and Secondary (B. Ed.) pre-service teachers of Bombay Teachers' Training College (BTTC). Administering the Self-Regulated Learning Scale (SRLS-GMMD) of Prof. (Dr.) Madhu Gupta & Ms. Dimple Mehtani on a purposive sample of 147 pre-service teachers, the study compares group differences based on programme type, class, family type, qualification and age. Statistical analyses including t-tests and ANOVA show no significant differences across the comparison groups, except between graduates and postgraduates. It was found that there was a significant difference in the SRL levels between graduate and post graduate pre-service teachers. The findings highlight the need for the usage and encouragement of SRL strategies in teacher education programmes. The present research is restricted to BTTC. The study contributes to a deeper understanding of SRL integration in teacher training and encourages transformative leadership for a sustainable future.

Keywords: *Self-Regulated Learning (SRL), D. El. Ed, B. Ed., Pre-Service Teachers, Elementary, Secondary, Bombay Teachers' Training College (BTTC), transformative leadership, sustainable future*

Introduction:

Self-Regulated Learning (SRL) makes students 'responsible students' by making them capable to manage their own learning journey. It encourages them to learn out of their own volition. There is minimal scaffolding from teachers. With SRL, students can become determined and goal-oriented. They will also be capable of understanding concepts independently and comprehensively as self-regulation facilitates a deeper understanding of subject matter.

A self-regulated student monitors their thoughts, emotions and actions in alignment with their learning goals. This makes the learning process more focused and efficient. Research shows that high achievers are more likely to be self-regulated learners (Kosnin, 2007) and that SRL components are significantly related to academic performance (Zhang & Huang, 2010) and psychological well-being (Tavakolizadeh, 2012).

Developing SRL strategies in pre-service teachers is vital for transformative capacity building in education. It prepares them to adapt to diverse learning environments, promote student autonomy and use sustainable teaching practices. Integrating SRL into teacher education supports future teachers to bring necessary positive changes and contribute to a sustainable future.

One of the first steps in becoming a good teacher is gaining strong content knowledge. SRL is a key to that. Encouraging today's pre-service teachers to become self-regulated students will empower them to pass these skills to their future students.

Significance of the Study:

This study and the researcher intend to contribute meaningfully to the increasing interest in SRL within teacher education. This research compares the SRL of Elementary and Secondary Pre-Service Teachers of BTTC. It adds on to the existing literature.

Though limited in scale, this study may offer useful insights for teacher educators, curriculum planners and institutions desiring to support pre-service teachers in becoming more reflective and independent people who will encourage and inspire their students to do the same in the future. As the National Education Policy (NEP) 2020 encourages autonomous, self-regulated and competent teachers, understanding SRL patterns among pre-service teachers is both timely and relevant.

Objectives of the Study:

1. To compare the overall SRL levels between D. El. Ed. and B. Ed. pre-service teachers of BTTC.
2. To compare the SRL levels between F.Y. D. El. Ed. and S.Y. D. El. Ed. pre-service teachers of BTTC.
3. To compare the SRL levels between F.Y. B. Ed. and S.Y. B. Ed. pre-service teachers of BTTC.
4. To compare the SRL levels between F.Y. D. El. Ed. and F.Y. B. Ed. pre-service teachers of BTTC.
5. To compare the SRL levels between S.Y. D. El. Ed. and S.Y. B. Ed. pre-service teachers of BTTC.

6. To compare the SRL levels of pre-service teachers of BTTC living in a nuclear family and joint family.
7. To compare the SRL levels of H. S. C., Graduates and Post Graduates pre-service teachers of BTTC.
8. To compare the SRL levels of pre-service teachers of BTTC of age groups below 20 and above 20.

Hypotheses:

1. There is no significant difference in the overall SRL levels between D. El. Ed. and B. Ed. pre-service teachers.
2. There is no significant difference in the SRL levels between F.Y. D. El. Ed. and S.Y. D. El. Ed. pre-service teachers.
3. There is no significant difference in the SRL levels between F.Y. B. Ed. and S.Y. B. Ed. pre-service teachers.
4. There is no significant difference in the SRL levels between F.Y. D. El. Ed. and F.Y. B. Ed. pre-service teachers.
5. There is no significant difference in the SRL levels between S.Y. D. El. Ed. and S.Y. B. Ed. pre-service teachers.
6. There is no significant difference in the SRL levels between pre-service teachers living in a nuclear family and joint family.
7. There is no significant difference in the SRL levels of pre-service teachers according to their qualification:
 - A. There is no significant difference in the SRL levels between H. S. C and Graduates pre-service teachers.
 - B. There is no significant difference in the SRL levels between H. S. C and Post Graduates pre-service teachers.
 - C. There is no significant difference in the SRL levels between Graduates and Post Graduates pre-service teachers.
8. There is no significant difference in the SRL levels of pre-service teachers of age groups below 20 and above 20.

Tool Used:

To analyse the SRL levels of the pre-service teachers, Self-Regulated Learning Scale (SRLS- GMMD) of Prof. (Dr.) Madhu Gupta & Ms Dimple Mehtani was used. The scale consists of 48 questions, the respondent has to rate their response on the five-point Likert scale. The scores against the response for positive items are like 5 for Strongly Agree, 4 for Agree, 3 for Undecided, 2 for Disagree and 1 for Strongly Disagree and the scores against the response for negative items are like 1 for Strongly Agree, 2 for Agree, 3 for Undecided, 2 for Disagree and 1 for Strongly Disagree. The reliability

coefficient of SRLS-GMMD was 0.88 by Split Half method and 0.982 by Test-Retest method.

Methodology:

The present study used the descriptive survey method of the quantitative type to compare the levels of SRL between pre-service teachers of BTTC. A purposive sample of 147 participants was drawn from the F.Y. and S.Y. pre-service teachers of the D. El. Ed. (71) and B. Ed. (76) programmes at BTTC. The survey, using the rating scale, was conducted via Google Forms, with official institutional permission and informed consent, under the supervision of the researcher. Both descriptive and inferential statistical techniques were used for data analysis, including the independent samples t-test and one-way ANOVA, were applied to understand group differences at the 0.05 level of significance. Further, after ANOVA, t-tests were run to determine which specific groups differ from each other.

Sample: The sample consisted of 147 pre-service teachers, N=147. These participants were from both first-year and second-year batches of the D. El. Ed. and B. Ed. programs.

Sampling Technique: The sampling technique used in the study was purposive sampling. Purposive sampling is a type of non-probability sampling. The participants were chosen purposely based on their enrollment in D. El. Ed and B. Ed. programs and their relevance to the research aim.

Size and Composition of Sample: The following Table A presents the detailed composition of the sample, along with percentages based on the total number of participants (N = 147).

Table A: Composition of the Sample

Category	Group	Number of Students with Percentage
Program-wise	D. El. Ed.	71 (48%)
	B. Ed.	76 (52%)
Year-wise	F.Y. D. El. Ed.	40 (27%)
	S.Y. D. El. Ed.	31 (21%)
	F.Y. B. Ed.	36 (25%)
	S.Y. B. Ed.	40 (27%)
Age-wise	Below 20 years	130 (88%)
	Above 20 years	17 (12%)
Family Type	Nuclear Family	103 (70%)
	Joint Family	44 (30%)
Qualification	HSC	45 (31%)
	Graduate	71 (48%)
	Postgraduate	31 (21%)

Table of Scoring Pattern:

Table B: Scoring Pattern

Type of Item	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
Positive	5	4	3	2	1
Negative	1	2	3	4	5

As seen in Table B, each item in the SRLS is scored on a 5-point Likert scale, depending on whether the item is positive or negative. The total score is the sum of scores across all 48 items.

Analysis of Data:

Data was analyzed on Microsoft Excel. T-tests were applied at 0.05 level of significance to compare SRL levels between programme types, age groups and family types. To understand the data better, Mean and Standard Deviation were also calculated. One-Way ANOVA was applied to compare the SRL levels between different qualifications of pre-service teachers. After ANOVA, t-tests were done to find out significance between groups.

Hypothesis 1 There is no significant difference in the overall SRL levels between D. El. Ed. and B. Ed. pre-service teachers.

The following table shows the relevant statistics of the overall SRL levels between D. El. Ed. and B. Ed. pre-service teachers.

Table 1: Relevant statistics of the overall SRL levels between D. El. Ed. and B. Ed. pre- service teachers

Hy 1	Groups	N	df	Mean	SD	SEd	T (cal)	T (tab)	L. of Sig.
1	D. El. Ed	71	14	176.28	15.39	2.68	0.28	1.96	NS at 0.05
	B. Ed.	76	5	175.51	16.97				

From Table 1, it is clear that the calculated t-value is 0.28, which is not significant at 0.05 level with $df = 145$, $p = 0.77$. It shows that the mean score of the overall D. El. Ed. pre-service teachers differs from the mean score of the overall B. Ed. pre-service teachers, but not significantly. In other words, the difference between the two groups is not statistically significant. Therefore, the null hypothesis stating that there is no significant difference in the overall SRL levels between D. El. Ed. and B. Ed. pre-service teachers is retained.

Hypothesis 2 There is no significant difference in the SRL levels between F.Y. D. El. Ed. And S.Y. D. El. Ed. pre-service teachers.

The following table shows the relevant statistics of SRL levels of F.Y. D. El. Ed. and S.Y. D. El. Ed. pre-service teachers.

Table 2 Relevant statistics of the SRL levels between F.Y. D. El. Ed. and S.Y. D. El. Ed. pre-service teachers

Hy 2	Groups	N	df	Mean	SD	SEd	T (cal)	T (tab)	L. of Sig.
2	F.Y. D. El. Ed	40	69	177.3	15.42	3.70	0.63	1.99	NS at 0.05
	S.Y. D. El. Ed	31		174.9	15.51				

From Table 2, it is clear that the calculated t-value is 0.63, which is not significant at 0.05 level with $df = 69$, $p = 0.53$. This indicates that the mean score of the F.Y. D. El. Ed. pre-service teachers differs from the mean score of the S.Y. D. El. Ed. pre-service teachers, but not significantly. In other words, the difference between the two groups is not statistically significant. Therefore, the null hypothesis stating that there is no significant difference in the SRL levels between F.Y. D. El. Ed. and S.Y. D. El. Ed. pre-service teachers is retained.

Hypothesis 3 There is no significant difference in the SRL levels between F.Y. B. Ed. And S.Y. B. Ed. pre-service teachers.

The following table shows the relevant statistics of SRL levels of F.Y. B. Ed. and S.Y. B. Ed. pre-service teachers.

Table 3: Relevant statistics of the SRL levels between F.Y. B. Ed. and S.Y. B. Ed. pre- service teachers

Hy 3	Groups	N	df	Mean	SD	SEd	T (cal)	T (tab)	L. of Sig.
3	F.Y. B. Ed.	36	74	172.8	18.53	3.92	1.28	1.99	NS at 0.05
	S.Y. B. Ed.	40		177.8	15.29				

From the Table 3, it is clear that the calculated t-value is 1.28, which is not significant at 0.05 level with $df = 74$, $p = 0.20$. This indicates that the mean score of the F.Y. B. Ed. pre-service teachers differs from the mean score of the S.Y. B. Ed. pre-service teachers, but not significantly. In other words, the difference between the two groups is not statistically significant. Therefore, the null hypothesis stating that there is no significant difference in the SRL levels between F.Y. B. Ed. and S.Y. B. Ed. pre-service teachers is retained.

Hypothesis 4 There is no significant difference in the SRL levels between F.Y. D. El. Ed. And F.Y. B. Ed. pre-service teachers.

The following table shows the relevant statistics of SRL levels of F.Y. D. El. Ed. and F.Y. B. Ed. pre-service teachers.

Table 4 Relevant statistics of the SRL levels between F.Y. D. El. Ed. and F.Y. B. Ed. pre- service teachers

Hy 4	Groups	N	df	Mean	SD	SEd	T (cal)	T (tab)	L. of Sig.
4	F.Y. D. El. Ed.	40	74	177.3	15.43	3.94	1.13	1.99	NS at 0.05
	F.Y. B. Ed.	36		172.8	18.53				

From Table 4, it is clear that the calculated t-value is 1.13, which is not significant at 0.05 level with $df = 74$, $p = 0.26$. This indicates that the mean score of the F.Y. D. El. Ed. pre-service teachers differs from the mean score of the F.Y. B. Ed. pre-service teachers, but not significantly. In other words, the difference between the two groups is not statistically significant. Therefore, the null hypothesis stating that there is no significant difference in the SRL levels between F.Y. D. El. Ed. and F.Y. B. Ed. pre-service teachers is retained.

Hypothesis 5 There is no significant difference in the SRL levels between S.Y. D. El. Ed. And S.Y. B. Ed. pre-service teachers.

The following table shows the relevant statistics of SRL levels of S.Y. D. El. Ed. and S.Y. B. Ed. pre-service teachers.

Table 5: Relevant statistics of the SRL levels between S.Y. D. El. Ed. and S.Y. B. Ed. pre- service teachers

Hy 5	Groups	N	df	Mean	SD	SEd	T (cal)	T (tab)	L. of Sig.
5	S.Y. D. El. Ed.	31	69	174.96	15.54	3.69	0.78	1.99	NS at 0.05
	S.Y. B. Ed.	40		177.87	15.28				

From Table 5, it is clear that the calculated t-value is -0.78, which is not significant at 0.05 level with $df = 69$, $p = 0.43$. This indicates that the mean score of the S.Y. D. El. Ed. pre-service teachers differs from the mean score of the S.Y. B. Ed. pre-service teachers, but not significantly. In other words, the difference between the two groups is not statistically significant. Therefore, the null hypothesis stating that there is no significant difference in the SRL levels between S.Y. D. El. Ed. and S.Y. B. Ed. pre-service teachers is retained.

Hypothesis 6 There is no significant difference in the SRL levels between pre-service teachers of BTTC living in a nuclear family and joint family.

The following table shows the relevant statistics of the SRL levels between pre-service teachers of BTTC living in a nuclear family and joint family.

Table 6: Relevant statistics of the SRL levels between pre-service teachers of BTTC living in a nuclear family and joint family

Hy 6	Groups	N	df	Mean	SD	SEd	T (cal)	T (tab)	L. of Sig.
6	Nuclear Family	103	145	176.65	16.43	2.81	0.64	1.96	NS at 0.05
	Joint family	44		174.77	15.21				

From Table 6, it is evident that the calculated t-value is 0.66, which is not significant at 0.05 level with $df = 145$, $p = 0.50$. This shows that the mean score of the pre-service teachers living in a nuclear family differs from the mean score of the pre-service teachers living in a joint family, but not significantly. In other words, the difference between the two groups is not statistically significant. Therefore, the null hypothesis stating that there is no significant difference in the SRL levels between pre-service teachers of BTTC living in a nuclear family and joint family is retained.

Hypothesis 7 There is no significant difference in the SRL levels of pre-service teachers according to their qualification:

7 a) There is no significant difference in the SRL levels between H. S. C. and Graduates pre- service teachers.

7 b) There is no significant difference in the SRL levels between H. S. C. and Post Graduates pre-service teachers.

7 c) There is no significant difference in the SRL levels between Graduates and Post Graduates pre-service teachers.

The following table shows the relevant statistics of the SRL levels of H. S. C., Graduates and Post Graduates pre-service teachers.

Table 7: Relevant statistics of the SRL levels of H. S. C., Graduates and Post Graduates pre- service teachers

Hy	Groups	N	Sum	Mean	Sum Xx2	SD
7	H. S. C.	45	7951	176.68	353.36	15.69
	Graduates	71	12300	173.23	346.46	14.94
	Post Graduates	31	5634	181.74	363.48	17.83

ANOVA Table						
Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	1583.34	2	791.67	3.16	0.04	3.05
Within Groups	36008.50	144	250.05			
Total	37591.85	146				

From the Table 7, it is evident that the calculated F-value is 3.16, which is significant at the 0.05 level with $df = 2$ and 144 , $p = 0.04$. This indicates that the mean SRL scores of pre-service teachers with different educational qualifications i.e. H.S.C, Graduates and Post Graduates differ significantly. In other words, there is a statistically significant difference in the SRL levels among the three groups. However, since the ANOVA result showed a significant difference in SRL levels among the three groups, t-tests were run to determine which specific groups differ from each other. Following are the tables showing the results of t-tests done between H.S.C and Graduates pre- service teachers, H.S.C and Post Graduates pre-service teachers and Graduates and Post Graduates pre-service teachers.

Table 7.1: Relevant statistics of the SRL levels of H. S. C. and Graduates pre-service teachers

Hy 7	Groups	N	df	Mean	SD	SEd	T (cal)	T (tab)	L. of Sig.
7 a	H. S. C.	45	114	176.69	15.69	2.96	1.18	1.98	NS at 0.05
	Graduates	71		173.24	14.94				

Table 7.2: Relevant statistics of the SRL levels of H. S. C. and Post Graduates pre- service teachers

Hy 7	Groups	N	df	Mean	SD	SEd	T (cal)	T (tab)	L. of Sig.
7 b	H. S. C	45	74	176.69	15.69	3.87	1.30	1.99	NS at 0.05
	Post Graduates	31		181.74	17.83				

Table 7.3: Relevant statistics of the SRL levels of Graduates and Post Graduates pre- service teachers

Hy 7	Groups	N	df	Mean	SD	SEd	T (cal)	T (tab)	L. of Sig.
7 c	Graduates	71	10	173.24	14.94	3.4	2.49	1.98	S at 0.05
	Post Graduates	31	0	181.74	17.83	2			

As evident in Table 7, Table 7.1, Table 7.2, and 7.3, it can be said that there is no significant difference in the SRL levels between H. S. C and Graduates pre-service teachers. Also, there is no significant difference in the SRL levels between H. S. C. and Post Graduates pre-service teachers. However, there is a significant difference in the SRL levels between Graduates and Post Graduates pre-service teachers.

Therefore, the null hypothesis stating that there is no significant difference in the SRL levels of pre-service teachers according to their qualification is retained, except for the comparison between Graduates and Post Graduates pre-service teachers.

Hypothesis 8 There is no significant difference in the SRL levels of pre-service teachers of age groups below 20 and above 20.

The following table shows the relevant statistics of the SRL levels of pre-service teachers of age groups below 20 and above 20.

Table 8: Relevant statistics of the SRL levels of pre-service teachers of age groups below 20 and above 20

Hy8	Groups	N	df	Mean	SD	SEd	T (cal)	T (tab)	L. of Sig.
8	Below 20	34	145	176.94	16.50	3.21	0.35	1.96	NS at 0.05
	Above 20	113		175.83	15.97				

From Table 8, it is evident that the calculated t-value is 0.35, which is not significant at 0.05 level with $df = 145$, $p = 0.72$. This shows that the mean score of the pre-service teachers below the age 20 differs from the mean score of the pre-service above the age of 20, but not significantly. In other words, the difference between the two groups is not statistically significant. Therefore, the null hypothesis stating that there is no significant difference in the SRL levels of pre-service teachers of age groups below 20 and above 20 is retained.

Conclusions and Discussions:

For Hypothesis 1 – There is no significant difference in the overall SRL levels between D. El. Ed. and B. Ed. pre-service teachers.

It may therefore be said that the difference in the overall SRL levels between D. El. Ed. and B. Ed. pre-service teachers was found to be almost the same.

Discussion:

This result can possibly be so because both groups of pre-service teachers would likely have similar tendencies toward goal setting and self-assessment skills. They might also know their strengths and weaknesses well.

For Hypothesis 2 – There is no significant difference in the SRL levels between F.Y. D. El. Ed. and S.Y. D. El. Ed. pre-service teachers.

It may therefore be said that the difference in the SRL levels between F.Y. D. El. Ed. and S.Y.

D. El. Ed. pre-service teachers was found to be almost the same.

Discussion:

It is possible that both F.Y. and S.Y. D. El. Ed pre-service teachers make a schedule to help them achieve their goals, indicating they are good at planning and managing time. It is also likely that both groups know their areas of improvement.

For Hypothesis 3 – There is no significant difference in the SRL levels between F.Y. B. Ed. and S.Y. B. Ed. pre-service teachers.

It may therefore be said that the difference in the SRL levels between F.Y. B. Ed. and S.Y. B. Ed. pre-service teachers was found to be almost the same.

Discussion:

Pre-service teachers of both classes might analyse whether their learning is meaningful or not by engaging in deep processing and meaning-making of what they learn. However, it is possible that S.Y. B. Ed. pre-service teachers can change their study habits if required for better performance. They might be better at adaptive regulation as compared to their juniors. Also,

S.Y. B. Ed pre-service teachers might have more developed awareness of their existing knowledge due to an additional year of experience.

For Hypothesis 4 – There is no significant difference in the SRL levels between F.Y. D. El. Ed. and F.Y. B. Ed. pre-service teachers.

It may therefore be said that the difference in the SRL levels between F.Y. D. El. Ed. and F.Y.

B. Ed. pre-service teachers was found to be almost the same.

Discussion:

This result can be explained as both groups of pre-service teachers may try to learn from their mistakes and try to remove the obstacles they face while learning. Both groups might be good at reflecting on their learning process.

For Hypothesis 5 – There is no significant difference in the SRL levels between S.Y. D. El. Ed. and S.Y. B. Ed. pre-service teachers.

It may therefore be said that the difference in the SRL levels between S.Y. D. El. Ed. and S.Y. B. Ed. pre-service teachers was found to be almost the same.

Discussion:

It is possible that both S.Y. groups (S.Y D. El. Ed. and S.Y. B. Ed) of pre-service teachers evaluate the effectiveness of the strategies they use for learning, try to learn challenging concepts, decide their goals keeping in mind their abilities and interests and also check how well they have accomplished their goals because since they are seniors, they may have advanced pedagogical training, experience, patience and maturity.

For Hypothesis 6 – There is no significant difference in the SRL levels between pre-service teachers living in a nuclear family and joint family.

It may therefore be said that the difference in the SRL levels between pre-service teachers living in a nuclear family and joint family was found to be almost the same.

Discussion:

It may be possible that the pre-service teachers are very determined to learn, so their family type may not affect their learning. It is also possible that SRL is dependent on one's personal traits like the ability to set goals, motivation, planning, etc. (dimensions of SRL) rather than the kind of family that they live in.

For Hypothesis 7 – There is no significant difference in the SRL levels of pre-service teachers according to their qualification:

7 a) There is no significant difference in the SRL levels between H. S. C and Graduates pre-service teachers.

7 b) There is no significant difference in the SRL levels between H. S. C and Post Graduates pre-service teachers.

7 c) There is a significant difference in the SRL levels between Graduates and Post Graduates pre-service teachers.

It may therefore be said that the difference in the SRL levels of pre-service teachers according to their qualification was found to be almost the same. However, the difference in the SRL levels between Graduates and Post Graduates pre-service teachers was found to be not the same. It differed significantly.

Discussion:

When the SRL levels of graduates vs H.S.C. pre-service teachers and H.S.C. vs post graduates were considered, there was no significant difference between both groups. This can be possibly so because maybe during the Covid-19 lockdown, the H.S.C students put in an effort to hone their skills and now they are finding it helpful in applying them to engage in SRL. Maybe the H.S.C. students were at par with the other groups due to better exposure to SRL and better learning experiences.

When it came to graduates vs post graduates pre-service teachers, it is possible that because of more experience and maturity, post-graduates had higher SRL. This finding of the present study is consistent with the results seen in the study done by Dianati et al. (2022) where post- graduates preferred using SRL more due to its autonomy and flexibility.

For Hypothesis 8 – There is no significant difference in the SRL levels of pre-service teachers of age groups below 20 and above 20.

It may therefore be stated that the difference in the SRL levels of pre-service teachers of age groups below 20 and above 20 was found to be almost the same.

Discussion:

While it is possible that older pre-service teachers might have a more matured approach towards their learning, it is also possible that younger pre-service teachers are more eager to learn new things, which could possibly be why there is no significant difference between the SRL levels of both groups of pre-service teachers.

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SOCIAL INTELLIGENCE AS A TOOL FOR MENTAL HEALTH FOR HOLISTIC EDUCATION

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Abstract:

This review paper aims to dive deeper into the relation between Social Intelligence (SI) and mental health, while integrating studies on dimensions varying from happiness to aggression, anxiety, well-being (subjective and psychological well-being). Social intelligence is defined as the ability to understand people, to work effectively within a group, understand the emotions of others, manage diverse situations that an individual may come across and behave wisely and according to the situational context of social relationships. Mental health does not only pertain to the absence of mental illness, but a state of complete well-being, mentally, physically, and socially. The related literature research discussed in this article suggests that more Social Intelligence is related to less anxiety, aggression and higher happiness and wellbeing (life-satisfaction, empathy). The article highlights Social Intelligence as a skill for change in individual mental health and societal wellness. The review advocates for the incorporation of Social Intelligence interventions in educational spaces to promote sustainable mental well-being and develop social resilience among teachers and students.

Keywords: *Social Intelligence, Mental Health, Educational Spaces.*

Introduction:

Whereas this drastically and rapidly changing era is giving numerous golden opportunities to students to grow and move forward, however, this progress is also positively contributing in mental health issues. In this situation and to navigate with this ever-changing society school ought to provide such education which can develop a balanced personality. By acknowledging the need of holistic development of students, New Education Policy 2020 (NEP 2020) emphasizes the importance of: *Education thus, 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."*

— National Education Policy 2020, p. 4

Social Intelligence (SI) can play a key role in achieving this vision of NEP. SI helps build empathy, social skill, enhance social information processing, and effective communication which positively correlates with autonomy (decision making), mental health and an individual's wellbeing (Subjective and psychological well-being). For example, in a study Infurna et. al (2016) found that SI based programmes helped students' wellbeing and social relationships who had faced adversity in their childhood.

NEP 2020 also advocates that-

Teachers will also focus on socio-emotional learning – a critical aspect of any student's holistic development.

— *National Education Policy 2020, p. 22*

In a research study it has been seen that teachers with high SI use more constructive strategies in the classroom and those who have low SI use more aggressive strategies in the classroom (Jeloudar, 2012). So, we need to train teachers in the field of social intelligence so they would be able to construct safe and stimulating classrooms which is one of the main focus of NEP 2020.

Therefore, SI can help students to achieve good mental health which can support their both academic and social growth.

Social Intelligence (SI):

Social Intelligence can be defined as the ability to understand people, work with others effectively, understand others' emotions, manage situations and behave wisely and according to the situation. Edward Thorndike (1920) first formally introduced the concept of SI, he defined it as the "the ability to understand and manage men and women, boys and girls to act wisely in human relation". Thorndike pointed out both cognitive and behavioural aspects of SI.

Although it has always been a matter of discussion among researchers whether SI is independent and distinct from general intelligence or not. Somazo, 1990 has cited that Weschler (1958) viewed social intelligence as a dependent structure, applying general intelligence to social situations. It is often discussed under terms like role-taking, interpersonal competence, and empathy.

Walker and Foley (1973) defined social intelligence as the ability to understand and deal with people by understanding and recognizing their feelings, thoughts, intentions, and motivations.

Marlowe (1986) explained that social intelligence or social competence, is the ability to understand the thoughts, feelings, and behaviors of both yourself and others in social situations, and to act accordingly based on that understanding.

According to Sliver et al. (2001) SI is social awareness, social skill and social information processing.

Buzan (2002) highlighted eight key factors of:

- reading people's minds, which involves understanding and knowing individuals through their body language and both verbal and nonverbal communication;
- active listening skills
 - influence others
 - being active in social media and achieving popularity
 - negotiation and social problem-solving
 - persuasion and
 - knowing how to behave appropriately in different social setting

More recent research, however, has shown that social intelligence and academic intelligence are separate, though they complement each other (Barnes & Sternberg, 1989; Ford & Tisak, 1983; Lee, 1999; Albrecht, 2006).

Goleman also explains that our brains are naturally built for social connection. He mentions special brain cells like spindle cells, which help with quick social decisions, and mirror neurons, which help us understand and feel what others are feeling. This shows that social intelligence is not just a skill we learn, it is a natural part of how our brain works to help us live and work well with others. He mentioned two components of SI- Social awareness which includes Primary empathy, attunement, empathetic accuracy, social cognition and Social facility which includes synchrony, self-presentation, Influence, concern.

Karl Albrecht's theory of Social Intelligence (SI) defines it as the ability to get along well with others and to influence social interactions positively. It involves not just understanding social situations but also using effective strategies to achieve cooperative and meaningful relationships. SI is often called "people skills" and includes self-awareness, empathy, and communication ability. SI can be developed and improved throughout life.

Albrecht describes SI as separate from emotional intelligence (EI), SI focuses on how effectively a person interacts with others (interpersonal).

Albrecht proposes a model called A.S.P.E.A.K., which includes six dimensions of intelligence: Abstract, Social, Practical, Emotional, Aesthetic, and Kinesthetic. SI is measured behaviorally through observable interaction skills and is seen as context-based—understanding different social environments and adjusting behavior accordingly.

To assess SI, Albrecht developed the Social Intelligence Profile (SIP), which measures SI through three lenses

1. Social Skills (S.P.A.C.E. formula):

- Situational Awareness
- Presence
- Authenticity
- Clarity
- Empathy

0. Self-Insight

0. Interaction Style

Albrecht argues that SI is essential for success in personal, social, and professional life. It can be developed through self-assessment, reflection, and practicing new social behaviors.

The Tromsø Social Intelligence Scale (TSIS) measures social intelligence through three components: **Social Information Processing**, which involves understanding social cues and empathy; **Social Skills**, referring to effective communication and relationship-building; and **Social Awareness**, which assesses appropriate behavior in social contexts. These dimensions reflect both cognitive and behavioral aspects of social functioning. The scale offers a structured approach to evaluating individual differences in social competence.

Mental Health:

According to the World Health Organization (WHO) mental health is not just the absence of mental illness, but a state of complete well-being, mentally, physically, and socially. It is the ability to manage everyday stress, work productively, and contribute to society. WHO highlights that mental health includes self-confidence, emotional strength, and the ability to reach an individual's full potential.

APA defines mental health as a state of emotional well-being where a person is able to manage everyday stress, maintain balanced behavior, build healthy relationships, and function effectively in day-to-day life.

Aim:

The objective of this review paper is to examine the connection between social intelligence and four important psychological constructs of mental health, that is, happiness, aggression, anxiety, and psychological well-being. This examination is important because these constructs have a broad impact on an individual's emotional health, social functioning, and overall quality of life. This review wishes to combine these relationships to support understanding from both a psychological viewpoint and to inform further research and actions and practical contributions towards building a more emotionally intelligent and socially sustainable future.

SI Relation to Happiness:

Martin Seligman defines happiness as multidimensional which goes beyond momentary pleasures. He talked about three type of life which contributes to the authentic happiness:

1. The Pleasant
2. The Good Life
3. The Meaningful Life

Psychologists talk about other two kinds of happiness- Hedonic and Eudemonic Happiness.

Tayfun Dogan and Ali Eryilmaz in their study The Role of social intelligence in happiness concluded that sub-dimensions of social intelligence are significantly and positively related with the happiness level of Sakarya university Turkey. Hood. D, Sharma, N.R. and Yadav (2009) have found the similar positive association SI with Satisfaction of life and happiness.

Aarthi M., Priyadharshini S., and Ghayathri Swetha Kumari R.A. (2020) found a strong positive correlation between all three components of SI and happiness. They investigated the role of social intelligence in predicting happiness among millennials (aged 23 to 39 years). The study through the regression analysis highlighted that people with high social intelligence exhibit good conversational skill, knowledge based on social roles, effective listening skills, social efficacy, conflict resolution skills and appropriate social behaviour. who understand social situations, communicate well, and those who are aware of others' emotions tend to be happier than others. Further a study done by Sangeeta, Rajni Kumari, and Shivani (2014) published in Voice of Research, attempted to find out the correlation between social intelligence and happiness among adolescents with and without disabilities. It can be inferred from the results that social intelligence in general leads to greater happiness but other factors like the type of disability affects the degree to which social intelligence impacts happiness. Aminpoor (2013) found the same result conducted on 226 students of Payame Noor university of Tehran, Iran.

SI in Relation to Aggression:

Aggression refers to any intentional behaviour that aims to harm others physically or psychologically. Bandura (1973) describes aggression as destructive behavior that violates social standards and frequently includes an intention to harm others or destroy property. Equally, Buss (1961) defines aggression as a reaction in which one person administers something unpleasant to another individual.

There is an extensive research study which shows the relationship between aggression and SI. A study conducted on 423 Iranian high school boys in Kashan

revealed a significant negative correlation between SI and all types of aggression: general aggression, verbal aggression, physical aggression, anger and hostility. This suggests that students with higher SI are less likely to exhibit aggressive behaviors. Kaukiainen et al. (1999) studied 526 Finnish school children aged 10, 12, and 14 to examine the relationship between SI, empathy, and aggression. They found that while empathy negatively correlated with all forms of aggression, SI was positively related to indirect aggression, indicating that socially intelligent children may use manipulative behaviors.

A longitudinal study of 968 Korean adolescents examined the effects of SI on pathological gaming. Using structural equation modeling, researchers found that higher SI reduced both aggression and addictive gaming behaviors. SI was more effective than emotional variables in reducing risk factors. (Wallenius, M. et al. 2007) Prabha and Mittal (2019) conducted research on 200 young adults in Jaipur, India. Using the Tromsø Social Intelligence Scale, they found SI was positively correlated with altruism and compassion, and negatively with aggression.

In Jordan, Alzoubi and Al-Zoubi (2011) examined gifted and non-gifted tenth-grade students. Results showed gifted students had higher SI and lower verbal and physical aggression than their non-gifted peers, reinforcing SI's role in emotional and behavioral regulation.

SI In Relation to Anxiety:

According to the APA anxiety is an emotional state which is marked by feelings of tension, worried thoughts and physical symptoms such as high blood pressure. Anxiety is typically a future oriented and prolonged response to a vague or perceived threat. whereas fear is a short-term reaction to a specific and identifiable danger (APA, Encyclopaedia of Psychology).

Ma et al. (2024) found that social intelligence (SI) reduces social anxiety by moderating brain activity in adolescents. The study showed a negative correlation with the left superior frontal gyrus. High SI work as shield anxiety related neural responses.

Hampel et al. (2011) in his study revealed that low SI specifically in social understanding and perception is linked to higher anxiety.

Both studies support SI as a crucial factor in reducing and managing social anxiety.

SI in Relation to Wellbeing:

Carol Ryff (1989) includes 6 components of psychological well-being (PWB) : personal growth, self-acceptance, purpose in life and positive relationships which contribute to an individual's overall psychological functioning. Ed Diener (1984) introduced Subjective well-being (SWB) which focuses on life satisfaction, happiness

and emotional experiences that reflect an individual's subjective assessment of their life.

Azañedo et al. (2020) explored the connection between social intelligence and well-being, demonstrating that social intelligence is positively associated with life satisfaction, positive affect, and psychological well-being, especially in terms of positive relationships. Which indicates that these constructs serve as mediators for reducing psychological distress.

Studies done by Leme, Del Prette, Coimbra (2015) and Segrin et al. (2007), emphasize that social skills, empathy and self-control are significant predictors of psychological well-being, especially in adolescents and university students. These studies support that strong social skills not only enhance life satisfaction but also reduce perceived stress.

Recommendations for Educational Spaces

○ **Policy makers**

- While preparing the curriculum framework across all levels, policy makers and stakeholders should integrate such curriculum for students as well as for aspiring teachers and in-service teachers. which enhance social competencies as foundational life skills.

○ **Management & Administrators**

- At institutional level institutions should prioritize SI intervention programmes and should allocate resources for regular SI-based intervention and assessment. Schools should arrange workshops and training programs for teachers, addressing the significance of social intelligence for teaching. Government agencies like Cluster Resource Centre, Block Resource centres can also arrange such training programmes at their level.

○ **Teachers**

- Teachers should adopt SI driven pedagogical strategies, inclusive classrooms by modelling appropriate social behavior.

Conclusion:

This review paper explores the impact of social intelligence on major aspects of mental health such as happiness, aggression, anxiety, and psychological well-being. Findings reveal that greater social intelligence, particularly three components social skills, awareness, and processing of information are linked to improved emotional resilience, less distress, and better interpersonal functioning. Social intelligence not only facilitates establishing meaningful relationships and lowering aggression and anxiety but also increases well-being through its contribution to autonomy, self-acceptance, and purpose in life, as conceptualized by Ryff's model.

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EXPLORING ENGLISH LANGUAGE EDUCATION FOR WELL-BEING AMONG CHILDREN: A META-ANALYTICAL STUDY

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Abstract:

Through this meta-analytical study, the evolving role of English language education that promotes well-being among children has been explored. While English language education was traditionally known for only developing linguistic skills, it is now recognised as a medium to nurture mental well-being, moral development, creative expression and self-identity. Drawing from scholarly discourse spanning from late 19th century to present times, these four themes have been identified and analysed. Through a meta-analysis of diverse related texts, this study explores how English classrooms have potential to grow into introspective and reflective spaces that help children develop mental health and moral values while learning to identify and express themselves efficiently. The study also identifies the importance of incorporating sensitive pedagogies and a more inclusive curriculum that focuses on not only achieving measurable outcomes related to the academic success of the child, but also on quality holistic education that helps in fostering lifelong growth among future responsible global citizens.

Keywords: *English Language Education, Mental Well-being, Self-identity, Moral Development, Creative Expression.*

Introduction:

English language education is often widely known only for its use in developing linguistic abilities of reading, writing and speaking in English. However, it also serves as an excellent medium in shaping more than a child's intellect, ie. Emotional, psychological and moral well-being. Modern classrooms for English language education, due to their dynamic nature have evolved into spaces that emphasize on the holistic development of pupils. Language education has transformed into something more than that which challenges the intelligence quotient of a child, which is commonly known for representing only academic benchmarks (Valencia & Wixson, 2001). English language education, over the past few decades, has also come to contribute to a child's formation of identity, supporting their mental health,

development of moral reasoning and exploration through language education in a more imaginative and creative light (Becker & Matz, 2023; Tan, 2015).

This meta-analytical study will help us explore and solidify how over the last century scholarly discourse has helped identify the way in which English language education has increasingly transformed into a force that promotes children's well-being. Upon looking into various journal articles that emerged from the late 19th century to current times, we reflect on how English language education through children's literature with rich elements coincides with themes of mental well-being, self-identity, moral development and creative expression among children.

This meta-analytical study mainly revolves around four core themes that were consistently identified throughout the related literature. The four core themes are as follows:

New pathways to mental well-being among children through English language education, Children's literature as a means to self-identity, Opening windows to moral development through English language education and Creative expression through interpretation of children's literature.

This study seeks to illustrate how English language education equips children with what they need to navigate through diverse emotional landscapes, build an understanding of one's self, internalize moral values and utilize their creativity to turn their imaginations to ideal realities, helping them freely express themselves efficiently.

New Pathways to Mental Well-being among Children through English Language Education:

In recent times, literature has increasingly emphasized on the significance of English language education in fostering mental well-being among children. Becker and Matz (2023) have acknowledged the same intersection of mental health and English language education. Their work draws attention to the transformation in pedagogical parameters– where English language education was viewed as a purely linguistic and cognitive skill, the same is now being viewed in light of the emotional horizons it meets. It is argued that as opposed to the conventional pedagogies used in English language education, literature and language now provide children with a platform where empathy, psychological resilience and other immeasurable growth can be explored and nurtured. These perspectives play a crucial role in contemporary classroom contexts where varying emotional and psychological needs are brought forward by the diverse student demographics.

Earlier literature has also remotely implied the same perspective. Morse (1968), in *Teacher Preparation in Mental Health*, also highlights the importance of mental

health awareness among teachers as a tool to be more accommodating towards students. He speaks in favour of professional training of teachers that involves identifying and understanding a child's psychological needs. Morse also speaks about how when it comes to English language education, which is more emotionally charged and welcomes discussion as compared to other subjects, literature can be used as a therapeutic tool for students to help identify, project and process their emotional experiences when more sensitive pedagogical approaches are used by teachers more mindfully.

The Boyd et al. (2006) article titled, *Real Teaching for Real Diversity* also supports this perspective by advocating for inclusivity in and through education points out how alienation and marginalisation can be eradicated to a certain extent through English curricula that are inclusive in nature, helping children validate their own identities with that of those mentioned in the literature that is part of their curriculum, something that homogeneous educational models lack. Featuring diverse narratives in literature can foster a sense of belonging and confidence among children, both of which are vital factors that contribute to mental well-being.

All in all, these texts strongly suggest that when approached with mental health awareness and inclusivity, English language education opens pathways to support mental well-being among children. This also portrays a shift towards quality education through a more holistic approach, where mental well-being and academic benchmarks of a child go hand in hand (Becker & Matz, 2023; Morse, 1968; Boyd et al., 2006).

Children's Literature as a means to Self-Identity:

The second theme that was recurrent in nature throughout the study, is the vital role of children's literature in nurturing self-identity among children. Literary texts act as a mirror through which children identify values, fears, strengths, weaknesses and principles within themselves through characters and narratives in the text (Reggy, 1973). Reggy in his essay, *Self-Identity through Literature*, implies that diverse characters featured in stories and the nature of narratives assist children in locating their own identities in their personal individualised environments. This makes English language education a safe space, for self reflection, internal dialogue and personal growth.

The *Purposeful Daydream* by Shaun Tan (2015) also similarly underscores the role of Children's literature in self-discovery. He suggests that through metaphors in children's stories, children interpret meaning and apply it subjectively how they see fit in their own realities. He further implies that stories allow children to emotionally process various phenomena around them in their own individualised manner. When

he says, “children’s literature is not about instruction but introspection”, he insinuates that while presenting moral lessons through texts, literature also opens doors through which children come to deeply understand themselves through introspection rather than through direct spoonfed direction or instruction.

All of this further pushes us towards the idea that children’s literature is not to be taught through direct instruction only, but also by giving a child space to learn through reflection and introspection. It acts as a catalyst for children to put themselves in a character's shoes, identify with them or to try different personalities learnt from diverse characters and even resolve internal conflicts among themselves through the perspective provided by characters and narratives. When assisted by mindful educators, English language education can become a means for the formation of a self-identity that is coherent and confident (Reggy, 1973; Tan, 2015).

Opening Windows to Moral Development through English Language Education:

For a long time now English language education has been viewed as an efficient tool to nurture moral development among children. Literature of any language has been regarded constantly as a means for instilling values, morals, and ethics in pupils. Kirkpatrick (1899) and Kratz (1904) in their studies have emphasized on the impact of reading in a child's development, not only in the context of cognitive development, but also in terms of ethical and emotional development. They also add that the English curriculum for reading must be selected on the basis of maintaining a balance between enjoyment and development of moral and ethical orientation.

Julian Hawthorne (1884) in her essay, *Literature for Children* suggests that literature should inspire moral growth among children by providing them with engaging narratives that equip children with moral insights. He insists that a child's intelligence must be respected while fostering values among them. This directly aligns with the modern pedagogical approach where stories with moral dilemmas are presented to a child in contrast to stories with simplistic lessons. This approach further advocates for moral education that is indirect in nature, the scope for which is wide in English language education.

Richard Burton (1898) similarly critiques children's books that are morally shallow in nature but are yet sensational. He argues that children must be exposed to books that reinforce compassion, empathy and curiosity among them. This resonates with contemporary conversations concerning children's literary engagement and broadening the ethical dimensions in them.

Humanizing English Literature by G. B. Heard (1922) suggests that literature must get students in touch with “universal human experiences” and that it is these

connections that will help foster moral development among children by helping students interact with human conditions while faced by moral and ethical challenges. In light of the above discussion, it is fair to assume that when ethical inquiry and moral reflection become foundations of English language education, it becomes a tool for strong character development among children. In this way, literature calls young minds to develop qualities essential for responsible global citizenship by helping them develop empathy, cultivate a sense of justice and confront various moral ambiguities (Hawthorne, 1884; Burton, 1898; Heard, 1922; Kirkpatrick, 1899; Kratz, 1904).

Creative Expression through Interpretation of Children's Literature:

The final theme focuses on the role English language education plays in fostering creative expression among children. English language education can act as a source of emotional fulfillment and to bring about a sense of empowerment by equipping a child with the ability to freely imagine, freely interpret and freely express ideas that children's literature elicits in them.

Kantor in his article *Creative Expression in the English Curriculum* (1975), throws light on the evolution of creativity in education. He states the dilemma between standardized instruction that is traditional and personal expression that is non-conventional in nature. He ultimately advocates for incorporating a more balanced approach by valuing a student's free expression and guiding them through instruction as a medium. He argues that creativity will not only add value to a child's academic success, but will also support their emotional well-being. This allows students to gain their own understanding of the world around them, as well as imagine and create new possibilities.

Children's Lore in Schools and Playgrounds by Mergen (1999) further supports Kantor's argument by stating how children use jokes, folklore and various games as most spontaneous forms of creative expression, although they are not a part of formal English language education. But it is important to note that these forms of creative expression truly represent a child's innate desires and instincts to make meaning of the world around them through stories and role play. This work also legitimizes how creativity should not only be encouraged in the classroom but also embraced in informal settings rather than just tolerating it.

While Shaun Tan (2015) suggests that the use of metaphor in children's stories and open-ended texts that are ambiguous in nature invite creative and imaginative interpretation, it also closely aligns with the implications of Reggy (1973) that literature is called to be a space for self-invention. This offers children with not only a chance to simply read literary texts, but also to create their own meaning, to

imagine other hypothetical scenarios or alternate realities and to express their understanding of the same through various forms of creative expression such as discussions, writings and art.

Keeping all of this in mind, English language education becomes a metaphorical playground for a child's imagination to come to life creating a space where children are welcome to identify, explore, experiment and express their inner ideas. Creative expression must not only be viewed as a benefit of study of literature, but also as a central learning outcome, that enhances not only the intellectual, but also the emotional growth of a child (Kantor, 1975; Mergen, 1999; Tan, 2015; Reggy, 1973).

Conclusion:

Throughout the years, after taking a look at how English language education takes place differently in various geographical locations, the varying reviewed literature throws light on the perspective that when the foundation for English language education is laid in rich literary engagement, it acts as a strong base to promote well-being among children. Classrooms where language education takes place, especially English language education, provide a platform to contribute towards the holistic development of young minds, be it exploring self-identity and developing moral reasoning through literature or eradicating stigma around mental well-being and promoting creative expression on the student's end.

This meta-analytical study has highlighted four major pathways through which English language education could potentially serve children's well-being: As a means to enhance mental health, as a guide to finding one's identity, fostering moral development and encouraging creativity among children. Each of these themes can be reflected in their discourse and when practiced mindfully, can be the genesis of classroom practices and pedagogies that not only nourish a child's intellect but also their holistic development. All of this can be done by implementing innovative pedagogies in the classroom such as involvement of dramatization while teaching literature, encouraging expression among children asking students to partake in creative writing, building a strong student teacher rapport by identifying areas where the child requires motivation and inspiration and providing the same, suggesting new curriculum content with deeper value as stakeholders in education after recognising the need of the hour and using informal or outdoor education as a new means to incorporate language education into.

It is crucial not to lose sight of the deeper purposes of education in a world that is increasingly concerned with challenging a child's intellect and focusing mainly on measurable outcomes only. English language education not only equips a child with linguistic abilities like communicating,

reading and writing in the language, but also provides children a platform to understand themselves and those around them. It is important to circle back to holistic well-being through education, utilizing the opportunities that the English pedagogy provides us with optimally. Educators must actualize their ability to transform classrooms into spaces that go beyond feeding the intelligence quotient of the child and emphasize on the emotional quotient with qualities of empathy, self-reflection, immeasurable growth, resilience and finding one's authentic identity, making English language education inseparable from learning to live well as global citizens.

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ASSESSING THE PSYCHOLOGICAL COUNSELLING NEEDS OF SECONDARY SCHOOL STUDENTS: A FOCUS ON CAPACITY BUILDING

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Abstract:

Psychological counselling is a professional and therapeutic process that helps individuals address emotional, mental, and psychological issues. In this study, the focus is on ICSE board students engaging with trained counselors to explore personal concerns, understand their challenges, and develop strategies to support their overall growth and development.

This research aims to assess the psychological counselling needs of secondary school students specifically from the ICSE board, with a special emphasis on capacity-building. Secondary school students often experience significant transitions and face academic, emotional, and social pressures that can impact their mental health and personal development.

The study focuses on students in grades 8, 9, and 10, evaluating their need for psychological counselling in relation to their overall well-being. It highlights the importance of enhancing their capacity using the 3H approach—Hand (skills), Heart (emotions), and Head (thinking). The study draws on relevant national and international literature to support its findings.

Furthermore, the paper emphasizes the importance of fostering a supportive school environment that nurtures students' self-esteem, confidence, and coping skills to manage stress and anxiety effectively. Such efforts can positively influence both academic achievement and personal growth. Overall, the study aims to provide valuable insights into developing a more responsive and student-friendly counselling framework tailored to the specific needs of ICSE students.

Keywords: *Psychological counselling, Grades, Capacity building, ICSE Board, Gender*

Introduction:

Adolescence brings emotional, academic, and social challenges. The ICSE curriculum intensifies these pressures due to its rigorous structure. Counselling in schools can address these challenges, fostering emotional regulation, academic planning, and coping mechanisms. Despite growing awareness, specific data on ICSE students' needs remains limited. This study addresses this gap, with focus on building capacity.

Objectives

The objectives of the research are as follows;

1. To assess the psychological counseling needs of the ICSE board students with a focus on capacity building.
2. To compare the psychological counseling needs of 8th and 9th-grade ICSE
3. students, focusing on capacity-building.
4. To compare the psychological counseling needs of 9th and 10th-grade ICSE students, highlighting the capacity-building.
5. To compare the psychological counseling needs of 8th and 10th-grade ICSE students, with an emphasis on capacity-building.
6. To compare the psychological counseling needs between males and females of ICSE board students, emphasizing on capacity building.

Hypothesis:

- There is no significant difference in the psychological counseling needs related to capacity-building between 8th and 9th-grade ICSE students.
- There is no significant difference in the psychological counseling needs related to capacity-building between 9th and 10th-grade ICSE students.
- There is no significant difference in the psychological counseling needs related to capacity-building between 9th and 10th-grade ICSE students.
- There is no significant difference in the psychological counseling needs related to capacity-building between male and female ICSE students.

Literature Review:

Research consistently emphasizes the rising psychological counselling needs of secondary school students in India. Emotional support emerges as the most common requirement, followed by vocational, educational, and behavioral counselling (Upadhyay, 2020; Abdul Azeez & Sumangala, 2015). Counselling is also linked to academic performance, particularly among government school students (Saila & Chamundeswari, 2013). Rural students often exhibit greater needs due to limited access and social stigma (Manisha & Seema, 2020). Despite minimal gender differences in need (Sangthanzuala et al., 2023), female students may still face more

emotional vulnerability in certain contexts. Vanika and Sharma (2021) noted that poor infrastructure and limited peer support contribute to higher counselling needs in government schools. Parikh et al. (2021) demonstrated the effectiveness of low-cost classroom interventions by lay counsellors in increasing help-seeking behavior, emphasizing the value of capacity-building strategies in resource-limited settings. Globally, access and stigma remain persistent challenges. Shea et al. (2019) and Duraku et al. (2023) found that stigma and lack of service availability discourage students from seeking help. Minh Le et al. (2024) highlighted poor visibility and trust in services as additional barriers. Student dissatisfaction with counselling services is common, particularly regarding the lack of academic and vocational guidance (Shi et al., 2014; Atmarno et al., 2020). These issues point to a mismatch between existing services and student expectations.

The capacity and well-being of counsellors also influence service delivery. Studies by Bali-Mahomed et al. (2022) and Yüksel-Şahin (2015) show that counsellor burnout, lack of training, and poor work conditions negatively affect counselling quality. Similar systemic challenges—such as insufficient training and weak policy frameworks—are reported in African contexts (Sima, 2010; Suleiman et al., 2019). Evidence from intervention studies supports the effectiveness of school-based counselling in reducing adolescent distress (Fox & Butler, 2009; Pearce et al., 2017), though long-term follow-up is limited. Innovative methods like online counselling may improve accessibility, especially for boys and students with disabilities (Glasheen & Campbell, 2009).

Musso et al. (2020) and Al-Rousan et al. (2023) stress aligning counselling services with students' actual needs and academic goals, reinforcing the link between psychological well-being and educational outcomes. Overall, these studies highlight the importance of accessible, student-centered, and capacity-driven counselling frameworks in schools.

Methodology:

A quantitative design using the Psychological Counselling Needs Scale (PCNS) was adopted. The tool includes 25 items on a 5-point Likert scale. Data was collected from 100 students (grades 8-10) at Diamond Jubilee High School, Mumbai, using stratified sampling. Students were categorized based on percentile ranks into five counselling need levels. T-tests analyzed differences across grades and gender.

The percentile norms for the interpretation of scores

Sr. No.	Percentile Scores	Psychological Counselling Needs	Score Awarded
1.	Upto 20 percentiles	Very Low	25-71
2.	21-40 percentiles	Low	72-75
3.	41-60 percentiles	Average	76-79
4.	61-80 percentiles	High	80-83
5.	81 and above percentiles	Very High	84-125

The Psychological Counselling Needs Scale (PCNS) includes 25 items—21 positive and 4 negative—rated on a five-point Likert scale from "Always" to "Never." Positive items are scored from 5 (Always) to 1 (Never), while negative items are reverse scored. Total scores range from 25 to 125, with higher scores indicating greater psychological counselling needs, providing a detailed measure of students' support requirements.

Data Collection: The data for the study was collected by using **stratified sampling technique**. Students from grades 8, 9, and 10 were selected from a single Diamond Jubilee High School (ICSE).

Board	Grades						Total
	8th		9th		10th		
	BOYS	GIRLS	BOYS	GIRLS	BOYS	GIRLS	
ICSE	28	9	19	12	18	14	100

Data Analysis:

To assess the psychological counseling needs of secondary school students of ICSE board with a focus on capacity building.

Table 1.1

Psychological counselling needs of secondary school students						
Board	Range					Total
	Very Low	Low	Average	High	Very High	
	25-71	72-75	76-79	80-83	84-125	
ICSE	53% (53)	14% (14)	11% (11)	10% (10)	12% (12)	100
Percentile Rank	Upto 20	21-40	41-60	61-80	81 and above	

To compare the psychological counseling needs of grade 8th and grade 9th students of ICSE board, focusing on capacity-building.

Table 1.2

Psychological counselling needs across 8th and 9th grades						
Grade	Range					Total
	Very Low	Low	Average	High	Very High	
	25-71	72-75	76-79	80-83	84-125	
8th	47.36% (18)	13.15% (5)	15.78% (6)	10.52% (4)	13.15% (5)	38
9th	58.06% (18)	12.90% (4)	12.90% (4)	9.67% (3)	6.45% (2)	31
Percentile rank	Upto 20	21-40	41-60	61-80	81 and above	

Comparison between grade 9th and grade 10th students of ICSE board, highlighting the capacity-building.

Table 1.3

Psychological counselling needs across 9th and 10th grade						
Grade	Range					Total
	Very Low	Low	Average	High	Very High	
	25-71	72-75	76-79	80-83	84-125	
9th	58.06% (18)	12.90% (4)	12.90% (4)	9.67% (3)	6.45% (2)	31
10th	53.12% (17)	15.52% (5)	6.25% (2)	9.37% (3)	15.52% (5)	32
Percentile rank	Upto 20	21-40	41-60	61-80	81 and above	

To compare the psychological counseling needs of grade 8th and 10th students of ICSE board, with an emphasis on capacity-building.

Table 1.4

Psychological counselling needs across 8th and 10th grade						
Grade	Range					Total
	Very Low	Low	Average	High	Very High	
	25-71	72-75	76-79	80-83	84-125	
8th	47.36% (18)	13.15% (5)	15.78% (6)	10.52% (4)	13.15% (5)	38
10th	53.12% (17)	15.52% (5)	6.25% (2)	9.37% (3)	15.52% (5)	32
Percentile rank	Upto 20	21-40	41-60	61-80	81 and above	

Inferential analysis:

H1: There is no significant difference in the psychological counseling needs related to capacity-building between grade 8th and grade 9th students of the ICSE board.

Table 1.1

H ₀	Groups	N	d.f	Mean	S.D	SEd	t(cal)	T (value)	L. of Sig.
1	8th	37	98	68.78	17.11	3.27	0.174	1.98	N.S at 0.05 sig
	9th	31		69.35	9.26				

H0 2: There is no significant difference in the psychological counseling needs related to capacity-building between grade 9th and grade 10th students of the ICSE board.

Table 1.2

H ₀	Groups	N	d.f	Mean	S.D	SEd	T (cal)	T (value)	L. of Sig.
2	9th	31	98	69.35	9.26	2.54	0.96	1.98	N.S at 0.05 sig
	10th	32		71.78	10.94				

H0 3: There is no significant difference in the psychological counseling needs related to capacity-building between grade 8th and grade 10th students of the ICSE board.

Table 1.3

H ₀	Groups	N	d.f	Mean	S.D	SEd	T (cal)	T (value)	L. of Sig.
3	8th	37	98	68.78	17.11	3.41	0.88	1.98	N.S at 0.05 sig
	10th	32		71.78	10.94				

H0 4: There is no significant difference in the psychological counseling needs related to capacity-building between male and female students of the ICSE board.

Table 1.4

H ₀	Groups	N	d.f	Mean	S.D	SEd	T (cal)	T (value)	L. of Sig.
4	M	65	98	69.8	9.75	2.58	0.89	1.98	N.S at 0.05 sig
	F	35		72.12	13.5				

Result:

All t-values < 1.98 at 0.05 level. Thus, there is no statistically significant difference in counselling needs was found across grades (8,9,and 10) or between male and female students

Graphical Representations:

To assess the psychological counseling needs of secondary school students of ICSE board with a focus on capacity building.

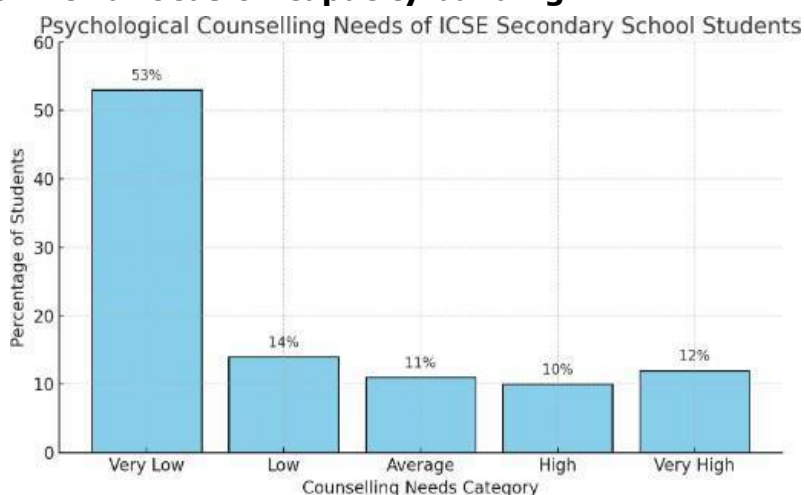
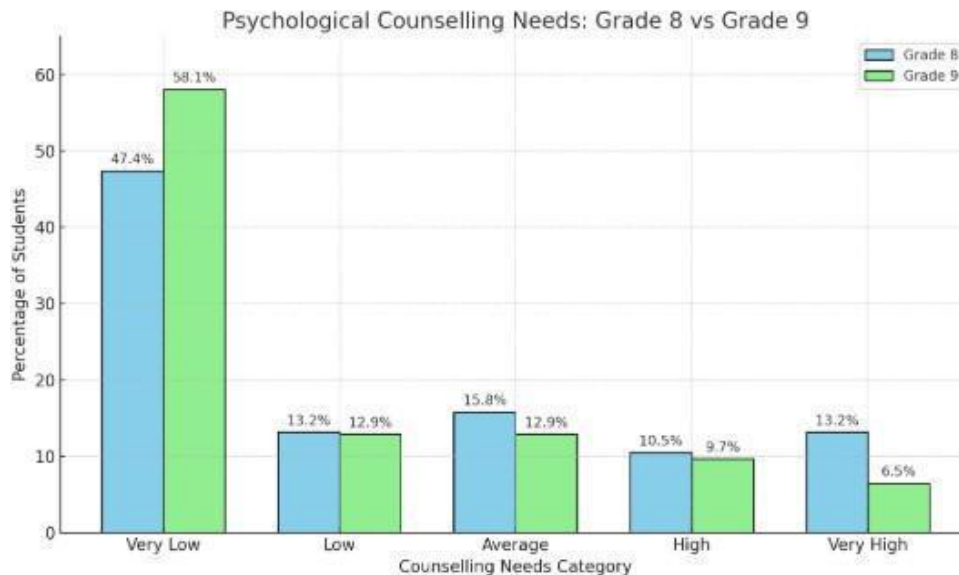


Figure 1.1

To compare the psychological counseling needs of grade 8th and grade 9th students of ICSE board, focusing on capacity-building.

Figure 1.2



To compare the psychological counseling needs of grade 9th and grade 10th students of ICSE board, highlighting the capacity-building.

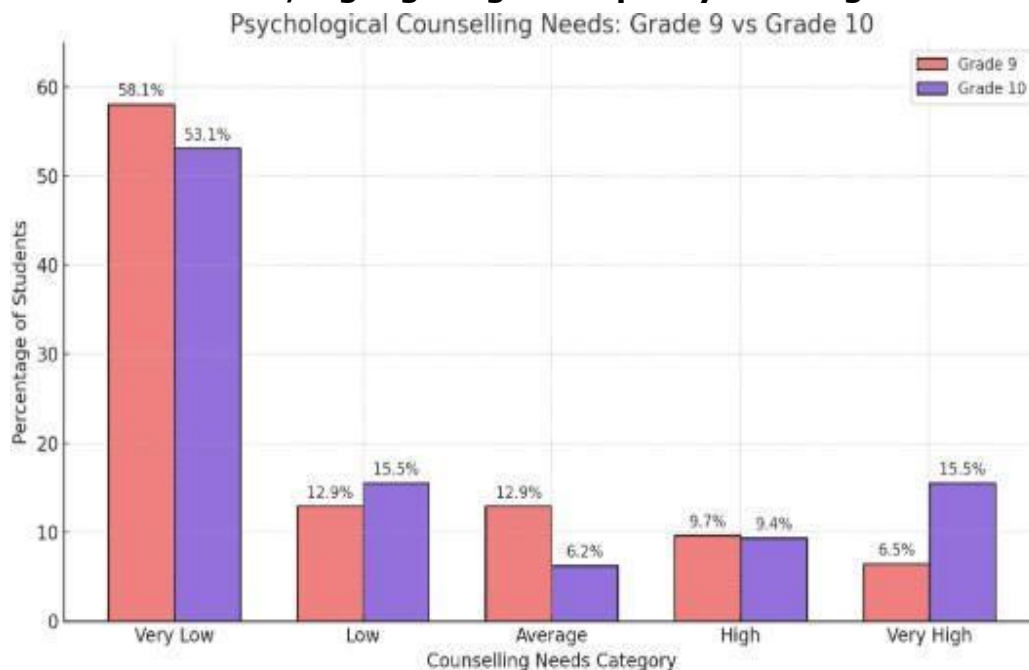
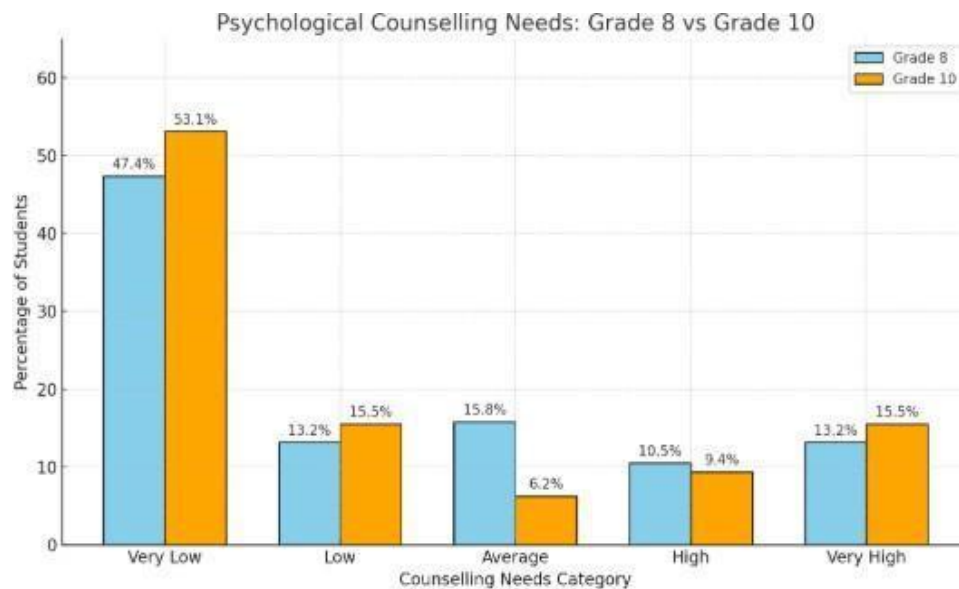


Figure 1.3

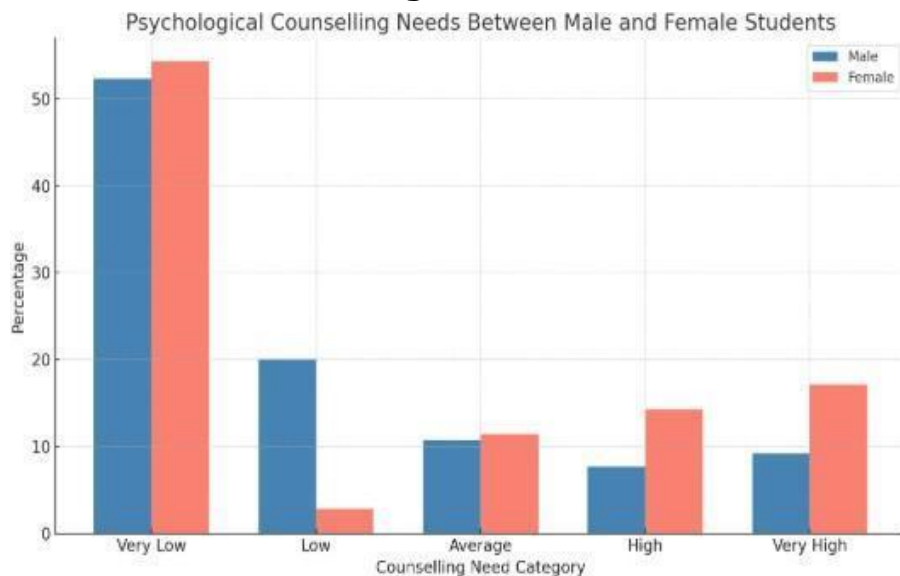
To compare the psychological counseling needs of grade 8th and 10th students of ICSE board, with an emphasis on capacity-building.

Figure 1.4



To compare the psychological counseling needs between males and females of ICSE board, emphasizing on capacity building.

Figure 1.5



Overall Interpretation:

The descriptive data reveal that although a majority of ICSE students fall into the "Very Low" counselling needs category, nearly half require varying degrees of psychological support. Grade 8 students showed higher representation in moderate to high need categories, indicating vulnerability during the transitional phase. Grade

10 students exhibited a polarized pattern, with significant numbers at both very low and very high levels, likely linked to academic stress. Comparatively, Grade 9 students reflected relatively lower needs overall. Gender-wise, female students were more prominent in the high and very high counselling need brackets, suggesting greater emotional stress or readiness to express such needs. These patterns highlight the importance of a dual strategy—maintaining broad preventive support for all students while delivering targeted interventions to vulnerable groups like Grade 8, Grade 10, and female students.

Discussion and Conclusion:

The findings indicate uniform counselling needs across grades and gender, likely due to shared academic pressures, school environment, and digital mental health access. Yet, subgroups (Grade 8, 10, females) exhibit patterns suggesting specific vulnerabilities. The absence of significant differences does not imply absence of need. A universal, proactive, and preventive approach is essential.

Suggestions:

- Implement structured school counselling with trained professionals
- Grade 8: Focus on emotional adjustment
- Grade 10: Focus on stress management
- Gender-sensitive programs: Open discussions, female mentors
- Train teachers for early distress identification
- Engage parents in awareness and support

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WOMEN IN SCIENCE: A LITERATURE REVIEW ON PERSISTENT GENDER DISPARITIES

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Abstract:

Through this review, the author aims to explore the different aspects of gender bias, prevalent in various areas of science (research and career opportunities). While doing the review, the author found many instances of gender bias at the workplace, at the university level and even at house level and how these instances of gender bias lead to underrepresentation of women in the STEM field. During the review, the author also found an acknowledgement of the progress the society has made to address the menace of gender bias. However, this humble acknowledgement does not completely rule out the prospect of gender bias, against women, in the field of science. This review also highlights the impact of gender stereotypes on the preferences and choices of female students, towards science. Gender relevant terms like 'leakage' and 'gender- blindness', and the significance attached to these words, are aptly touched upon in this review. The review also pointed to several factors, often overlooked, such as impact of parenthood, negative sex stereotypes, attitude of science faculty members and their contribution to underrepresentation of women in the STEM sectors. Among other things, the review aptly underscores the 'gender- barriers', which prevent women from taking up science related subjects. The cross-cultural approach adopted in this review, provided many measures, aimed at increasing women participation, in the field of science (career opportunities as well as research). These measures are quite relevant in tackling gender-disparities in the field of science, in a country like India, which aims to become a developed country by 2047.

Keywords: *gender bias, gender blindness, leakage, stereotypes, underrepresentation, work-life imbalance.*

Introduction:

The case of **Matilda Effect**, i.e., a bias against acknowledging the achievements of women scientists, whose work is attributed to their male colleagues, still haunts the projectile stride made by mankind, in the field of Science. The history of science is filled with examples of women scientists having been robbed off their due credit, such as **Rosalind Franklin, Nettie Steven, Marietta Blau** etc. Gender bias against female scientists., propels us to wonder, if the traces and different forms of this gender bias still exist today, in the field of science, across the cultures.

Review of related Literature:

Under-representation of women in STEM sectors

- One of the most common themes observed during the review was that, despite all the progress around the globe, women still remain underrepresented in STEM Sectors. (Ceci, S. J., & Williams, W. M.-2011).
- Another study revealed that there is higher participation of women, only in non-math intensive STEM fields. (Ceci, S. J., Ginther, D. K., Kahn, S., & Williams, W. M. -2014)
- Some studies did acknowledge the progress of women in science, however, they underlined that despite global attention on underrepresentation of women in STEM sectors, the progress has been slow. (Peters, J. W., & Lane, N. J. The Status of Women in the Life Sciences. 1-13)

Biases at University Level:

- During this review, the author came across one of the main reasons for the underrepresentation of women in science i.e., biases at university level. Challenges like gender stereotyping and the underrepresentation of women in STEM classrooms persist, at university level. (Heitman, C. C. (2017). THE CREATION OF GENDER BIAS IN MUSEUM COLLECTIONS: Recontextualizing Archaeological and Archival Collections from Chaco Canyon, New Mexico. *Museum Anthropology*, 40(2), 128-142.)
- In another study, a significant gender bias was observed, in supervision and evaluation. (Vallejo, M., Torralbo, M., & Fernández-Cano, A. 2016).
- A study pointed to unconscious biases, reflected in funding allocation, employment, publication, and general research directions, in the field of science (Ceci, S. J., & Williams, W. M. 2011).

Biases at Hiring Level:

- It was found that despite equal performance, both male and female participants were likely to hire a man over a woman, largely due to the perception that men

perform better. [Reuben, E., Sapienza, P., & Zingales, L. (2014). How stereotypes impair women's careers in science.]

- In a study, aimed at checking the attitude of science faculty members, using a randomized double-blind experiment with 127 faculty members, where participants rated identical application materials for a laboratory manager position, with the only difference being the name (male or female), it was observed that faculty rated the male applicant as more competent, hireable, and offered a higher salary and more career mentoring than the female applicant., while hiring for the position of Lab Manager (Moss-Racusin, C. A., Dovidio, J. F., Brescoll, V. L., Graham, M. J., & Handelsman, J. 2012).
- Another study concluded that women researchers have lower chances of securing academic positions than men in all fields. [Kim, L., Smith, D. S., Hofstra, B., & McFarland, D. A. (2021). Gendered knowledge in fields and academic careers. *Research Policy*, 51(1), 104411.]
- A study used the Implicit Association Test (IAT) to reveal that implicit gender stereotypes are the primary cause of this gender bias, affecting the expectations of the employers, especially when performance is self-reported. [Reuben, E., Sapienza, P., & Zingales, L. (2014). How stereotypes impair women's careers in science.]

Impact of Parenthood:

- Declared as one of the most important causes of gender bias in the field of science. In a survey of Brazilian scientists, mothers reported facing more negative biases in the workplace than fathers. (Staniscuaski, F., Machado, A. V., Soletti, R. C., Reichert, F., Zandonà, E., B., P., Infanger, C., Ludwig, Z. M., & De Oliveira, L. 2023).
- A study claimed that women also face the challenge of balancing family responsibilities and scientific careers. (Ceci, S. J., & Williams, W. M. 2011)
- While another study highlighted that women are more likely to be employed in lower-paying, temporary roles and often face career breaks due to child-rearing. (Ver Steeg, L. M.2003)

Causes of Gender Disparities:

The process of review highlighted a few major causes of the Gender Disparities, seen in the field of Science. These major causes are:-

- Attrition of female students, during various stages of their academics, from choosing math intensive courses.
- Negative Sex Stereotypes influence hiring decisions in a task where both men and women perform equally well.

- Societal expectations, affecting the preferences and choices of women.
- Cultural factors play an important role in creating opportunities for females in Science.
- Work-life imbalance caused by parenthood.
- Lack of women at decision-making positions, is found to be a major cause of Gender Disparities.
- Lack of awareness about STEM careers, results in fewer participation of women in Science Stream.

Suggested Measures:

This review also provided some recommendations, to overcome the 'Gender Disparities in Science'. These recommendations are: -

- Inclusive hiring practices and creating mentorship opportunities for women in science.
- Addressing biases in recruitment, tenure evaluations, and grant funding processes.
- Promoting a more supportive work-life balance.
- Addressing faculty gender bias could help increase women's participation in science.
- Promoting gender-blindness, as opposed to gender awareness.
- Promoting more research in the area of Gender Disparities in Science.

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USE OF SOCIAL MEDIA AND ITS ADDICTION AMONG STUDENTS

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Abstract:

Social media plays a significant role in shaping the lifestyle, communication and behaviour of individuals, especially among youth. Social media, while being a powerful tool of connectivity and information, has also led to growing concerns about its addiction. The purpose of the present study was to assess the use of social media and its addiction among college students aged 18 to 25 and to examine the differences in addiction levels based on age and gender. For this purpose, the researcher selected 82 students using purposive sampling. The participants included students who had completed HSC, were currently pursuing graduation or post-graduation and consisted of both male and female students from the age group of 18 to 25 years. The Social Media Addiction Scale – Student Form (SMAS-SF) developed by Cengiz Şahin (2018) was used for data collection. As per the statistical analysis conducted using the t- test, the results revealed no significant difference in addiction between the two age groups. However, a significant difference was observed between genders, with males showing higher levels of addiction than females.

Key words: *Social media, addiction, college students, gender difference, age group*

Introduction:

Social media has become inseparable part of our lives in today's rapidly growing digital age particularly within student demographics. The development of digital technologies has transformed communication, interaction, and information sharing. Social media usage is perhaps the most prominent development of the digital era. Services such as Instagram, Facebook, Snapchat, and YouTube are now part of the routine for most students. In this age of smartphones, social media is incessantly accessible with notifications, along with an infinite amount of content to scroll through. This turns social media usage into more than just a means of connection, making it a daily habit, a place for self-expression, validation, and even escapism. Social media platforms were initially introduced to provide great benefits such as better connectivity, wide access to information and building community across the

world. However, their use raises the issue of excessive use and addiction. Students and youth who are at a young stage of emotional and intellectual development are being highly influenced by the use of social media. Compared to earlier times, when social media was not risen and people were not dependent on it, their lifestyle choices, their eating habits, way of thinking and self-consciousness have undergone a drastic change – which may or may not be always better.

Significance of the study:

Social media is no longer a pastime -It is becoming a substitute for real world experiences. Students are spending most of their time scrolling through reels, online gaming platforms or virtual communications. The current study on the use of social media and its addiction is highly significant in today's fast growing technologically-driven environment, especially as social media becomes more deeply instilled into the lives of young adults. By concentrating on individuals aged 18 to 25—most crucial time for identity development, emotional development, and career establishment—this study provides insights that can be helpful to various parts of society. Teachers find their students distracted during lectures which affects their academic results and their productivity. This study will help teachers in identifying early indicators of social media addiction and its effects on attention, academic success, classroom participation, and peer relationships. It can help counselors, psychologists, and social workers in understanding age-related and gender-specific trends in social media addiction.

Objectives of the study:

1. To compare the use of social media and its addiction between two age groups—18 to 21 years and 22 to 25 years
2. To compare the use of social media and its addiction between male and female students.

Hypotheses:

1. There is no significant difference in the use of social media and its addiction between the 18–21 and 22–25 age groups.
There is no significant difference in the use of social media and its addiction between male and female students.

Scope of the study:

This study has scope among age groups between 18 and 25 years. It will reveal their habits that are linked to social media, the level of addiction reached, and the changes in their behavior resulting from the excessive use.

The study includes male and female students to evaluate any differences based on gender in terms of social media usage, addiction levels and related behavioral

outcomes. The participants are selected from a broad range of academic institutions including junior colleges, degree colleges and students enrolled in postgraduate programs such as Master's and PhD. Regionally, the study focuses on the city of Mumbai, concentrating specifically on south Mumbai. The behavioral aspects covered consist of time management, attention span, social interactions, academic involvement, and emotional control. The study also looks into the social impact of the technological revolution and the shifts in the relationships between individuals in the communities.

Limitations of the study:

The study is confined to students who are living in Mumbai. The sample comprises students aged between 18 to 25 years or beyond. The social media use and addiction behaviors of younger adolescents are excluded from consideration, which limits the applicability to a wider age range.

The study depends on self-reported answers, which can be affected by personal bias, social desirability or incorrect self-evaluation. This may influence the objectivity and dependability of the findings. The study might not differentiate among various social media platforms (e.g., Instagram, WhatsApp, Snapchat, LinkedIn) though their usage and addictive patterns may differ.

Tools Used:

To assess the level of social media addiction among students, the Social Media Addiction Scale – Student Form (SMAS-SF) developed by Cengiz Şahin (2018) was used. The scale consists of 29 items, and responses are measured using a 5-point Likert scale, where 1 indicates "Strongly Disagree" and 5 indicates "Strongly Agree". The higher the total score, the greater the level of social media addiction. The SMAS-SF is a reliable and valid instrument that has been widely used in educational and psychological research to evaluate students' usage patterns and psychological tendencies related to social media.

Methodology:

The present study followed a descriptive survey method of the quantitative to assess social media addiction among college students. The sample comprised 82 students in the age group of 18 to 25 years. Among them, 41 students belonged to the 18 to 21 age group and the remaining 41 students were between 22 and 25 years. The sample included an equal number of male and female participants—41 each. The participants were selected using purposive sampling and represented diverse academic backgrounds such as HSC pass, undergraduate (pursuing and completed), and postgraduate students. Data was collected using the Social Media Addiction Scale – Student Form (SMAS-SF) developed by Cengiz Şahin (2018). The scale was

administered through a structured Google Form shared with students under the supervision of the researcher. The tool measured levels of social media addiction through student responses. For statistical analysis, the t-test was used to compare social media addiction levels between the two age groups (18–21 and 22–25), as well as between male and female students, and the results were tested at the 0.05 level of significance.

Analysis of data:

In the present study, the t-test was applied at the 0.05 level of significance to compare social media usage and addiction between the two age groups (18–21 and 22–25), as well as between male and female students. In addition, the mean and standard deviation were calculated to aid in better interpretation and understanding of the data. The data analysis was performed using the Microsoft Excel application, which is part of the Microsoft Office program.

Hypothesis 1: There is no significant difference in the use of social media and its addiction between the age groups 18-21 years and 22-25 years.

The following table shows the relevant statistics of mean scores between the age groups of 18- 21 years and 22-25 years in relation to use of social media and its addiction.

Table 1. Relevant statistics of mean scores between the age groups of 18-21 years and 22-25 years in relation to use of social media and its addiction.

Hy	Age Group	N	df	Mean	SD	SEd	t (cal)	t (tab)	L. of Sig
1	18 -21 years	41	80	87.76	21.93	5.32	0.60	1.99	NS at 0.05
	22-25 years	41		84.56	26.04				

From the preceding table, it is evident that the calculated t-value is 0.60, which is not significant at the 0.05 level with $df = 80$. It reflects that the mean scores of 18–21-year-olds and 22–25- year-olds do not differ significantly in terms of social media addiction. In this context, the null hypothesis that there is no significant difference in the use of social media and its addiction between the age groups 18–21 years and 22–25 years is accepted.

Further, the mean score of social media addiction among the 18–21 age group is 87.76, which is not significantly higher than the mean score of the 22–25 age group, which is 84.56. It may therefore be said that the level of social media addiction among

the age group of 18–21 years was found to be not significantly higher as compared to the age group of 22–25 years.

Hypothesis 2: There is no significant difference in the use of social media and its addiction between the Male and Female students.

The following table shows the relevant statistics of mean scores between the Male and Female students in relation to use of social media and its addiction.

Table 2. Relevant statistics of mean scores between the Male and Female students in relation to use of social media and its addiction.

Hy	Gender	N	df	Mean	SD	SEd	t (cal)	t (tab)	L. of Sig
2	Male	41	80	91.88	26.86	5.05	2.63	1.99	S at 0.05
	Female	41		78.59	18.00				

From the preceding table, it is evident that the calculated t-value is 2.63, which is significant at 0.05 level with $df = 80$. It reflects that the mean scores of male and female students differ significantly. In this context, the null hypothesis that there is no significant difference in the use of social media and its addiction between male and female students is rejected.

Further, the mean score of male students is 91.88, which is significantly higher than the mean score of female students, which is 78.59. It may therefore be said that male students were found to exhibit significantly higher social media addiction as compared to female students.

Major Findings:

1. The use of social media and its addiction among students aged 18 to 21 was found to be not significantly higher than that of students aged 22 to 25.
2. The use of social media and its addiction among Male students was found to be significantly higher as compared to Female students.

Conclusions and Discussions:

For Hypothesis 1: There is no significant difference in the use of social media and its addiction among students aged 18 to 21 and 22 to 25.

It may therefore be said that the use of social media and its addiction among students aged 18 to 21 and 22 to 25 was found to be almost the same.

Discussion:

This may be attributed to the fact that students aged 18–21 and 22–25 share similar academic demands, social habits, and digital routines. Both age groups actively use social media for communication, staying updated, and managing course-related

tasks. Another possible reason may be emotional dependency, such as feeling unhappy without access, the preference for virtual engagement and the need to stay informed. Hence, their usage patterns show parallel behavior.

For Hypothesis 2: There is significant difference in the use of social media and its addiction between the Male and Female students.

It may be therefore said that the use of social media and its addiction among male students was found to be significantly higher as compared to the use of social media and its addiction among female students.

Discussion:

This may be attributed to the fact that males are often emotionally less expressive and may turn to social media as a space for distraction, escape, or emotional release. Male might possess behaviors such avoidance of real interactions, and compulsive checking behaviors. They may also use social media more for gaming, entertainment, or building identity through online presence. In contrast, females may exhibit more self-regulation and social support offline.

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A STUDY OF ATTITUDE TOWARDS SCIENCE AMONG SECONDARY SCHOOL STUDENTS ACROSS DIFFERENT BOARDS IN MUMBAI

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Abstract:

This research explores the attitudes of secondary school students towards science across three major educational boards in Mumbai: SSC, CBSE, and ICSE. A total sample of 281 students from grades 8 and 9 was studied using the Attitude Towards Science Scale (ATSS). The study's primary aim was to identify whether variables such as gender, grade level and board affiliation significantly influence students' scientific attitudes. The analysis revealed no significant difference in attitude based on gender or grade level. However, statistically significant differences were found between boards with CBSE and ICSE students displaying more positive attitudes compared to SSC students. These findings underscore the importance of curriculum content and teaching methodologies in shaping learners' perceptions and enthusiasm toward science. The study provides valuable insights for educators, policymakers, and stakeholders aiming to foster stronger scientific temperaments among young learners.

Keywords: *Scientific Attitude, Secondary School Students, SSC, CBSE, ICSE, Gender.*

Introduction:

Science education is foundational to developing a well-informed, rational and analytically capable citizenry. It is not only about imparting knowledge but also about nurturing an attitude of curiosity, exploration, and evidence-based reasoning. A student's attitude towards science can significantly impact their academic engagement, career preferences, and lifelong learning behaviors. Research supports that variables such as motivation, prior experiences, and learning environment influence student attitudes (Christidou, 2006; Haladyna et al., 1982). In a diverse educational landscape like Mumbai, students are enrolled in schools under different boards—SSC, CBSE, and ICSE—each offering distinct curriculum frameworks and pedagogical styles. This study explores how these environments shape students' attitudes and whether gender or grade level influence these perspectives.

Significance of the Study:

This research offers critical insights for multiple stakeholders in science education. School administrators can identify areas for improving student engagement, while teachers can better address student attitudes using inclusive, inquiry-based methods. Prior research highlights the link between instructional design and attitude (Bicer et al., 2015), making this study relevant for classroom-level innovation. Parents gain insight into supporting their children's scientific interests at home. The findings also inform policy decisions on curriculum design and teacher training, echoing earlier studies stressing the role of systemic factors (Bayraktar, 2011; Dogan & Turgut, 2011).

Objectives of the Study:

1. To study the overall attitude towards science among secondary school students across different boards in Mumbai.
2. To compare the differences in the attitude towards science among secondary school students of different Genders across various school boards in Mumbai.
3. To compare the differences in the attitude towards science among secondary school students of different Boards (SSC,CBSE, ICSE) in Mumbai.
 - 3a. To compare the differences in the attitude towards science between secondary school students from SSC and ICSE boards in Mumbai.
 - 3b. To compare the differences in the attitude towards science between secondary school students from SSC and CBSE boards in Mumbai.
 - 3c. To compare the differences in the attitude towards science between secondary school students from ICSE and CBSE boards in Mumbai.
4. To compare the differences in the attitude towards science among secondary school students of different Grade levels (8th and 9th) across various school boards in Mumbai.

Hypotheses of the Study:

1. There is no significant difference in the attitude towards science between male and female students in secondary schools.
2. There is no significant difference in the attitude towards science between different boards (SSC,CBSE, ICSE) students in secondary schools.
 - 2a. There is no significant difference in the attitude towards science of secondary school students studying under the SSC and ICSE boards in Mumbai.
 - 2b. There is no significant difference in the attitude towards science of secondary school students from SSC and CBSE boards in Mumbai.
 - 2c. There is no significant difference in the attitude towards science of secondary school students from the ICSE and CBSE boards in Mumbai.

3. There is no significant difference in the attitude towards science across different grade levels (8th and 9th).

Tool Used:

The tool used for data collection was the Attitude Towards Science Scale (ATSS) developed by Dr. Anuradha Agnihotri. This standardized instrument uses a five-point Likert scale format (Strongly Agree to Strongly Disagree) and is designed to measure scientific attitudes in students across cognitive, affective, and behavioral domains. The scale includes statements addressing various dimensions such as interest in science, perceptions of the value of science, enjoyment of scientific activities, and attitudes toward science education and its relevance. It has been validated for reliability and content validity, making it a robust tool for assessing students' attitudes toward science.

Methodology:

The present study employed a descriptive survey method suitable for collecting quantitative data related to students' attitudes. A purposive sampling technique was adopted to ensure diverse representation from SSC, CBSE, and ICSE boards, including both male and female students in 8th and 9th grades. A total of 281 students from English-medium schools in Mumbai formed the sample group. These schools were selected to maintain consistency in language comprehension, ensuring students could accurately interpret the items in the questionnaire. This method enabled the researchers to collect structured and relevant data that reflect students' perceptions and attitudes toward science.

Administration of the Test:

The ATSS questionnaire was administered in a structured environment during regular school hours, with prior permission from school authorities. Students were briefed about the objective of the study and instructed to answer all items honestly and independently. Adequate time was given to complete the questionnaire, and students were encouraged to seek clarification only on procedural aspects. Responses were collected anonymously, and confidentiality was maintained throughout the process to ensure authenticity and minimize bias.

Analysis of Data:

- ***T- test for Hypothesis (H_0) 1***

There is no significant difference in scientific attitude between male and female students in secondary schools

Table 4.3.1 Relevant statistics of mean scores between the scientific attitude between male and female students in secondary schools

H ₀	Groups	N	d.f	Mean	S.D	SEd	t (cal)	t (value)	L. of Sig.
1	Female	91	279	269.01	23.55	3.60	1.75	1.98	N.S at 0.05
	Male	184		262.73	24.95				

From the above table it can be seen that the calculated t-value is 1.75 which is not significant at the 0.05 level with degrees of freedom (d.f.) = 279. This reflects that the mean scores of females (269.01) and males (262.73) do not differ significantly. Hence the null hypothesis that there is no significant difference between the mean scores of females and males is accepted.

The mean score of females (269.01) is slightly higher than that of males (262.73), but this difference is not significant. It may therefore be said that female participants were not found to possess significantly higher scores compared to male participants in this context.

There is no significant difference between the mean scores of females and males it may therefore be said that the scores of both groups were found to be almost the same with no significant difference observed between them.

• **ANNOVA - test for Hypothesis (H₀) 2**

There is no significant difference in scientific attitude between different boards (SSC,CBSE, ICSE) students in secondary schools.

Table 4.3.2 ANNOVA of scientific attitude between different boards (SSC,CBSE, ICSE) students in secondary schools.

Treatment	N	SUM	MEAN	SUM X ²	STD
S.S.C	88	22511	255.81	5787701	18.33
C.B.S.E	63	16660	264.44	4451594	27.22
I.C.S.E	131	35541	271.31	9723115	24.91
Total	282	74712	264.936	19962410	24.4875

SOURCE	SS	df	MS	F VALUE	F TABLE
BETWEEN	13663.79	2	6331.89	11.336	3
WITHIN	155835.06	279	558.55		
TOTAL	168498.85	281			

From the above table the calculated F-value of 11.336 exceeds the critical value at the 0.05 significance level, confirming that the observed differences are statistically

meaningful. Among the boards, ICSE students achieved the highest mean score (271.31), followed by CBSE students (264.44), and SSC students (255.81). These differences suggest that the educational board may influence student performance.

• **T- test for Hypothesis (H_0) 2a**

There is no significant difference in the scientific attitude of secondary school students studying under the SSC and ICSE boards in Mumbai.

Table 4.3.2a - Relevant statistics of mean scores between the scientific attitude of secondary school students studying under the SSC and ICSE boards in Mumbai

H ₀	Groups	N	d.f	Mean	S.D	SEd	t (cal)	t (value)	L. of Sig.
2a	SSC	88	216	255.81	18.33	2.47	6.27	1.98	S at 0.05
	ICSE	130		271.31	24.91				

The above table compares the mean scores of two educational boards: SSC (N = 88, Mean = 255.81, SD = 18.33) and ICSE (N = 130, Mean = 271.31, SD = 24.91). The calculated t-value is 6.27, which exceeds the critical t-value of 1.98 ($\alpha = 0.05$, d.f. = 216). This indicates a significant difference between the two groups.

The standard error of the difference (SEd = 2.47) reflects the precision of the mean estimates, and the large t-value suggests the observed difference ($\Delta = 15.5$) is unlikely due to random chance. Since the calculated t-value surpasses the critical threshold the null hypothesis is rejected.

• **T- test for Hypothesis (H_0) 2b**

There is no significant difference in the scientific attitude of secondary school students from SSC and CBSE boards in Mumbai.

Table 4.3.2b – Relevant statistics of mean scores between the scientific attitude of secondary school students from SSC and CBSE boards in Mumbai

H ₀	Groups	N	d.f	Mean	S.D	SEd	t (cal)	t (value)	L. of Sig.
2b	SSC	88	149	255.81	18.33	3.95	2.18	1.98	S at 0.05
	CBSE	63		264.45	27.23				

The above table compares the mean scores of two educational boards: SSC (N = 88, Mean = 255.81, SD = 18.33) and CBSE (N = 63, Mean = 264.45, SD = 27.23). The calculated t-value is 2.18, which exceeds the critical t-value of 1.98 ($\alpha = 0.05$, d.f. = 149). This indicates a significant difference between the two groups.

The standard error of the difference ($SEd = 3.95$) reflects the precision of the mean estimates, and the observed difference ($\Delta = 8.64$) suggests that the difference in mean scores is unlikely to be due to random chance. Since the calculated t-value surpasses the critical threshold, the null hypothesis is rejected.

• **T- test for Hypothesis (H_o) 2c**

There is no significant difference in the scientific attitude of secondary school students from ICSE and CBSE boards in Mumbai.

Table 4.3.2c – Relevant statistics of mean scores between the scientific attitude of secondary school students from ICSE and CBSE boards in Mumbai

H _o	Groups	N	d.f	Mean	S.D	SEd	t (cal)	t (value)	L. of Sig
2c	ICSE	130	191	271.31	24.91	3.75	1.82	1.98	N.S at 0.05
	CBSE	63		264.45	27.23				

The above table compares the mean scores of two educational boards: ICSE (N = 130, Mean = 271.31, SD = 24.91) and CBSE (N = 63, Mean = 264.45, SD = 27.23). The calculated t-value is 1.82, which does not exceed the critical t-value of 1.98 ($\alpha = 0.05$, d.f. = 191). This indicates that there is no significant difference between the two groups.

The standard error of the difference ($SEd = 3.75$) reflects the precision of the mean estimates, and the observed difference ($\Delta = 6.86$) suggests that while there is a difference in mean scores it is not significant and may be due to random chance. Since the calculated t-value does not surpass the critical threshold the null hypothesis cannot be rejected.

• **T- test for Hypothesis (H_o) 3**

There is no significant difference in scientific attitude across different grade levels (8th and 9th)

Table 4.3.3 – Relevant statistics of mean scores between the scientific attitude across different grade levels (8th and 9th)

H _o	Groups	N	d.f	Mean	S.D	SEd	t (cal)	t (value)	L. of Sig
3	8th	154	279	262.56	23.46	2.95	1.83	1.98	N.S at 0.05
	9th	127		267.96	25.58				

The above table compares the mean scores of two student groups: 8th grade ($N = 154$, Mean = 262.56, SD = 23.46) and 9th grade ($N = 127$, Mean = 267.96, SD = 25.58). The calculated t-value is 1.83, which does not exceed the critical t-value of 1.98 ($\alpha = 0.05$, d.f. = 279). This indicates that there is no significant difference between the two groups.

The standard error of the difference ($SEd = 2.95$) reflects the precision of the mean estimates, and the observed difference ($\Delta = 5.40$) suggests that while there is a difference in mean scores, it is not significant and may be attributed to random chance. Since the calculated t-value does not surpass the critical threshold, the null hypothesis cannot be rejected.

Major Findings of the Study:

Hypothesis 1: The study found no significant difference in scientific attitude between male and female secondary school students. While acknowledging potential influencing factors like access to resources and cultural norms, the mean scores of both groups were statistically similar. This aligns with findings by Jones et al. (2000), suggesting gender gaps in science attitude are narrowing.

Hypothesis 2: A significant difference exists in the scientific attitude among students from the SSC, CBSE and ICSE boards. This confirms previous research indicating that curriculum design and teaching practices play crucial roles in shaping student attitudes (Chakraborty et al., 2024; Babar & Zaman, 2023).

Hypothesis 2a: Students under the ICSE board in Mumbai exhibit a significantly higher scientific attitude compared to SSC students. This may be due to ICSE's emphasis on conceptual understanding and reasoning-based learning.

Hypothesis 2b: CBSE students also demonstrated significantly higher scientific attitudes than SSC students, possibly due to CBSE's structured and experiential learning approaches.

Hypothesis 2c: No significant difference was found between ICSE and CBSE students. Despite differences in curriculum styles, both boards promote inquiry-based science education effectively.

Hypothesis 3: No significant difference was observed in the scientific attitudes of students between grades 8 and 9. This is consistent with Freeman et al. (2014), who noted stable science attitudes across closely related academic levels.

Conclusion:

This study highlights that while gender and grade level did not significantly influence students' scientific attitudes, the type of educational board did. Students from CBSE and ICSE boards showed more positive attitudes than those from SSC. These results align with existing research by Bicer et al. (2015), Cannon & Simpson (1985), and

Chouhan & Patel (2024), which emphasize the role of curriculum design, teaching methods, and learning environments in shaping scientific attitudes. The findings suggest that inquiry-based and experiential learning approaches, as practiced in CBSE and ICSE, are more effective in fostering curiosity, analytical thinking, and long-term interest in science, indicating the need for pedagogical reform in SSC-affiliated schools.

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FOSTERING REFLECTIVE PRACTICES IN STUDENT TEACHERS THROUGH A DIGITAL MULTIMODAL ARTISTIC MODULE

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Abstract:

Reflective practice plays a crucial role in teacher education, allowing educators to analyze their teaching methodologies, experiences, and pedagogical choices to enhance self-development. This study explores the impact of the Digital Multimodal Artistic Module (DMAM) on the reflective practices of student teachers. The module integrates Four Quadrant Module learning to create a holistic reflective experience. A quasi-experimental research design was adopted with 70 student teachers used as sample, divided into control and experimental groups. The experimental group was taught using DMAM, whereas the control group was taught traditionally. The assessment of reflective practices pre- and post-test was used to identify a difference among the groups, statistically analyzed using descriptive and inferential analysis. Results demonstrate that the experimental group had significantly better reflective practices than the control group, suggesting that the module is effective in teacher education. However, within the control group, no significant difference was observed between pre-test and post-test scores, reinforcing the need for innovative pedagogical interventions. This study underscores the importance of reflective practices in teacher training and recommends further exploration of multimodal approaches to foster holistic development.

Keywords: *Reflective practices, Digital Multimodal Artistic Module, Student Teachers*

Introduction:

Reflective practice is the apex of Teaching Practices, allowing educators to self-analyze the processes, experiences, and pedagogical choices to facilitate self-development. In teacher training, developing self-reflection skills among student teachers implies the ability to change, create, and improve instructional designs. With the rise of digital tools, educators integrate multimodal elements—visuals, audio, text, and video—to create richer, more engaging reflective experiences. Digital

platforms not only provide flexibility but also enable student teachers to document, revisit, and analyze their teaching practices more holistically.

When artistic expression is embedded into these digital formats, it further deepens reflection by allowing educators to convey emotions, perspectives, and insights that may not be fully captured through traditional means.

This research focuses on the transformation of self-reflective practices of student teachers using the Digital Multimodal Artistic Module (DMAM). It looks into the effects of integrating Digital Multimodal Artistic Module (DMAM) with structured reflection tasks on the students' level of evaluation, adjustment and implementation of self-reflection practices.

Conceptual Framework:

A key component of teacher education is reflective practice, which helps teachers assess their own teaching thoughtfully, improve their methods, and improve the learning experiences of their students. The Digital Multimodal Artistic Module (DMAM) is designed to integrate digital tools, multimodal learning, and artistic elements to create a dynamic and reflective educational experience.

➤ **The 4-quadrant Model**

The module follows a four-quadrant learning approach, ensuring a comprehensive engagement with learning content through:

1. **Textual Mode** – Providing structured explanations, theoretical insights, and instructional content through PowerPoint presentations and documents.
2. **Visual Mode** – Utilizing infographics, mind maps, and artistic representations to organize and simplify complex ideas.
3. **Audio Mode** – Incorporating podcasts with background music for an immersive and reflective learning experience.
4. **Video Mode** – Delivering pre-recorded lectures, demonstrations, and visual storytelling to ensure clarity and engagement.

➤ **Blended Approach of Learning:**

Beyond content delivery, DMAM adopted a blended learning approach using the Face-to-Face Driver Model. The face-to-face driver model is a blended learning approach where traditional classroom instruction is the primary method, and technology is used to supplement learning, particularly for students who need extra support or are working at different paces. The researcher enhanced the traditional classroom instruction with interactive digital tools, such as:

1. Mentimeter for real-time polls, quizzes, and word clouds, ensuring active participation.
2. Nearpod for interactive discussions and peer collaboration, fostering deeper engagement.
3. Visual Organizers like concept maps to help student-teachers analyze and connect pedagogical and artistic concepts.
4. Padlet, a collaborative digital board where student-teachers shared reflections, brainstormed ideas, and curated resources.

➤ **Artistic essence of DMAM**

The artistic essence of DMAM ensures that aesthetic elements are embedded in every aspect of teaching. Drawing from Abhinaya in Natyashastra, the module transforms teaching into an expressive, immersive, and performative act using physical expression, verbal expression, aesthetic elements & emotional connection.

Effective teaching is not just about delivering content but also about continuously evaluating and refining instructional practices.

➤ **Cultivating a Reflective Mindset**

For student-teachers, the ability to analyze their teaching experiences, identify strengths, and recognize areas for improvement is crucial for professional growth. This necessitates a structured approach to reflection, where educators actively engage in self-assessment and peer discussions to enhance their competencies. To cultivate a reflective mindset, the Digital Multimodal Artistic Module (DMAM) embeds structured reflection, integrating self-feedback, peer feedback, and teacher feedback within a Reflective Cycle.

This structured reflection is guided by four key stages:

1. **Habitual Action** – Routine teaching practices performed automatically.
2. **Understanding** – Applying existing knowledge without deep evaluation.
3. **Reflection** – Thoughtful analysis of teaching experiences to identify strengths and areas for improvement.
4. **Critical Reflection** – Deep self-examination of beliefs and teaching philosophies, leading to transformative learning.

To facilitate structured and continuous reflection, after each skill presentation:

1. Student-teachers were engaged in **self-reflection** using a Google Form integrated within the DMAM, documenting their thoughts systematically.
2. **Peer feedback** was provided through digital collaborative tools, fostering constructive discussions.
3. **Teacher feedback** was given to guide professional growth.

This reflective cycle, rooted in psychological reflection methods, notes that student-teachers don't merely perform teaching skills but actively evaluate, refine, and improve their pedagogical techniques.

Rationale of the Study:

Teaching is not just about delivering lessons—it is about continuous learning and self-improvement. The National Education Policy (NEP) 2020 highlights the need for teacher autonomy, critical thinking, and professional development, encouraging educators to reflect on their practices to create engaging, student-centered classrooms. Similarly, the National Curriculum Framework for Teacher Education (NCF 2023) underscores the importance of reflective teaching, advocating for teachers who analyze their instructional methods, adapt to diverse student needs, and develop a deeper connection with their profession. Hence the researcher wanted to foster reflective practices among student teachers.

The researcher believes that teaching is more than just delivering lessons—it is a journey of growth, self-discovery, and transformation. Educators constantly strive to improve their methods, understand the students better, and create meaningful learning experiences. However, reflective practice does not always come naturally. Many student teachers tend to rely on habitual teaching patterns without deeply analyzing their effectiveness. Hence the researcher felt the need to develop a structured approach to reflection can help educators move beyond routine actions and become more self-aware, adaptable, and impactful in their teaching.

Objectives of the Study:

1. To compare the Pre-test scores of Reflective Practices among Student teachers of the Control and Experimental groups.
2. To compare the Post-test scores of Reflective Practices among Student teachers of the Control and Experimental groups.
3. To study the effect of Conventional Method on Reflective Practices among Student teachers with respect to the Pre-test scores and Post-test scores of the Control group.
4. To study the effect of Digital Multimodal Artistic Module on Reflective Practices among Student teachers with respect to the Pre-test scores and Post-test scores of the Experimental group.

Research Methodology:

- **Research Design** This study employs an experimental research design that uses quasi-experimental methods, particularly the pre-test post-test non-equivalent group design. **Sample and Sampling Technique of the Study:** The study sample consists of 35 student teachers as the experimental group, and 35 student

teachers as the control group. A cluster sampling technique is employed to select participants. This method is suitable for educational research where groups of students (clusters) are naturally formed within institutions. Instead of selecting individuals randomly, entire clusters (such as specific sections or batches of student teachers) are chosen to participate in the study.

- **Tools and Techniques used for the Study**

1. **Digital Multimodal Artistic Module (DMAM):**

The primary intervention tool designed to foster reflective practices through a combination of visual, text, audio, and video elements:

2. **Reflective Practices Questionnaire** A validated 5-point rating scale questionnaire was developed and validated by 15 experts. Modifications suggested by the experts were incorporated. Reliability was calculated using the split-half method, yielding a reliability coefficient of 0.64.

- **Data Collection Procedure:**

The data collection process was systematically structured to ensure accurate measurement of the impact of the Digital Multimodal Artistic Module (DMAM) on Reflective Practices among student teachers.

Both the experimental group and the control group were assessed using pre-test tools. The pre-test included the Reflective Practices Questionnaire to establish baseline data. The experimental group underwent training using the Digital Multimodal Artistic Module. The intervention for the experimental group spanned 15 active days over 22 calendar days, later the group was supported with Multimodal module. The control group followed traditional teaching methods without exposure to DMAM for 14 active days and 21 calendar days. The same instructional content was covered through conventional teaching techniques. After the intervention, both groups were re-assessed using the same instruments as in the pre-test.

- **Data Analysis:**

Data was analyzed using quantitative method. Descriptive statistics were employed to summarize and characterize the data. For inferential statistics, a t-test was performed to assess the statistical significance of the differences observed.

Findings & Discussion:

Hypothesis 1: There is no significant difference in the Pre-test scores of Reflective Practices among Student teachers of the Control and Experimental groups.

Table 1: Pre-test scores of Reflective Practices among Student teachers of Control and Experimental groups								
Group	N	Df	Mean	SD	SE _D	't' value	Level of Significance 0.05	Ho Accepted or Rejected
Control Group	35	68	73.57	1.03	1.51	1.10	Not Significant	Accepted
Experimental Group	35		75.23	1.10				

Description The obtained t-value does not reach the threshold for statistical significance. Therefore, the null hypothesis (H_0) is accepted, indicating that there is no significant difference between the pre-test scores of the Control and Experimental groups in terms of Reflective Practices.

Interpretation The findings suggest that both groups had comparable levels of Reflective Practices before the intervention, as their pre-test scores do not show a statistically significant difference. This establishes a baseline equivalence between the groups, ensuring that any subsequent differences observed in the post-test can be attributed to the intervention rather than pre-existing differences.

Hypothesis 2: There is no significant difference in the Post-test scores of Reflective Practices among Student teachers of the Control and Experimental groups.

Table 2: Post-test scores of Reflective Practices among Student teachers of Control and Experimental groups								
Group	N	Df	Mean	SD	SE _D	't' value	Level of Significance 0.01	Ho Accepted or Rejected
Control Group	35	68	73.57	7.29	1.65	4.76	Significant	Rejected
Experimental Group	35		81.4	6.45				

Description The obtained t-value is statistically significant at 0.01 level. Consequently, the null hypothesis (H_0) is rejected, indicating that there is a significant difference in the post-test scores between the Control and Experimental groups.

Interpretation The results indicate that the Experimental Group, which was exposed to the Digital Multimodal Artistic Module, demonstrated a statistically significant improvement in Reflective Practices compared to the Control Group. These findings suggest that the intervention may have influenced the development of reflective practices among student teachers.

Hypothesis 3: There is no significant difference in the effect of Conventional Method on Reflective Practices among Student teachers with respect to the Pre-test scores and Post-test scores of the Control group.

Table 3: Reflective Practices -Pre-test scores and Post-test scores of the Control group								
Control Group	N	Df	Mean	SD	SE _D	't' value	Level of Significance 0.05	Ho Accepted or Rejected
Pre – Test	35	34	74.46	5.41	1.53	0.59	Not Significant	Accepted
Post – Test	35		73.57	7.29				

Description The obtained t-value does not reach the threshold for statistical significance. As a result, the null hypothesis (H_0) is accepted, indicating that there is no significant difference between the pre-test and post-test scores of the Control Group.

Interpretation The findings suggest that there is no substantial change in Reflective Practices among student teachers in the Control Group between the pre-test and post-test. This indicates that without exposure to the Digital Multimodal Artistic Module, there was no significant improvement in Reflective Practices.

Hypothesis 4: There is no significant difference in the effect of Digital Multimodal Artistic Module on Reflective Practices among Student teachers with respect to the Pre-test scores and Post-test scores of the Experimental group.

Table 4: Reflective Practices-Pre-test scores and Post-test scores of the Experimental group.								
Experimental Group	N	Df	Mean	SD	SE _D	't' value	Level of Significance 0.01	Ho Accepted or Rejected
Pre-Test	35	34	75.23	6.54	1.57	3.43	Significant	Rejected
Post- Test	35		80.63	6.62				

Description The level of significance is set at 0.01, and the obtained t-value is significant, leading to the rejection of the null hypothesis (H_0).

Interpretation The results indicate a significant improvement in Reflective Practices among student teachers in the Experimental Group after exposure to the Digital Multimodal Artistic Module. The increase in the mean score from pre-test to post-test suggests that the intervention had a positive impact on fostering Reflective Practices.

Suggestions based on the study:

This study has offered important insights into how digital multimodal artistic modules can improve Reflective Practices among student teachers. However, to create a lasting impact, it's crucial to carry this learning forward in significant ways.

- Ensure sustained engagement with reflective practices, student teachers should be guided to apply reflective cycle before, during, and after their teaching sessions. Embedding structured reflection in lesson planning, classroom delivery, and post-lesson self-assessment—supported by digital portfolios, peer discussions, and mentor feedback—will help cultivate a habit of continuous professional growth.
- Teaching isn't just about knowledge—it's about evolving through experience. Student teachers should be encouraged to reflect on their lessons, classroom interactions, and student responses in real-time. Platforms like digital journals, discussion forums, or collaborative reflection groups can be created for them to document and refine their teaching styles.
- Schools and colleges can work together to improve and refine this approach. A larger-scale implementation with shared best practices can lead to a stronger impact on teacher training across multiple institutions.

Conclusion:

The study highlights the positive impact of the Digital Multimodal Artistic Module on Reflective Practices among student teachers. The findings indicate that while both groups started with similar reflective abilities, the Experimental Group showed significant improvement after exposure to the module. This suggests that integrating digital and artistic elements into teacher education can enhance reflective practices. As John Dewey rightly said, "We do not learn from experience... we learn from reflecting on experience." This study reinforces the value of reflection in teacher education and emphasizes the importance of innovative, multimodal approaches to foster meaningful learning and professional development.

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**EFFECT OF SUSTAINABLE DEVELOPMENT LEARNING MODULES
ON DEVELOPING SUSTAINABLE COMPETENCIES
AMONG SECONDARY SCHOOL STUDENTS**

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Abstract:

In the face of escalating global challenges—ranging from climate change and environmental degradation to social inequity and unsustainable economic practices—there is an urgent call for an educational paradigm that fosters critical consciousness and actionable competencies among learners. Education for Sustainable Development (ESD) offers a powerful tool for cultivating the knowledge, values, attitudes, and behaviors necessary to build a sustainable future. This study explores the effect of Sustainable Development Learning Modules (SDLMs) on the sustainable competencies of secondary school students in Amritsar, India. Employing a quasi-experimental research design, the study involved 100 ninth-grade students divided equally into control and experimental groups. The experimental group was taught using specially designed SDLMs, while the control group received conventional instruction. Pre- and post-tests assessed competencies across knowledge, understanding, and application domains in six key areas: climate change, deforestation, gender equity, population growth, poverty, and resource management. Results revealed statistically significant improvements in the experimental group, confirming the effectiveness of SDLMs. Furthermore, gender-based analysis indicated no significant differences in learning outcomes, suggesting the modules' inclusiveness and universal applicability. This study contributes valuable empirical evidence supporting the integration of sustainability education in school curricula and provides a replicable model for similar educational interventions.

Keywords: *Sustainable Development, Education for Sustainable Development, Secondary Education, Sustainable Competencies, SDGs*

Introduction:

The urgency of sustainability education cannot be overstated in today's rapidly changing world. Our planet faces unprecedented environmental challenges, including climate change, biodiversity loss, and resource depletion—primarily caused by unsustainable human activities. These challenges not only threaten ecological balance but also pose significant risks to global peace, public health, economic development, and social justice. The solution to these multidimensional problems lies not only in scientific innovation or policy reform but in reimagining education itself. Education must become a catalyst for sustainability.

The concept of sustainable development, as defined by the Brundtland Commission in 1987, is "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." This holistic vision underscores the balance of environmental integrity, social equity, and economic viability—commonly referred to as the three pillars of sustainability. To embody this vision, Education for Sustainable Development (ESD) must be integrated across all levels of education.

With the launch of the 2030 Agenda for Sustainable Development, the United Nations established 17 Sustainable Development Goals (SDGs). Among these, Goal 4—Quality Education—plays a foundational role by embedding the principles of ESD in its sub-goal 4.7. It emphasizes that learners should acquire the knowledge and skills needed to promote sustainable development, including through education for global citizenship, human rights, and cultural diversity.

Despite growing recognition, the actual implementation of ESD in school settings remains limited, especially in countries like India. The conventional education system still heavily emphasizes rote learning and standardized testing, often neglecting real-world issues and cross-disciplinary thinking. There is a pressing need to develop structured, engaging, and impactful educational modules that introduce sustainability concepts in age-appropriate, contextual, and experiential ways.

This study addresses this gap by developing and testing the effectiveness of Sustainable Development Learning Modules (SDLMs) tailored for secondary school students. These modules integrate experiential and participatory pedagogies, critical thinking exercises, and real-life scenarios to enable students not just to learn about sustainability—but to live it.

Review of Literature:

Over the last two decades, there has been a surge in research focusing on integrating sustainability in education, with various studies emphasizing ESD's role in cultivating responsible global citizenship and problem-solving skills.

Social Dimensions of Sustainability: Tilbury (2011) asserted that experiential learning and community-based education encourage youth to engage with social issues, thereby nurturing civic responsibility. Sterling et al. (2014) elaborated that transformative learning can reframe students' values and ethical orientations toward sustainable social practices. Similarly, Laurie et al. (2019) emphasized that competency-based education, which integrates real-world scenarios and moral reasoning, can enhance social equity awareness.

Environmental Education and Pedagogy: Wals & Benavot (2017) criticized traditional curriculum approaches for failing to cultivate ecological consciousness. Their work recommended immersive, hands-on experiences such as nature walks, community clean-ups, and conservation projects to instill environmental stewardship. Kioupi & Voulvoulis (2019) found that simulations on renewable energy and carbon footprints improved systems thinking and environmental literacy among school students.

Curriculum Integration: Sterling et al. (2016) and Barth et al. (2018) found that interdisciplinary integration of sustainability themes led to higher engagement. However, they also noted institutional inertia, rigid curricula, and lack of teacher training as significant barriers. UNESCO (2020) further emphasized the need for curricular reform to make SDG themes central to the educational experience.

Learning Approaches: Constructivist models have gained traction in sustainability education. Studies by Gal & Gan (2020) and Doychinova (2023) demonstrated that project-based learning (PBL) and issue-based inquiry significantly enhance critical thinking and empower students to connect learning with real-world sustainability challenges.

Technology and ESD: Anderson & Brody (2021) explored the use of gamified platforms and digital simulations, finding them effective in increasing motivation and comprehension in topics like climate change and resource management. Such tools also support inclusive learning, particularly for students with diverse learning needs. Global Goals and Competency Frameworks: White et al. (2019) proposed a competency framework aligned with SDG 4.7 that includes systems thinking, normative competence, strategic competence, and anticipatory skills. González-Salamanca et al. (2020) highlighted that these competencies are essential for navigating the complex interactions between society, economy, and environment. Despite this rich literature, few studies in India have empirically tested structured ESD modules for school students. This research attempts to bridge that gap.

Objectives of the study:

- a) To develop sustainable development learning modules for secondary school students.
- b) To examine the effect of sustainable development learning modules on the sustainable competencies of secondary school students. .

Hypotheses:

The present study was designed to test the following hypotheses:

- I. No significant differences exist in the sustainable competencies of secondary school students taught through sustainable development learning modules and those taught using conventional methods.
 - a) No significant differences exist in the knowledge domain of students belonging to Experimental group and Control Group.
 - b) No significant differences exist in the understanding domain of students belonging to Experimental group and Control Group.
 - c) No significant differences exist in the application domain of students belonging to Experimental group and Control Group.

Methodology:**Research Design**

The study employed a quasi-experimental design with non-randomized control and experimental groups. This design was selected due to the practical constraints of randomly assigning school children in educational settings. The pre-test/post-test control group design helped assess the causal effect of the intervention.

Sample and Setting

The sample consisted of 100 students from two co-educational English medium schools in Amritsar, Punjab—Khalsa College Public School and P.B. Memorial Public School. The students were from Grade IX and aged between 13 to 15 years. The sample was divided equally: 50 students in the control group and 50 in the experimental group.

Tools Used

- 1. Intelligence Test: The G.C. Ahuja Intelligence Test was used to ensure cognitive equivalence between groups.
- 2. Competency Test (Pre and Post): A 40-item objective test designed by the researcher to assess sustainable competencies in three domains—knowledge, understanding, and application—across six modules: climate change, deforestation, gender equity, poverty, population growth, and resource management.

Instructional Intervention:

The SDLMs were developed based on experiential and participatory learning principles. Each module included contextual information, problem-based tasks, simulations, and reflection exercises. For instance:

- a) The climate change module included weather pattern analysis and carbon footprint calculators.
- b) The gender equity module used role-play scenarios and discussion circles.
- c) Deforestation was explored through virtual field trips and creative storytelling.
- d) Poverty was addressed through empathy simulations and documentary screenings.
- e) Resource Management was taught through Hands-on activities on recycling, sustainable consumption.
- f) Population Growth was analyzed through Statistical Analysis and debates on carrying capacity.

The intervention lasted 15 working days, with one session per day. The control group continued with traditional textbook-based instruction.

Data Analysis:

- Descriptive statistics (mean, standard deviation) were calculated.
- Inferential analysis used independent sample t-tests to compare group means.
- Bar graphs were used to visually represent results for interpretative clarity.

Results and Discussion:

Hypothesis - I

"No significant differences exist in the sustainable competencies of secondary school students taught through sustainable development learning modules and those taught using conventional methods."

In order to test this hypothesis, post test scores of both the control and the experimental group were tabulated and analyzed through SPSS and the results have been entered in Table 6.1.

TABLE 6.1
T-RATIO OF MEAN SCORES OF EXPERIMENTAL AND CONTROL GROUP IN POST TEST

Groups	N	Mean	S.D.	S.E _d	Mean difference	df	t-value	R
Control	50	22.68	3.40732	.66544	4.32	98	6.492	Significant at 0.05 level
Experimental	50	27.00	3.24509					

The results showed that students in the experimental group, who were taught using sustainable development learning modules, had a significantly higher mean score ($M = 27.00$) compared to those in the control group ($M = 22.68$). The t -value of 6.492 was found to be statistically significant at a 0.05 level of significance.

This indicates that a significant difference exists in the sustainable competencies of secondary school students taught through sustainable development learning modules compared to those taught using conventional methods.

Further, Table 6.1 reveals that the mean scores of the Experimental and Control groups are 27 and 22.68, respectively. The higher mean scores of Experimental Group indicates that the group taught using sustainable development learning modules exhibited better performance in sustainable competencies compared to the group that was given no treatment at all.

In order to further study whether the students differed in three different domains viz: Knowledge, Understanding and Application, scores obtained by students in different domains were separately scored and the data was analyzed to test the following hypotheses:

HYPOTHESIS I(a)

"No significant differences exist in the knowledge domain of students belonging to Experimental group and Control Group."

To test this hypothesis, post-test scores of students in both the control and experimental groups, specifically for the knowledge domain, were tabulated and analyzed using SPSS and the results are entered in Table 6.2.

TABLE 6.2
MEAN SCORES OF EXPERIMENTAL AND CONTROL GROUP IN THE
KNOWLEDGE DOMAIN

Group	N	Mean	S.D.	S.Ed	Mean Difference	df	t-value	R
Control	50	7.10	1.23567	0.3436	0.42	98	1.222	Not Significant at 0.05 level
Experimental	50	6.68	1.30984					

The analysis revealed that the mean score of the control group ($M = 7.10$) was slightly higher than that of the experimental group ($M = 6.68$). The calculated t -value of 1.222, was found to be statistically not significant which was less than the critical value at the 0.05 level of significance.

Table 6.2 indicates that the calculated t-value (1.222) is not significant at the 0.05 level. This implies that there is no statistically significant difference in the knowledge domain of students taught through sustainable development learning modules and those taught using conventional methods.

HYPOTHESES I(b)

"No significant differences exist in the understanding domain of students belonging to Experimental group and Control Group."

To test this hypothesis, post-test scores of students from both the control and experimental groups, specifically in the understanding domain, were tabulated and analyzed using SPSS and have been entered in Table 6.3. The statistical results are presented in Table 6.3.

TABLE 6.3
MEAN SCORES OF EXPERIMENTAL AND CONTROL GROUP IN THE
UNDERSTANDING DOMAIN

Group	N	Mean	S.D.	S.Ed	Mean Difference	df	t-value	R
Control	50	8.06	1.89123	0.3176	2.90	98	9.138	Significant at 0.05 level
Experimental	50	10.96	2.00432					

The results showed that the experimental group scored significantly higher (M = 10.96) compared to the control group (M = 8.06) in the understanding-based questions. The t-value of 9.138 was found to be statistically significant, which exceeds the critical value at the 0.05 level of significance, indicating a meaningful difference.

This indicates a statistically significant difference in the understanding domain scores between students taught using sustainable development learning modules and those taught through conventional methods. The higher mean score of the experimental group (M = 10.96) suggests that the experimental group outperformed the control group in the understanding domain, likely due to the treatment or intervention they received. This indicates that the approach used in the experimental group was more effective in enhancing comprehension and understanding of the subject compared to the control group, which did not receive the same treatment.

HYPOTHESIS I(c)

"No significant differences exist in the application domain of students belonging to Experimental group and Control Group."

To test this hypothesis, the post-test scores of students from both the control and experimental groups were analyzed using SPSS with respect to the application domain. The results are being entered in Table 6.4.

TABLE 6.4
MEAN SCORES OF EXPERIMENTAL AND CONTROL GROUP IN THE APPLICATION DOMAIN

Group	N	Mean	S.D.	S.Ed	Mean Difference	df	t-value	R
Control	50	7.52	1.58010	0.3169	2.22	98	7.005	Significant at 0.05 level
Experimental	50	9.74	1.58835					

The results indicated that the experimental group achieved a higher mean score (M = 9.74) compared to the control group (M = 7.52). The t-value of 7.005 was found to be statistically significant, which exceeds the critical value at the 0.05 level of significance.

The higher mean scores of Experimental group in Application Domain clearly indicates that students taught using sustainable development learning modules performed better than those that were not given any treatment.

The findings of Sub-Hypotheses I(b) and I(c) further support the results of Hypothesis I confirming that a significant difference exists in the sustainable competencies between students in the experimental and control groups.

Discussion:

The results support previous studies like those by Espinoza et al. (2024), which stressed the importance of interdisciplinary sustainability education. The findings also echo the competencies framework proposed by White et al. (2019), showing that well-structured learning environments cultivate not only knowledge but also affective and behavioral attributes essential for sustainability.

Moreover, the modules' participatory and experiential design aligns with constructivist pedagogies, empowering students to internalize abstract concepts.

Conclusion and Recommendations:

Conclusion:

This study confirms that Sustainable Development Learning Modules significantly enhance sustainable competencies among secondary school students. The intervention not only improved students' understanding of critical sustainability issues but also fostered higher-order thinking, empathy, and decision-making skills.

Limitations of the study:

1. The study was limited to a specific geographic location and sample size (100 students from Grade 9), which may limit the generalizability of the findings to broader populations.
2. The research focused solely on secondary school students. Therefore, the effect of sustainable development learning modules on students of other educational levels (primary or higher secondary) was not assessed.
The study employed a quantitative approach, primarily using objective tests. Aspects such as students' attitudes, values, and long-term behavioural changes regarding sustainability were not deeply explored through qualitative methods.
4. The intervention period was limited, which might not have been sufficient for students to fully internalize and reflect on sustainability practices.
5. The study relied on teacher-led implementation of the modules. Variations in teaching style and classroom dynamics may have influenced the outcomes to some extent.
6. External factors such as students' background, home environment, and prior exposure to environmental education were not controlled.

Suggestions for further research:

1. Future studies can adopt a longitudinal approach to assess the long-term impact of sustainable development learning modules on students' behaviors and decision-making.
2. Research can be expanded to include students from different educational levels (e.g., primary or senior secondary) and diverse socio-economic backgrounds to enhance generalizability.
3. A mixed-methods approach, combining quantitative tests with qualitative tools like interviews, focus groups, and observation, can provide deeper insights into students' attitudinal and behavioral shifts.
4. Comparative studies can be conducted between schools with varying curriculum orientations, such as CBSE, ICSE, and state boards, to assess curriculum-specific responses to SDLM.

5. Further exploration into teacher training and preparedness for implementing sustainability modules can help identify the support systems needed for effective delivery.
6. Studies can also examine the integration of technology, such as digital simulations and gamification, to enhance the impact of sustainability education.

Educational implications:

1. The study affirms the value of integrating sustainability education into mainstream curriculum using well-designed, interactive learning modules.
2. The significant improvement in students' understanding and application domains highlights the importance of moving beyond rote learning to include experiential and problem-based learning strategies.
3. Educators should be encouraged and trained to use interdisciplinary approaches when teaching sustainability, connecting environmental, social, and economic aspects.
4. The modules can serve as a model for curriculum developers to embed sustainability themes across subjects rather than treating them as stand-alone topics.
5. Schools and educational institutions should provide adequate resources and infrastructure to support the use of sustainability modules, including digital content, collaborative projects, and field-based learning.
6. The findings support policy-level recommendations for including sustainability education as a mandatory component of teacher training and school curricula.

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ROLE OF CLASSROOM OBSERVATIONS IN TARGETED PROFESSIONAL DEVELOPMENT OF SCIENCE TEACHERS

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Abstract:

The study focuses on the role of classroom observations as a method to identify professional development needs of in-service teachers to enhance the effectiveness of their teaching. The research elaborates on how systematic classroom observation was used to record teachers' interaction with the content, the learner and the resources to achieve the learning outcomes. The study was theoretically grounded in principles of behaviourism, social learning theory and constructivism. These theories provide a basis of understanding the process of learning and the influence of teacher behaviour and action on student learning. The study adopted a mixed methodology with aspects of both quantitative and qualitative data collection. For structured and systematic observations, a classroom observation tool was developed that comprised of six domains and twenty-three indicators of the classroom dynamics. These domains were inspired from National Professional Standards for Teachers (NPST) and the descriptors given in Australian Council for Education Research's (ACER's) School Improvement Tool. The aspects of communication, setting the expectation, teaching pedagogies, learner engagement, classroom management and closure were some of the criteria that were assessed in these domains. Each classroom observation was followed up with a focus group discussion for sharing the insights from the observations. The observation data collected through these were used to report the gaps that need to be addressed through professional development. Classroom observations were conducted in three private schools affiliated with CBSE located in sub urban region of Gurgaon, Haryana. A total of 16 observations were made with 12 teachers. The study suggested that classroom observations if done systematically with defined scales and criterion can provide comprehensive information about the professional development needs of the teacher. Periodic cycles of classroom observations and continuous professional development (CPD) can help enhance the effectiveness of instruction increasing teacher motivation and confidence.

Key words: Classroom observation. Continuous professional development, Teacher effectiveness, Pedagogical strategies.

Introduction:

India's National Education Policy (NEP) 2020 places teachers at the centre of fundamental educational reforms in India and calls for action to empower them to do their jobs effectively (Ministry of Education, 2020, p.4). To empower teachers, a significant measure is to identify the areas in which the teachers need professional development for motivation and success.

Classroom Observations is a powerful method that can be used to evaluate the effectiveness of the teaching learning process in a classroom. It provides concrete information about the areas that can be strengthened through continuous professional development. Classroom observations have a high level of face validity as the information provided through these observations directly reflect and appear to measure the teaching learning environment in the classroom. (Cohen & Goldhaber, 2016)

Classroom observation method is based on various theoretical perspectives primarily focussing on improving teaching and learning. Observational learning is one of the key aspects of theory of social learning (Bandura, 1997) that focuses on learning by observing and imitating others. This aspect of classroom observations is used in many schools as a peer learning method. Classroom observations also closely align with social constructivism theory (Vygotsky, 1968) as classroom observations provide valuable insights into dynamics of student engagement, peer interactions and teacher facilitation all of which are aspects of social constructivist learning environment. Previous research also indicates that classroom observations provides concrete evidence of the impact of teacher action on student learning. through interaction and collaboration in constructing knowledge (Ceven McNally, 2016).

Structured and systematic classroom observations can offer a comprehensive view of classroom dynamics. For instance, they can reveal how the lesson is introduced, the pedagogical strategies employed by the teacher, the level of student engagement during the lesson, whether the teacher builds on students' prior knowledge, and how effectively the lesson is concluded. This information can serve as a foundation for identifying the teacher's professional development needs, helping to address gaps and improve the overall effectiveness of classroom instruction.

Research design and methodology:

The primary aim of the study was to offer formative feedback on the effectiveness of classroom teaching through structured observations and focused group discussions. The underlying objective was to examine the teaching methods used by teachers to deliver content and assess their impact on student learning, with the goal of identifying pathways for continuous professional development. Additionally, the study

sought to explore teaching strategies adopted by science teachers that foster more meaningful and engaging learning experiences. The objective was to gather evidence from classroom interactions to identify pedagogical approaches in science that support the development of critical thinking and problem-solving skills.

For the study, classroom observations were carried out in three private CBSE-affiliated schools situated in the suburban area of Gurugram, Haryana. A total of 12 elementary-level science teachers were observed. Each classroom session lasted 40 minutes, with observations covering the entire duration from the start to the end of the lesson. In total, 16 observations were conducted, with some teachers being observed more than once.

Research Questions:

The overall study was guided by the following research questions:

- How classroom observation can be used as an effective method to identify continuous professional development needs of teachers?
- How can science lesson be designed and Teaching-Learning Materials (TLMs) used to effectively engage students?
- Which pedagogical strategies in science promote critical thinking and problem solving?

Phases of Research:

The research was designed and implemented in three distinct phases, as detailed below.

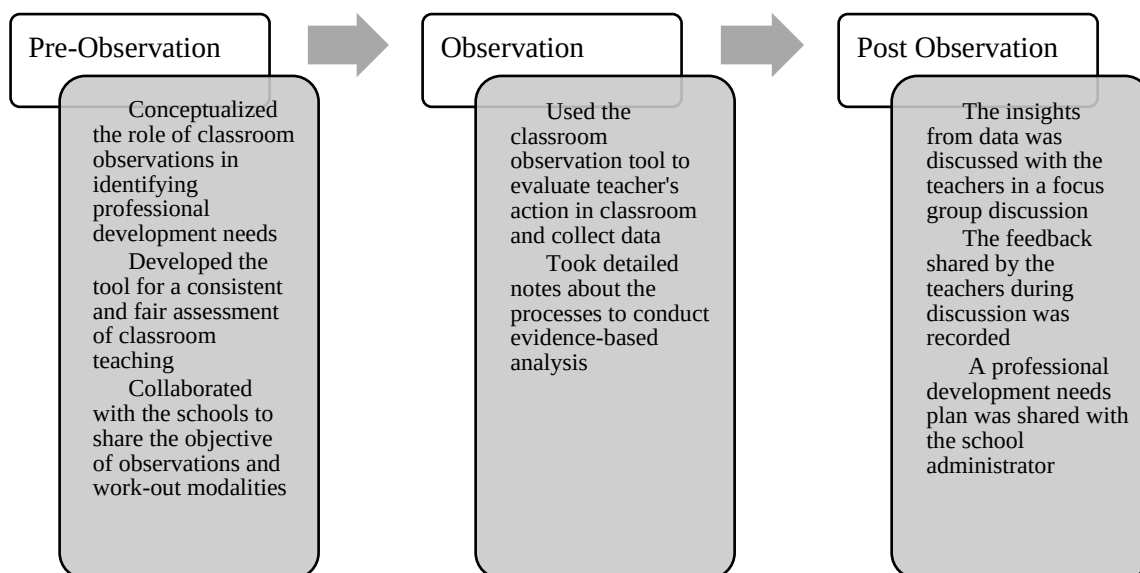


Figure 1: The three phases of implementation of the research

Data collection:

A case-based study approach combined with a mixed-methods design—integrating both quantitative and qualitative data collection and analysis was employed for this research. The case-based nature of the study stems from its focus on analysing specific classroom scenarios and teaching practices within the selected schools. This approach allowed for real-time insights into how teaching and learning unfold, enabling a more nuanced assessment of effectiveness and identification of areas for improvement.

The quantitative component involved the use of a structured classroom observation tool comprising six domains and twenty-three indicators. Each indicator was evaluated using a three-level rubric—Beginner, Proficient, and Advanced—representing varying levels of performance. This process generated numerical data related to the effectiveness of the teaching-learning process across the observed domains.

Qualitative data was gathered through in-depth, semi-structured focus group discussions (FGD) with teachers following the classroom observations. These discussions provided valuable feedback, highlighting both the enabling factors and challenges experienced by teachers.

Triangulation was achieved by integrating numerical data from the observation tool with qualitative insights drawn from the focus group discussions and case-based reflections, ensuring a comprehensive analysis of the findings.

Data analysis:

To analyse the data from the observation tool and focus group discussion, thematic analysis approach was adopted to identify recurrent patterns and themes within the data. The method involved a systematic examination of the data to find recurring topics and meanings. The systematic approach was used to code the data by categorizing responses of the FGD and observation study with descriptive terms.

The quantitative analysis of the observer's responses on the indicators was done through tallying and taking out averages to understand the level at which teachers are against each indicator. This allowed for a more nuanced evaluation to track whether a specific behaviour/ practice occurred or not.

Findings & discussions: This section discusses the key findings against each of the research questions and theme-based analysis of the FGD.

1. How classroom observation can be used as an effective method to identify continuous professional development needs of teachers?

A classroom observation tool was designed to examine the dynamic interactions among the content being taught, the teacher, and the students. Its development was

guided by the National Professional Standards for Teachers (NPST) 2023. The initial structure of the tool was informed by the standards outlined in the NPST framework. (NCTE, 2023) To refine this structure, descriptors from the Australian Council for Educational Research's (ACER) School Improvement Tool were also reviewed and adapted. (ACER, 2023) The final observation tool consisted of six domains, each containing three to four indicators that specified key criteria and performance levels. In total, there were twenty-three indicators across the six domains. Each indicator was evaluated using a three-level rubric, providing a clear, consistent, and objective framework for observing teacher practices.

The figure below illustrates the six domains that were assessed through the observation tool.

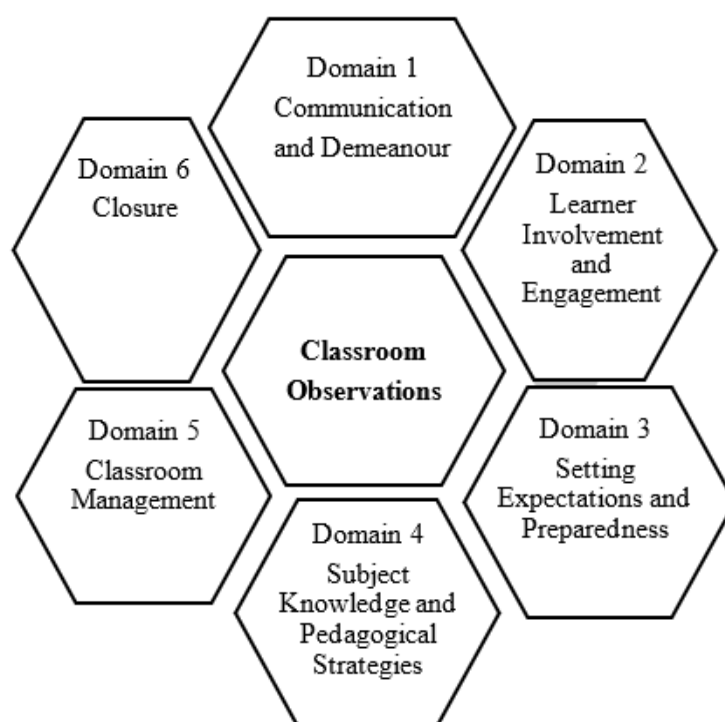


Figure 2: The six domains evaluated in the classroom observation tool

The findings indicated that a well-structured and comprehensive observation tool offers a systematic and objective approach to evaluating and enhancing teaching practices. The tool's six domains encompassed various criteria, each represented by specific indicators designed to collect measurable data for unbiased analysis. The clearly defined descriptive rubrics for each indicator level in the observation tool allowed observers to collect precise data, ensuring consistency in evaluations. These rubrics provided an objective basis for placing teachers at an appropriate level based on observable criteria, helping to minimize personal bias and subjective judgments.

The figure below highlights the indicators and descriptive rubrics to assess the domain *Subject knowledge and Pedagogical strategies*.

	Beginner	Proficient	Advanced
4.1 Uses a variety of instructional formats during teaching	Uses a limited range of instructional formats (e.g., mainly lecture or textbook-based)	Incorporates a moderate range of instructional formats (e.g., lectures, discussions, activities)	Uses a wide variety of instructional formats (e.g., activities, stories, experiments) to enrich learning experiences
4.2 Makes interdisciplinary linkages across different subject areas	Rarely or minimally connects concepts across different subject areas, with limited integration	Occasionally connects concepts across different subject areas, demonstrating some integration between disciplines	Skilfully creates meaningful linkages between different subject areas, integrating concepts to provide a cohesive and interdisciplinary learning experience
4.3 Tailors instructional strategies to accommodate diverse learning needs	Makes few or minimal adjustments to instructional strategies to accommodate diverse learning needs	Adapts instructional strategies to address a range of learning needs, effectively supporting most students	Skilfully and extensively adapts instructional strategies to meet a wide range of diverse learning needs, including special needs, ensuring all students are supported
4.4 Demonstrates graded progression of lessons from simple to complex concepts	Rarely demonstrated organization of subject matter that catering to diverse learning needs	Organizes subject matter to a large extent covering simple to complex concepts	Expertly organizes the subject matter ensuring that all learners advance from simple to complex concepts
4.5 Demonstrates depth of knowledge and expertise in the subject area	Demonstrates basic knowledge of the subject with some gaps in content understanding	Shows solid understanding of the subject with occasional gaps or inaccuracies in content knowledge	Demonstrates deep and thorough understanding of the subject, with extensive knowledge and accuracy
4.6 Effective use of assessments to promote learning	Rarely checks for students' understanding of the lesson content, using any varied or effective methods	Mostly checks for students' understanding through various methods such as questioning, informal assessments, reflections etc.	Consistently monitors and evaluates students' understanding and adapts instruction to ensure all students grasp the lesson content thoroughly

Figure 3: The three proficiency levels of the indicators of the domain *Subject knowledge and Pedagogical strategies*

The quantitative data showed that most teachers across the three schools were at the beginner level in five out of the six domains, with only one domain having teachers at the proficient level.

Table 1: Result of quantitative analysis of the observation tool

Domains	Level of the observed teachers in each domain		
	Beginner	Proficient	Advanced
1. Communication & Demeanour		✓	
2. Learner Involvement and Engagement	✓		
3. Setting Expectations and Preparedness	✓		
4. Subject Knowledge and Pedagogical Strategies	✓		
5. Classroom Management	✓		
6. Closure	✓		

The findings indicate that most teachers communicated with confidence and clarity, with only a few struggling to express themselves clearly. Clear communication is a crucial skill for teachers, as previous research also highlights that it helps students

effectively process, store, and retrieve information, leading to a better understanding of concepts. (Kearney & McCroskey, 1980).

Most teachers asked questions during class, but almost all observations revealed a lack of fostering an environment where students feel comfortable asking questions. The questions posed by most teachers were confined to textbook content and did not promote critical thinking or problem-solving opportunities for students. Nearly all teachers relied heavily on the lecture method, with few attempts to connect the content to other subject areas. Additionally, in all observations, the lesson's closure—through summarizing key concepts and addressing students' doubts—was not implemented.

The focus group discussion findings supported the data collected from classroom observations, with most teachers acknowledging the need for continuous professional development across the six domains particularly in areas like student engagement and student-centred teaching strategies. Classroom observation tools are becoming more widely used in schools to assess teachers and offer formative feedback on their instructional strengths and areas for improvement. (National Council on Teacher Quality, 2019) Previous research also establishes link between classroom observations and identifying areas for teacher improvement. (Dudney, 2002).

The findings of the study support that in order to identify targeted professional development needs classroom observation method can be implemented.

Most teachers acknowledged that receiving constructive feedback following a classroom observation was valuable in helping them recognize their strengths and areas for improvement. Constructive recommendations from the observer offered specific, actionable insights that could guide their professional growth. Such feedback not only boosted teachers' confidence but also encouraged a culture of continuous learning, as areas for improvement were viewed as opportunities for development. Previous studies also suggest that teachers believe classroom observations motivate them to invest more effort in planning and delivering their lessons effectively. (Marcelo, 2019)

The study also identified key factors for ensuring that classroom observations are reliable and fair. These include conducting multiple observations using a standardized tool with descriptive rubrics, avoiding the use of observations solely for appraisals to prevent intimidating teachers, incorporating a pre-observation process to help teachers feel at ease, and ensuring that the observer is adequately trained and competent to carry out the observations

2. How can science lesson be designed and Teaching-Learning Materials (TLMs) used to effectively engage students?

Most teachers began the lesson by stating the lesson's name and topics, but this approach did not assess students' prior knowledge. Additionally, it failed to spark curiosity about the subject. Classroom observations indicated that many teachers need training in using diverse strategies to introduce topics, assess prior knowledge, and set expectations. For instance, in one observation, the teacher introduced the topic of Heat by discussing the three domains of science, which did not effectively engage students with the main topic. A more engaging approach, such as an introductory activity, demonstration, or real-life examples, could have been more effective. For example, in another class, the teacher introduced the topic of force by using a balloon and pressing it against a wall to change its shape, which created a positive disruption and actively engaged the students. It was observed that classes incorporating such introductory activities-maintained student interest for a longer time. Introducing a science lesson should also consider students' prior knowledge to inform instructional design and curriculum planning. Additionally, the results of prior-knowledge assessments can serve as a tool to support students in addressing areas of weakness. (Lin et al.,2011) Most teachers were generally unaware of various techniques that could be used to engage students at the start of the lesson—such as demonstrations, connecting the topic to prior knowledge, or using real-life examples. For many, a mechanical recitation of the learning outcomes was considered enough to begin the class.

Teaching-Learning Materials (TLMs) are resources used by teachers to promote experiential learning. The study found that some teachers utilized visual TLMs, such as charts and models, while others incorporated materials from daily life to teach specific topics. For example, a primary science teacher used a potato tuber to explain vegetative propagation. These TLMs had a positive impact on student engagement. However, the observations revealed that while some teachers used TLMs to facilitate experiential or visual learning, several factors hindered their effectiveness.

Some factors that affected the usefulness of TLMs included:

- **Lack of novelty:** For instance, a model illustrating the different layers of the atmosphere did not provide any new information beyond what was already presented in the textbook.
- **Limited accessibility:** Some TLMs failed to engage all students. For example, when the teacher presented a potato tuber from her desk, it did not provide an interactive experience and failed to engage the students effectively.

- **Lack of clarity:** In one middle-grade class, the teacher used a collage of images depicting physical and chemical changes as an assessment. The TLM was ineffective because the images were too small and not visible to students seated at the back. The teacher could have made multiple copies of the collage and used it for group activities instead.

Research suggests that effective use of TLMs promotes two-way communication between the teacher and students in science lessons. The observations confirmed that when a TLM is effective, it sparks curiosity and creates opportunities for dialogue. For example, in one class, the teacher brought in various materials and asked students to predict which one would allow light to pass through, followed by a demonstration. This approach encouraged students to actively participate and share their ideas.

Research also supports that the effective use of TLMs involves students in scientific inquiry, where they observe, classify, and organize knowledge to solve problems. When science teachers act as facilitators, they create opportunities for students to construct their own understanding of scientific concepts. This approach encourages students to reflect on their learning, and teachers can adjust their instructional strategies to challenge students' thinking, promoting meaningful learning. (Osei-Himah & Adu-Gyamfi, 2022)

3. Which pedagogical strategies in science promote critical thinking and problem solving?

The findings from both the observations and focus group discussions supported the idea that pedagogical strategies promoting evidence-based thinking and critical analysis are those that actively engage students in the learning process, rather than having them passively absorb information. The observational study revealed that most teachers relied on a limited range of instructional methods, with the lecture method being the dominant strategy. Only one or two teachers incorporated tasks that challenged students and encouraged critical thinking or problem-solving. Most tasks and questions were confined to the content presented in the textbooks.

FGD revealed that most teachers required training to enhance their instructional methods. Some are unfamiliar with student-centred pedagogies such as discovery learning, project-based learning, and inquiry-based approaches. Additionally, a number of teachers need to shift away from the traditional "jug-and-mug" model of content delivery based solely on textbooks and instead connect lessons to students' real-life experiences to promote deeper

The findings also indicated that many teachers struggled with effectively delivering lessons even through the lecture method. To effectively implement active learning

methods, these teachers need to first strengthen their subject expertise. Research further shows that good active learning tasks, which simulate authentic problem-solving, require more subject knowledge and preparation than traditional lecture-based methods. (Wieman,2014).

The study highlighted that teachers need to shift their mindset from being the sole providers of knowledge to actively engaging students in the learning process. For instance, during an observation of a primary science class, the teacher discussed the concept of an ideal house by writing its characteristics on the board. Instead, the teacher could have started the lesson by asking students to draw an ideal house based on their personal experiences and then encouraged them to critically compare their drawings with those of their peers. The teacher could have also connected the topic to geography by assigning group work where students draw ideal houses in different environments, such as hilly or desert areas, or given them a project to explore how animal homes differ from human houses.

The findings also emphasized the need for continuous professional development for in-service teachers, particularly in gaining deeper and more extensive knowledge of the subject. While teachers recognize that methods like simulation, experimentation, inquiry, and collaborative tasks help develop critical thinking and problem-solving skills in science, they need targeted training to confidently implement these strategies in their classrooms.

Conclusion:

The study indicated that classroom observation serves as a valuable tool for providing teachers with constructive feedback to support self-improvement. When conducted systematically using structured tools with clear criteria and rating scales, classroom observations help teachers identify their strengths and areas for growth, while also guiding school leaders in recognizing professional development needs. This process can play a pivotal role in fostering continuous professional development and encouraging positive shifts in instructional practices.

A key insight from the study was the effectiveness of using classroom observation to examine the dynamic interactions within the classroom, offering a thorough understanding of teaching practices. Additionally, the study emphasized that for science teachers to effectively engage students and cultivate critical thinking, it is essential to integrate innovative, active learning approaches. Adopting such strategies is fundamental to fulfilling the broader goals of science education for meaningful participation of individuals in society and the world of work with scientific temper, critical and evidence-based thinking as envisioned in NCFSE 2023. (NCERT. 2023)

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EXPERIENTIAL LEARNING FOR SUSTAINABLE DEVELOPMENT: A THEMATIC AND PROJECT-BASED APPROACH

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Abstract:

In response to escalating global challenges such as climate change, social inequity, and ecological degradation, this study explores how transformative education can build the capacity of learners to drive sustainable change. The study is anchored in the theoretical orientation of David Kolb's Experiential Learning Cycle and integrates pedagogical models of Experiential Learning (EL), Interdisciplinary and Thematic Teaching, and Project-Based Learning (PBL), all of which are closely aligned with the United Nations Sustainable Development Goals (SDGs). Adopting a qualitative, case study-based methodology, the research examines how these approaches foster critical thinking, ethical engagement, collaboration, and applied problem-solving among students. Thematic units, school-wide initiatives, and community partnerships serve as implementation frameworks to observe the impact of these methodologies in practice. Notably, examples such as the thematic unit on "Myself" and sustainability-focused PBL projects like school waste audits and digital awareness campaigns are used to analyze student learning outcomes.

The findings indicate that integrating EL, thematic teaching, and PBL leads to significant cognitive, emotional, and behavioral transformations. Students develop greater self-awareness, empathy, systems thinking, and civic responsibility. Educators, in turn, evolve from traditional instructors into facilitators and co-learners, supporting student agency and reflective inquiry. Technology serves as a critical enabler, enhancing digital storytelling, gamified learning, and virtual collaboration. In conclusion, this study presents a replicable, student-centered educational model that aligns classroom learning with real-world sustainability challenges. The proposed framework empowers learners to act as informed, ethical, and proactive global citizens, and offers strategic insights for institutions seeking to implement education for sustainable development.

Keywords: *Sustainable Development, Experiential Learning, Project-Based Learning, Thematic Teaching, Transformative Education.*

Introduction:

In an era characterized by unprecedented environmental, social, and economic challenges, education must evolve beyond conventional frameworks to become a powerful catalyst for sustainable change. The urgency of climate change, widening social inequalities, technological disruptions, and ecological degradation has underscored the need for transformative education—one that cultivates learners who are informed, empathetic, and empowered to act. "Transformative Capacity Building for a Sustainable Future" envisions education not as a passive transmission of facts, but as a dynamic, learner-centered, and action-oriented journey. Experiential Learning (EL), Interdisciplinary and Thematic Teaching, and Project-Based Learning (PBL) form the foundational pillars of this educational paradigm, aligning closely with the United Nations Sustainable Development Goals (SDGs). These pedagogical approaches center on real-world engagement, critical reflection, and collaborative inquiry, enabling students to acquire not only academic knowledge but also the values and life skills necessary for sustainable living.

This paper explores how these methodologies create meaningful learning environments that foster critical thinking, ethical responsibility, and long-term commitment to building a more just, inclusive, and resilient world. It also outlines practical strategies, case studies, and implementation frameworks to inspire and guide educators and institutions in adopting these transformative practices.

Objectives:

- To explore how Experiential Learning (EL) can foster personal growth, critical thinking, and social responsibility among learners through active, real-world engagement.
- To examine the role of interdisciplinary and thematic teaching in cultivating systems thinking, knowledge integration, and value-based education aligned with sustainable development.
- To demonstrate how Project-Based Learning (PBL) empowers learners to solve real-world problems, develop 21st-century skills, and drive community-level change.
- To showcase integrated models that connect EL, thematic learning, and PBL with the UN SDGs in school settings.
- To highlight the role of educators as facilitators and co-learners in creating transformative, inclusive, and future-ready educational ecosystems.

Transformative Capacity Building through Experiential Learning for Sustainable Development:

Experiential Learning is a learner-centered approach that emphasizes direct experience, reflective observation, conceptual understanding, and practical application. David Kolb's Experiential Learning Cycle provides a robust theoretical framework for this model. The cycle comprises four interrelated stages: Concrete Experience, Reflective Observation, Abstract Conceptualization, and Active Experimentation. Each stage fosters a holistic learning process that moves beyond rote memorization to deep, contextual understanding.

Theoretical Framework: Kolb's Experiential Learning Cycle

David Kolb's Experiential Learning Theory provides the foundation for understanding how EL functions as a continuous process comprising four interrelated stages:

1. Concrete Experience (Doing): Learners actively participate in hands-on tasks such as community service, gardening, or conducting scientific experiments. These experiences foster direct involvement and emotional engagement.

Example: A student takes part in a cleanliness drive, collaborating with municipal workers—gaining first-hand knowledge of civic responsibility beyond the textbook.

2. Reflective Observation (Reviewing): After the activity, learners reflect on their experiences to evaluate outcomes, emotions, and lessons learned. Reflection tools include journals, guided discussions, and visual storytelling.

Example: Students journal about the cleanliness drive, acknowledging the effort required, the societal impact, and their own role in environmental stewardship.

3. Abstract Conceptualization (Learning): Learners connect their experiences to theoretical frameworks, drawing insights and forming broader understandings about issues such as sustainability, public health, or civic duty.

Example: The experience is connected to Sustainable Development Goals (SDGs), such as SDG 3 (Good Health and Well-being) and SDG 11 (Sustainable Cities and Communities).

4. Active Experimentation (Applying): Learners apply new knowledge to novel situations, take initiative, and design creative solutions.

Example: Motivated by their experience, students initiate recycling or awareness campaigns within their school or community.

In sustainable education, EL transforms abstract sustainability principles into tangible experiences. For instance, students participating in cleanliness drives, community service, or school gardening projects directly engage with civic and environmental issues. These activities serve as the Concrete Experience. Following this, students engage in Reflective Observation through journaling, group discussions, or

storytelling—helping them process emotions, challenges, and learnings. In the Abstract Conceptualization stage, students connect their actions to broader frameworks such as the SDGs—e.g., linking waste management efforts to SDG 11 (Sustainable Cities and Communities) and SDG 12 (Responsible Consumption and Production). Finally, Active Experimentation sees students design and implement new initiatives—such as recycling campaigns or digital awareness projects—demonstrating applied learning and leadership.

EL also embraces diverse forms of engagement that cater to multiple intelligences and learning styles. Activities such as hydroponics, vertical gardening (SDGs 2 & 15), rainwater harvesting (SDG 6), and energy audits (SDG 7) embed science, technology, and environmental stewardship into everyday learning. Digital literacy service learning addresses equity and inclusion (SDGs 4 & 10), while simulations, role plays, and nature immersions build socio-emotional and ecological awareness. EL projects such as student-led climate change conferences or design-thinking bootcamps further reinforce civic engagement and innovation. Through such integrative approaches, EL becomes a tool not only for cognitive development but also for shaping ethical, compassionate, and proactive global citizens.

Furthermore, EL enhances student voice and agency, as learners are encouraged to co-create projects, propose solutions, and evaluate outcomes. This shift builds leadership, resilience, and a growth mindset—skills that are essential in facing the uncertainties of the future. Real-world partnerships with NGOs, civic bodies, and industries enhance authenticity and deepen students' understanding of sustainability in action.

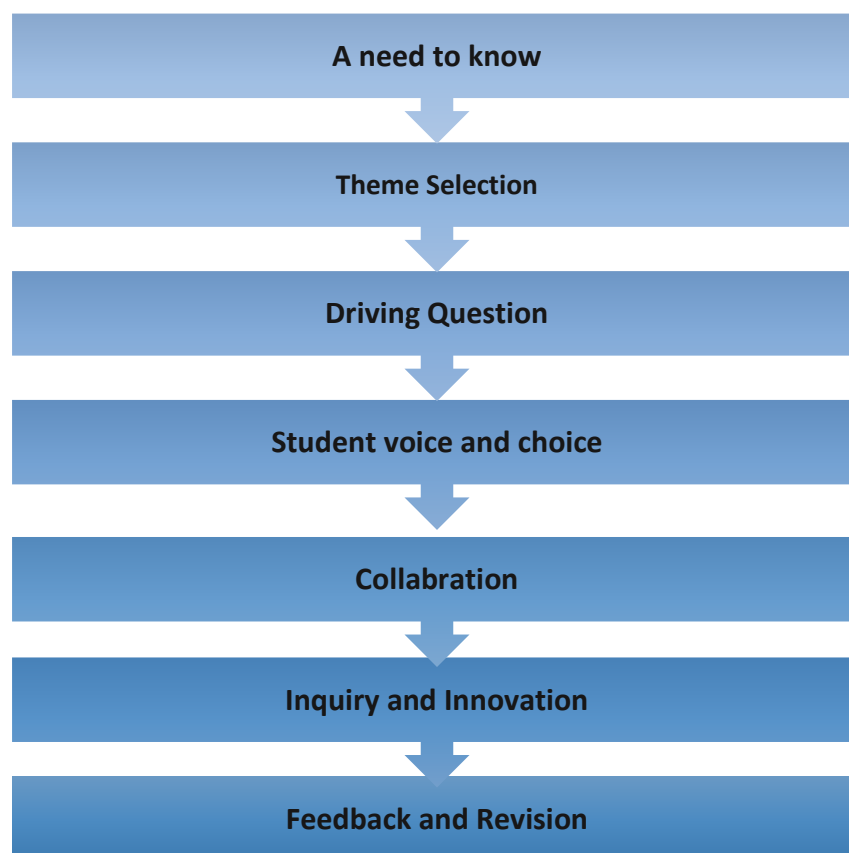
Transformative Capacity Building through Interdisciplinary and Thematic Teaching:

“Tell me and I forget, teach me and I may remember, involve me and I learn.” – Benjamin Franklin. This quote captures the essence of interdisciplinary and thematic teaching, which serves as the backbone of experiential education. Thematic learning connects academic subjects through overarching, real-world themes such as “My School,” “Water,” or “Community Helpers.” By approaching these themes from multiple disciplinary angles—science, geography, mathematics, literature, and the arts—students develop a holistic understanding of complex systems and interdependencies.

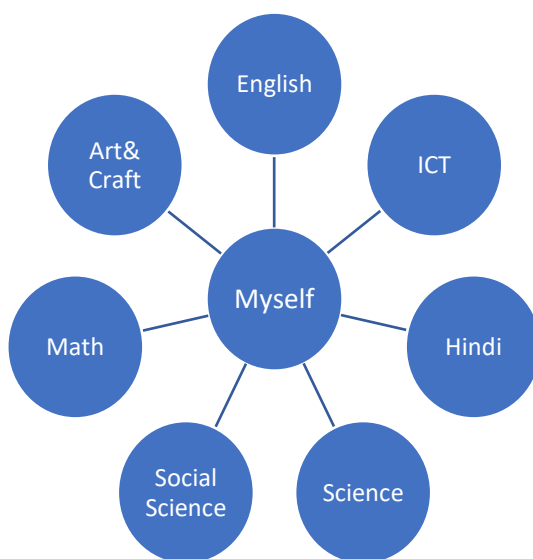
The thematic model promotes the development of **Knowledge, Attitudes, Skills, and Habits (KASH)**, enabling students to think critically and act responsibly. Learning is structured around the core inquiry questions: What? Why? and How? This scaffolding encourages exploration, reflection, and application, making education

meaningful and student-centered. When learners explore the theme of “Ecosystems,” for example, they may investigate food chains in science, write poems about nature in language class, map ecosystems in geography, and create dioramas in art—leading to multidimensional learning that nurtures creativity, empathy, and systems thinking. A case study on the Grade 2 theme “Myself” exemplifies how thematic teaching can be integrated into early childhood education to foster self-awareness, foundational knowledge, and sustainable values. Over seven weeks, learners progress through sub-themes such as “Knowing Myself,” “My Body,” “My Needs,” and “My Environment.” The program blends subject-specific lab visits, mindfulness practices, hands-on experiments, and collaborative group work. Students visit science labs to observe organs, participate in yoga for well-being, create models of homes and water cycles, engage in food preparation, and conduct interviews to understand community roles.

- Seven essentials of meaningful projects



- **Integrated Subjects**



Thematic Teaching for Grade 2 – Theme: “Myself”

Each week’s theme integrates academic subjects with sustainability education. The **Weekly Thematic Breakdown** offers a structured, holistic approach to foundational education that integrates academic learning with personal growth, sustainability awareness, and life skills development. Over seven weeks, students engage in progressively complex themes that begin with self-exploration and extend to understanding their needs and social environment. In **Week 1: Knowing Myself**, the focus is on building self-awareness and identity through activities such as self-introductions, personal storytelling, and group

naming exercises. This cultivates a sense of belonging and teamwork while also introducing basic geographical concepts through map reading in the Social Studies Lab. **Week 2: Knowing Your Body (Part 1)** enhances body awareness through a visit to the Biology Lab, clay modeling of sense organs, and yoga sessions. These activities promote both cognitive and sensory learning. A key highlight is the art-from-waste project, tying environmental consciousness with creativity.

In **Week 3: Knowing Your Body (Part 2)**, students apply mathematical concepts in real-life contexts by measuring their height and weight and plotting data on graphs, reinforcing numeracy alongside health education. **Week 4: Knowing Your Needs – Food and Air** integrates science and wellness through interactive sessions with medical professionals, hands-on nutrition activities like making fruit salads, and experiments such as the candle-burning activity to understand oxygen's role in respiration. **Week 5** continues this exploration with a focus on **Water, Clothing, and Shelter**, using scientific experiments, bilingual talk shows, and digital

assemblies to promote conservation, communication, and creativity. In **Week 6: Knowing Your Friend's Neighborhood and Environment**, students delve into civic learning and value education through interviews, letter writing, dramatizations, and community mapping, fostering empathy and environmental responsibility.

Finally, **Week 7** is dedicated to review and integration. Students reflect on their learning through peer feedback, creative rubrics, and a culminating event showcasing interdisciplinary projects. This comprehensive thematic model not only strengthens academic foundations but also nurtures essential life skills such as collaboration, communication, critical thinking, and empathy. It creates an inclusive, joyful, and meaningful learning experience, laying the groundwork for sustainable mindsets and responsible citizenship from an early age.

The outcome of this weekly thematic case study reveals a holistic and impactful approach to experiential and interdisciplinary learning in early education. Over seven weeks, students demonstrated significant growth in self-awareness, cognitive understanding, social skills, and environmental consciousness. The carefully curated themes—ranging from personal identity to essential needs and community awareness—allowed students to engage meaningfully with real-life contexts while integrating concepts from science, mathematics, social studies, language, and art. Visits to subject-specific labs, hands-on experiments, model-making, dramatization, and digital assemblies fostered curiosity, critical thinking, and creativity. Reflection activities and student-led initiatives nurtured communication, collaboration, and a sense of responsibility. Exposure to sustainability concepts—such as waste management, healthy living, and water conservation—enabled students to develop values aligned with sustainable development goals. The integration of yoga, breathing exercises, and mindfulness practices supported emotional well-being, while continuous formative assessments, peer feedback, and performance-based evaluations ensured inclusive and personalized learning. The finale event served as a powerful platform for students to synthesize and express their learning through interdisciplinary presentations, showcasing not only academic knowledge but also empathy, respect, and teamwork. Overall, the project highlights the success of thematic learning in creating a learner-centered, experiential environment that prepares students to be thoughtful, skilled, and responsible individuals equipped to contribute to a sustainable future.

Technology-Enhanced Thematic Learning effectively bridges digital innovation with experiential education to achieve key learning objectives such as critical thinking, creativity, collaboration, and personalized learning. By integrating tools like flipped classrooms, gamification, multimedia creation, and digital collaboration platforms,

students engage deeply with real-world themes across disciplines. These approaches empower learners to take ownership of their learning, connect knowledge across subjects, and express their understanding through diverse media. Teachers, as facilitators, use technology to enhance inquiry, provide real-time feedback, and foster reflective practices. The overall outcome is a more inclusive, student-centered environment that cultivates 21st-century skills and prepares learners for real-world problem-solving.

Transformative Capacity Building through Project-Based Learning (PBL) :

Project-Based Learning (PBL) extends the experiential and thematic learning models into a structured, inquiry-driven process that focuses on solving real-world problems through interdisciplinary projects. As a transformative learning framework, PBL positions students as active agents who research, create, and present solutions to issues that matter to them and their communities. The approach nurtures key 21st-century competencies—critical thinking, collaboration, creativity, communication, and citizenship—while aligning learning with the SDGs.

Each PBL cycle begins with a driving question—an open-ended, thought-provoking inquiry that guides the entire project. Students then engage in research, data analysis, fieldwork, interviews with experts, and creative design. The process emphasizes collaboration and real-time problem-solving. Projects often culminate in tangible outcomes such as prototypes, awareness campaigns, or digital products, which students present to authentic audiences. This element of public sharing reinforces purpose and accountability while deepening understanding.

In a sustainability-focused PBL unit, students may address themes like waste management, food security, climate change, or inclusive technology. A school waste audit project, for instance, might involve collecting and categorizing waste, calculating volumes using math, analyzing trends in science, writing persuasive essays on the need for recycling in language class, and developing digital posters or videos using technology. The outcome might include a zero-waste campaign, school-wide policy proposals, or upcycled products.

Teachers in a PBL setting act as facilitators—guiding inquiry, supporting reflection, and scaffolding skills when needed. This shift from directive instruction to mentorship builds learner autonomy, resilience, and a growth mindset. Reflective practices such as journals, learning logs, and peer critique are embedded throughout the process to enhance metacognitive awareness and personal growth.

PBL is inherently interdisciplinary and deeply aligned with the SDGs. It enables students to work on meaningful projects with real-world implications, fostering ethical awareness and civic engagement. It also accommodates diverse learning styles and

abilities, creating an inclusive environment where all students can contribute according to their strengths. Collaborative partnerships with local governments, businesses, and civil society organizations further enrich PBL experiences and provide platforms for civic action and leadership.

Outcomes:

The integration of Experiential Learning, Thematic Teaching, and Project-Based Learning leads to transformative capacity building across cognitive, emotional, social, and ethical dimensions. Learners gain not just subject knowledge but also the ability to apply it in varied contexts—solving problems, making decisions, and acting with empathy and responsibility. The thematic unit on “Myself” demonstrated growth in areas such as self-confidence, communication, teamwork, critical thinking, and environmental awareness. PBL projects led to student-led initiatives that impacted school policy, community awareness, and individual behavior. EL practices helped students internalize sustainable values, developing long-term behavioral change.

From an educator’s perspective, these pedagogies shift the role of teachers from instructors to facilitators of learning, co-creators of knowledge, and mentors of transformation. Technology further amplifies the impact by supporting flipped learning, digital storytelling, gamified assessments, and virtual collaborations—bridging innovation with inclusion. Teachers also become continuous learners, engaging in professional development, collaborative planning, and reflective practice. Students emerge from these learning experiences with a stronger sense of purpose, global citizenship, and readiness for the future. They become active participants in their communities and are better prepared to tackle the uncertainties and opportunities of a rapidly evolving world.

Conclusion:

Transformative capacity building for a sustainable future begins with reimagining education as a living, participatory, and ethical process. Experiential Learning, Interdisciplinary and Thematic Teaching, and Project-Based Learning offer integrated, powerful methodologies to foster this transformation. These pedagogies move learning beyond the confines of the classroom, anchoring it in the lived realities of learners and the pressing needs of our planet. They nurture skills, values, and attitudes essential for sustainable development, preparing students not only for academic success but for meaningful contribution to society.

By engaging learners in inquiry, reflection, collaboration, and action, these approaches foster deep learning that is inclusive, student-centered, and future-ready. As educators, schools, and systems embrace this paradigm, they lay the foundation for an education that not only informs but also inspires, empowers, and

transforms. This paper offers a replicable model for institutions seeking to align education with sustainability goals through innovative, experiential, and holistic approaches—paving the way toward a more equitable, sustainable, and compassionate world.

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CULTIVATING TRANSFORMATIVE LEADERSHIP: THE ROLE OF TEACHER TRAINING PROGRAMS IN EDUCATIONAL REFORM

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Abstract:

The effectiveness of teacher preparation programs in developing educators' transformational leadership abilities is examined in this study. We investigate important elements that lead to successful leadership development using a structured questionnaire given to various teachers in various educational contexts. Participants' opinions on transformative leadership skills, including flexibility, teamwork in decision-making, and community involvement were the main emphasis of the survey measurements. Our results underline the importance of peer cooperation and experiential learning by showing strong associations between organized training interventions and higher self-efficacy in leadership roles.

The findings highlight the need for focused professional development programs that foster an inclusive and common vision in schools while also giving teachers real-world leadership experience. By offering evidence-based perspectives on the transformational potential of teacher training programs and highlighting the necessity of ongoing professional development in a changing educational environment, this article adds to the conversation on educational leadership.

Keywords: *Transformative leadership, Teacher's training, Professional development*

Introduction:

Teachers today do more than just teach in the classroom. They are now seen as important leaders who can bring positive change to their communities. As we face big global problems like social inequality and rapid technology changes, strong leadership in education is more needed than ever. Transformational leadership, which focuses on creative thinking, teamwork, and fairness, can help improve student learning and create inclusive, strong schools.

But, for teachers to be effective leaders, they need good training and ongoing support. Teacher training programs should teach the skills, mind-set, and teaching methods needed for transformational leadership. Unfortunately, many current training programs are outdated and don't fully prepare teachers for today's complex educational challenges.

This essay looks at why training programs are important for helping teachers develop leadership skills. We will explore successful strategies, current ideas, and real-life examples. Our goal is to promote a new way of training teachers that makes leadership a key part of their professional growth. We believe this will help teachers inspire change and lead improvements in their schools and communities, creating a more fair and lively education system.

Purpose of the Study:

This study wants to find out how much teacher training programs help develop transformational leadership in teachers. We will survey teachers to learn about their beliefs, experiences, and skills related to being transformational leaders. The goal is to identify the main qualities of transformational leadership and see how different training opportunities help teachers develop these skills. We will also look at whether longer or better-quality training leads to stronger leadership behaviours that create positive changes in schools. Our hope is to give suggestions for improving teacher education so teachers can become effective leaders who make a positive difference for students and the school community. Besides helping improve teacher training, this study also adds to what we know about educational leadership and teacher preparation, and it can help guide future research.

Objectives of the Study:

- 1.To assess how well teacher preparation programs promote transformational leadership in educational environment.
- 2.To ascertain teachers' perspectives and opinions how the teacher preparation programmes promote transformational leadership in educational environment.

Hypothesis of the Study:

This study intends to evaluate the influence of teacher training programs on the development of transformational leadership qualities among educators. We put out the following theories in light of the examination of an extensive survey that examined participant feedback, leadership skills, and educational practices:

1. Teachers' opinions about the value of transformative leadership in education do not significantly change based on gender.
2. Teachers' opinions about the value of transformative leadership in education do not significantly change based on age.

3. Teachers' opinions about the value of transformative leadership in education do not change much based on their educational background.

Scope of the Study:

To help teachers increase their capacity for creativity, teamwork, and inclusivity in their organisations, this study assesses teacher development concerning transformational leadership development. The study collects quantitative and qualitative information relevant to teachers' experiences and understandings of leadership development programs and utilises a standardised survey to capture quality information from a diverse array of educators in different contexts. The study examines the fundamental skills developed through the professional development program, how these skills manifest in pedagogical practices, and the impact on student achievement and school climate. With these outcomes, this study contributes to understanding models with the largest leverage for nurturing transformational leaders in education and developing recommendations for improving training. It also contributes to the body of knowledge on professional development and educational leadership with implications for actionable praxis for educational organisations worldwide.

Methodology:

The type and goal of the investigation will determine the methodology used. The current study examines the perspectives and experiences of educators who received transformational leadership training. For this study, 48 teachers from a state board schools made up the sample. The researcher employed a quantitative descriptive technique. Based on earlier studies that created lists of questions for teachers of various sections of state board school who underwent a training based on transformative leadership the researcher has created a survey instrument. The researcher has taken reference for the tool that is used by Beauchamp, M. R., Barling, J., Li, Z., Morton, K. L., Keith, S. E., & Zumbo, B. D. (2010). *Transformational Teaching Questionnaire (TTQ)* [Database record]. APA

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Table 1. Demographic Presentation of Participant Teachers

Gender wise			Section wise				Teaching Experience wise			
	Female	Male	Pre – Prim.	Prim.	Scond.	Higher Second.	1- 10	11- 20	21- 30	31- 40
	33	15	0	2	41	5	8	16	20	4

Table 2. Relevant Statistics for t test for gender wise difference

t-test results	
1.t-Score	78.6073
2. Standard Error of Difference	0.9446
3.Degrees of Freedom	23
4.Two-tailed p-Value	0
Confidential Interval	95%
Confidence Range	74.25
1. Mean Difference	
2. Confidencce Range	72.2957 76.2043

The result of the T-test shows that there is no significant difference Gender wise in perception of teachers regarding the importance of transformative leadership in education.

Table 3. ANOVA Results Section wise

Analysis of Variance Results

F-statistic value = 7212.41231

P value = 0

Data Summary					
Groups	N	Mean	Std. Dev.	Std. Error	
Groups 1	24	81.25	1.5948	0.3255	
Group 2	24	8.7083	0.55	0.1123	
Group 3	24	168.7917	8.8119	1.7987	
ANOVA Summary					
Source	Degrees of freedom (DF)	Sum of Squares (SS)	Mean Square (MS)	F-Stat	P-Value
Between Groups	2	387044.3395	193522.1697	7212.4123	0
Within Groups	69	1851.3958	26.8318		
Total	71	388895.7352			

There is no Section wise significant difference in perceptions of teachers regarding the importance of transformative leadership in education.

Table 4. ANOVA Results Teaching Experience wise

Analysis of Variance Results

F-statistic value = 1902.60962

P value = 0

Data Summary					
Groups	N	Mean	Std. Dev.	Std. Error	
Groups 1	24	33.283	1.9106	0.39	
Group 2	24	66.375	3.8653	0.789	
Group 3	24	80.625	5.0374	1.0282	
Group 4	24	15.5417	0.9771	0.1994	
ANOVA Summary					
Source	Degrees of freedom (DF)	Sum of Squares (SS)	Mean Square (MS)	F-Stat	P-Value
Between Groups	3	64100.4301	21366.81	1902.6096	0
Within Groups	92	1033.1844	11.2303		
Total	95	65133.6144			

There is no significant difference in perceptions of teachers regarding the importance of transformative leadership in education as per their Experience of teaching.

The following factors were used to separate the data in this study: gender, teaching experience, and teaching sections. The T-test was used to test the hypothesis.

Results & Findings:

1. Teachers' perceptions of transformational leadership in education do not significantly change based on gender.
2. Teachers' perceptions of transformational leadership in education do not significantly differ by sector.
3. Teachers' perceptions of their teaching experiences do not significantly differ from one another.

Conclusion:

Teacher preparation programs provide the strongest connection toward transformational leadership, and indeed, a serious focus on social equity, parental and community engagement, and development of skills as mechanisms to instigate educational change toward more inclusive and successful practices. It makes sense to invest billions in teacher preparation, because it prepares leaders with the agency to mobilise change and develop new thoughts to create the future of education for generations against the burdened weight of pandemic time and the social issues

coupled with education today. From this investment will emerge much more responsive and egalitarian education systems.

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**TRANSFORMATIVE CAPACITY BUILDING FOR A SUSTAINABLE FUTURE:
MINDFULNESS AND NATURE-BASED PEDAGOGY FOR SUSTAINABLE
BEHAVIOUR CHANGE**

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Abstract:

In the face of escalating environmental challenges, education emerges as a powerful tool to foster sustainable development and ecological consciousness. This research explores the integration of innovative pedagogical practices—specifically mindfulness and nature-based learning—into sustainability education. Through a mixed-methods survey of students and teachers conducted during Earth Week, the study investigates how these approaches influence students' sustainable behaviours, emotional connection to nature, and environmental awareness. The findings reveal a marked increase in eco-conscious actions, particularly in energy conservation and community engagement. Additionally, students displayed improved mindfulness and a deeper sense of environmental responsibility. The paper highlights the effectiveness of short, focused interventions and the value of experiential learning in cultivating critical thinking, empathy, and ethical decision-making. Recommendations include equipping teachers with mindfulness facilitation skills, incorporating outdoor learning across curricula, and leveraging events like Earth Day for thematic instruction. These insights underscore the potential of experiential, emotionally grounded education in nurturing environmentally responsible future citizens.

Keywords: *Sustainability Education, Mindfulness in Education, Nature-Based Learning, Environmental Awareness, Experiential Pedagogy, Student Engagement, Eco-Conscious Behaviour*

Introduction:

A Chinese saying states, "If you plan for a year, plant rice; if you plan for ten years, plant trees; and if you plan for a hundred years, educate people." In a world where the declining health of the Earth is an inevitable threat, integrating environmental awareness into the education system is not just beneficial—it's essential. We need a

plan to secure our tomorrow because the environment does not belong to our today, but to our tomorrow. Sustainable education focuses on teaching students about the environment, sustainability practices, and the impact of human actions on the planet. It teaches students the responsible and balanced use of the planet's resources. By incorporating these concepts into the curriculum, we can foster a generation of environmentally conscious individuals who are equipped to tackle the pressing ecological issues of our time.

By introducing students to the concept of sustainability at a young age, each lesson becomes like ink on stone—etched deep, and never washed away. It grants them a crucial understanding of the relationship between human actions and their impact on the planet. Sustainability in education also brings about problem-solving skills, creativity, critical thinking, and ethical decision-making. Embedding inquiry-based learning encourages students to question and explore innovative solutions to the sustainability challenges that may arise. By engaging in real-world problem-solving, students develop the ability to analyse issues from multiple perspectives, fostering creativity and resilience. As they explore topics such as climate change, resource depletion, and biodiversity loss, students gain a deeper understanding of the ethical implications of human actions, emphasising the importance of integrity, empathy, and responsibility in decision-making processes. This empowers them to become change advocates in their communities.

Earth Day – celebrated on April 22 – is an international day devoted to our planet. It draws attention to the environment and promotes conservation and sustainability. Earth Day holds immense relevance as a pedagogical opportunity. It enables educators to go beyond the textbook, anchoring classroom learning in real-world environmental issues. Connecting theory to practice helps students develop a deeper understanding of topics like climate change, sustainability, and environmental justice. Earth Day fosters inquiry-based learning by encouraging students to ask questions, participate in hands-on activities, and engage in meaningful discussions about the planet's future. It nurtures critical thinking, creativity, collaboration, and a sense of responsibility—skills that are essential for tackling global challenges.

Earth Day events often include workshops, lectures, documentaries, and other educational activities that inform and empower people to act. This includes ongoing efforts to demand environmental protection. The Earth Day Network's Global Teach-In initiative seeks to reach more than 500 million people worldwide.

Literature Review:

Sustainability education has gained significant momentum as educators worldwide recognize the urgency of equipping students with the knowledge and values necessary to address environmental crises. According to Hnatyuk et al. (2023), embedding sustainability within the curriculum fosters holistic development, empowering students to act as informed and responsible global citizens. This is particularly relevant in a world grappling with climate change, biodiversity loss, and resource depletion, where education is increasingly viewed as a key driver of sustainable development.

Mindfulness is awareness of one's internal states and surroundings. It helps people avoid destructive or automatic habits and responses by learning to observe their thoughts, emotions, and other present-moment experiences without judging or reacting to them. Mindfulness is also described as an action of two simple words: "pay attention". When we pay attention with all of our senses, we are then present in the current moment. By being in the current moment, our minds are not ruminating about the past or worried about the future.

Modern psychology defines mindfulness as "bringing one's complete attention to the present experience on a moment-to-moment basis." Jon Kabat-Zinn, the biologist who first coined the term "mindfulness" in the 1970s in the United States, defines it as a state of mind: the act of "paying attention on purpose" to the present moment, with a "non-judgmental" attitude. The origins of mindfulness are a secular philosophy and set of techniques adapted from Buddhist meditation traditions.

Jon Kabat-Zinn founded the Centre for Mindfulness at University of Massachusetts Medical School, and he is credited with being the first person to introduce mindfulness into a medical setting. He developed the Mindfulness-Based Stress Reduction (MBSR) program, which used specific exercises to help patients deal with chronic pain. Subsequently, decades of ongoing medical and scientific research have proven that other modalities that create present-centred awareness also help improve emotional and physical well-being. Other activities that achieve present-centred awareness include yoga, meditation, controlled breathing techniques, and tai-chi.

Nature-based Pedagogy is an understanding of our sense of belonging to land; our sense of being with nature. There is a pedagogical shift when you embrace the natural world in your practice inside buildings, outside in nature-based play spaces and beyond into wilder spaces. It's learning with nature, not just teaching about it. Nature-based Pedagogy is an educational approach that engages children with the natural environment and elements as a learning pathway. Although nature-based pedagogy often occurs in natural settings, it can also occur in built environments

where natural elements are added to promote learning and skill development. It includes learning about the natural world, but extends to engagement in any subject, skill, or area and is often implemented interdisciplinary.

Methodology:

A survey of 118 students in grades 5-9 and 4 teachers was conducted to explore how mindfulness and nature-based learning impact students' sustainable behaviour and emotional connection to nature. The tool used was a Google Form, designed to capture responses both before and after the intervention, which took place during Earth Week. The survey aimed to answer key questions: Does mindfulness increase connection to nature? What sustainable behaviours emerge post-intervention? And what are teachers' perspectives on this pedagogy?

Survey Question	Before Intervention	After Intervention	Insight
Spent time outdoors / Felt peaceful in nature	53.4% felt peaceful in nature	53.4% felt peaceful in nature	No change in emotional connection to nature
Thought about environmental impact of actions	52.5% thought about their impact	53.4% thought about their impact	Slight increase in awareness
Familiarity with the term "sustainability"	59.3% were somewhat familiar	80% became familiar or very familiar	Increased understanding despite different response scale
Tried reducing waste / conserving resources	42.4% made efforts	66.1% make efforts	Significant improvement
Knowledge about effects of plastic waste	Not quantified explicitly	Not quantified explicitly	Presumed improvement due to related learning activities
Belief in importance of sustainable choices	58.5% believed it was very important	71.2% now believe it is very important	Strong increase in sustainability mindset
Likelihood of taking actions to protect nature	52.5% were likely to take actions	70.3% are actively taking actions	Substantial positive behavioural change
Awareness of personal environmental impact	Not quantified explicitly	Not quantified explicitly	Presumed improvement based on context
Turned off lights to save energy	55.9% did this	99.2% now do this	Dramatic improvement in energy-saving behaviour
Participation in clean-up events	11.9% participated	97.5% now participate	Major shift in environmental engagement

Survey Observations Summary:

To evaluate the impact of mindfulness and nature-based pedagogical interventions, a pre- and post-intervention survey was conducted among students. The aim was to measure changes in environmental attitudes, awareness, and behaviours. The results offered key insights into how short-term educational strategies can influence sustainable habits.

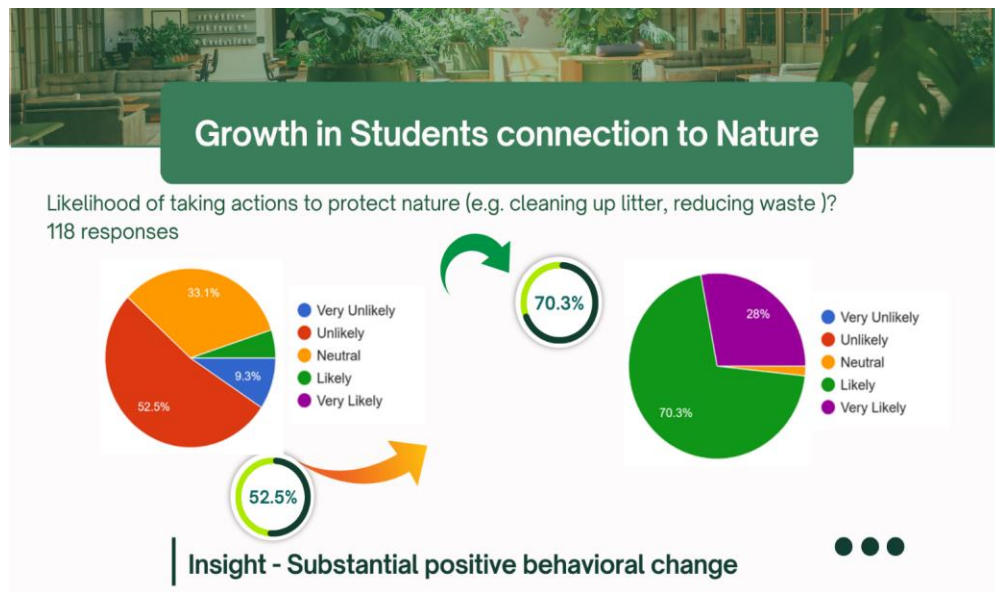
Post-intervention data revealed notable improvements in student behaviour and mindset. While emotional connection to nature remained unchanged, there was a significant rise in energy-saving habits (from 55.9% to 99.2%) and participation in clean-up events (from 11.9% to 97.5%). Efforts to reduce waste also increased from 42.4% to 66.1%. Understanding of sustainability deepened, and belief in the importance of sustainable choices rose from 58.5% to 71.2%. A greater number of students expressed willingness to take action to protect nature, indicating a clear shift toward proactive environmental engagement.

These findings suggest that even brief, well-designed interventions can lead to meaningful behavioural change. By combining mindfulness with hands-on, nature-based learning, students not only developed practical sustainable habits but also internalized the importance of environmental responsibility. This highlights the potential of experiential education in shaping environmentally conscious future citizens.

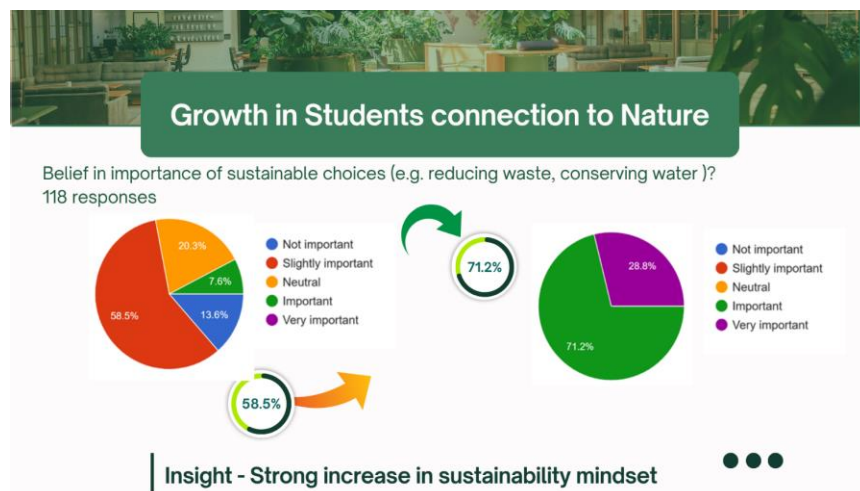
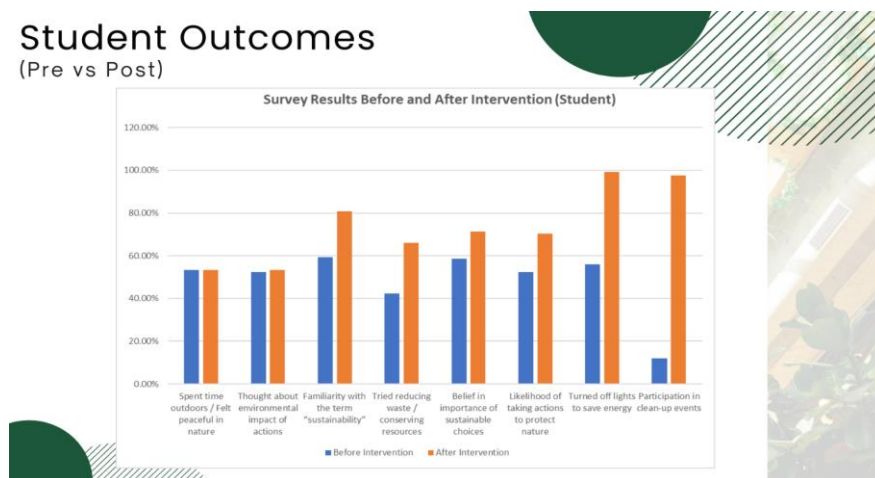
Key findings:

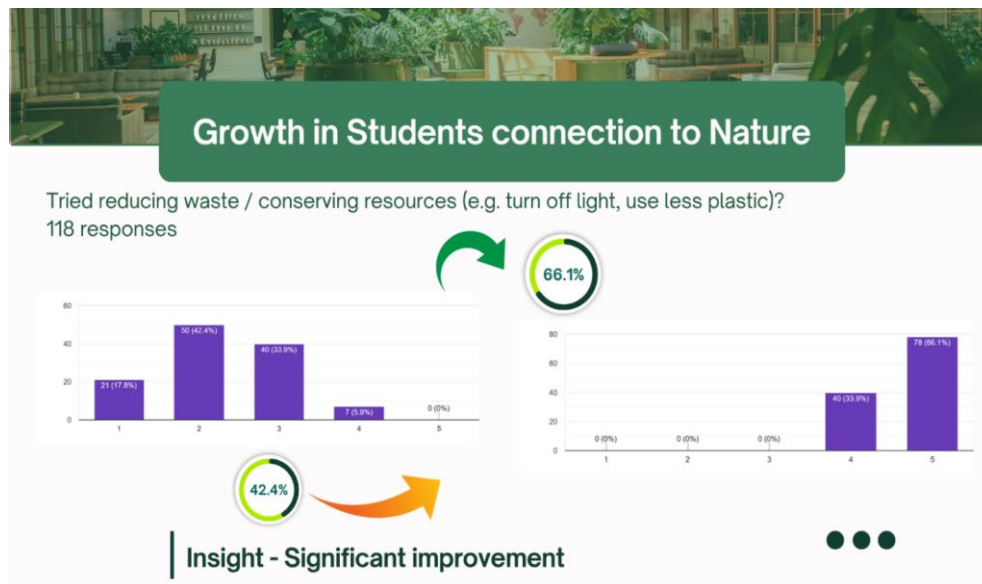
Key findings reveal a notable increase in sustainable actions, including waste reduction, energy-saving practices, and active participation in clean-up events. One of the most significant improvements was seen in energy conservation behaviour, with a dramatic rise in simple yet impactful habits such as turning off lights when not in use. There were also moderate gains in awareness, as students demonstrated a better understanding of environmental impact and sustainability concepts. More importantly, there was evidence of a mindset shift, with a stronger belief in the importance of sustainability, suggesting the development of deeper environmental values. Overall, there was a high level of engagement, particularly reflected in the surge of participation in community clean-up efforts.

Data Presentation:



Student Outcomes (Pre vs Post)





Implementations for Practice:

Sustainability can be integrated into everyday classroom activities through projects, audits, and clean-up drives. These practical steps help students connect learning with real-life environmental action.

➤ **Short Interventions, Lasting Impact**

Pedagogical interventions don't need to be long to be effective. Even brief nature walks, discussions, or activities can leave lasting impressions when done consistently and with purpose.

➤ **Mindfulness and Environmental Action**

Mindfulness encourages students to reflect on their actions and their impact on the planet. This emotional connection strengthens empathy and motivates more meaningful environmental choices.

➤ **Nature-Based Learning**

Learning outdoors stimulates curiosity, creativity, and responsibility. Nature becomes both a classroom and a teacher, reinforcing care and respect for the environment.

Recommendations:

➤ **Train Teachers in Mindfulness Facilitation**

Equip teachers with tools to lead mindfulness practices in class. This builds emotional awareness and strengthens students' connection to environmental issues.

➤ **Integrate Outdoor Learning into the Curriculum**

Link outdoor activities to subjects like science, art, and geography. It makes lessons more engaging while encouraging real-world connections with nature.

➤ **Create School Gardens or Green Corners**

Establish green spaces as permanent fixtures within school grounds. They offer hands-on learning opportunities and foster a sense of care and responsibility.

➤ **Use Local Events like Earth Day for Thematic Learning**

Anchor lessons around events like Earth Day to spark interest and relevance. These occasions provide a timely, real-world context to explore sustainability themes.

Conclusion:

Integrating mindful practice with tactile, nature-based learning can enhance or deepen sustainability education or learning by linking it “from the head to the hands and the heart” through a mental, intellectual, and physical approach to action. To conclude, if EARTH Week or Day interventions are carefully planned with themes based on ecological issues, and inspire or motivate students through repeated periods of outdoors physical, tactile learning, even brief, theme interventions like Earth Day can encourage the long-term changes in many aspects of our behaviour when they:

1. Combine mind and body awareness (mindfulness) with practical ecological work.
2. Encourage consistent reflection of our impact (personal or collective).
3. Provide outdoor, site-based experiences. Scaling of these types of projects will require
 - (i) Teacher workshops and formal understanding of mindfulness practice and facilitating learning
 - (ii) Allowing some flexibility in the curriculum for outdoor activities, and
 - (iii) Partnerships with environmental organizations or groups in the community for authentic action projects or initiatives in the environmental or sustainability field.

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BUILDING MINDS FOR A SUSTAINABLE FUTURE: A STUDY ON READING HABITS AND MENTAL WELL-BEING OF COMMERCE STUDENTS

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Abstract:

"Building Minds for a Sustainable Future: A Study on Reading Habits and Mental Well-Being of Commerce Students" investigates the reading habits, preferences, and perceived benefits of undergraduate commerce students, with a special focus on mental well-being and personal development. The research highlights the role of reading as a leisure activity and a tool for cognitive growth, emotional resilience, and transformative learning. Using a survey of 62 students, the study examines gender-based differences, preferred reading materials and formats, and how reading supports academic and personal growth. Results show that female students have more consistent reading habits and report greater personal development benefits from reading. While reading contributes positively to emotional well-being and intellectual curiosity, the study also finds that multiple factors beyond reading alone influence well-being. The research emphasizes the importance of nurturing reading habits within educational systems to support lifelong learning and sustainable mental health, aligning with Sustainable Development Goal 4 principles.

Keywords: *Reading habits, Mental well-being, Students, Leisure reading, Emotional resilience, Transformative learning.*

Introduction:

Reading involves coordinating several brain areas while promoting emotional and intellectual development. In a time characterized by declining attention spans and growing mental health issues, reading has come to be more and more recognized as both a therapeutic and empowering activity. For young students with high academic pressure and stress, reading acts as a mode of self-reflection, encouragement, and emotional stability. It is an essential skill for educational achievement and personal growth.

Mental well-being has been described by the World Health Organization (WHO) as a condition under which people find fulfillment of their potential, deal with the ordinary pressures of life, and are assets to society. This study investigates how frequent reading can maximize these aspects of well-being among business students, especially in the broader context of sustainability and lifelong learning. In this contemporary age of digitization, it is also essential to understand how different types like books in print, e-books, audiobooks, and blogs, and genres like fiction, non-fiction, and self-help affect mental and emotional well-being in various ways.

The research also supports the United Nations' Sustainable Development Goal 4, inclusive and equitable quality education and lifelong learning for all. As the body is nourished by food, the brain is nourished by reading, making it essential to mental health, emotional intelligence, and lifelong personal development.

According to (Clark & Teravainen-Goff, 2018), Children and young people who are the most engaged with literacy are three times more likely to have higher levels of mental well-being than children who are the least engaged.

Definition of Key Terms:

Reading As per the Cambridge Dictionary, "Reading is the skill or activity of getting information from written words."

Habit A routine of behaviour performed regularly and, in many cases, subconsciously. According to the Cambridge Dictionary, a *habit* is defined as "something that you do often and regularly, sometimes without knowing that you are doing it" (Cambridge Dictionary, 2024).

The WHO constitution states, "Health is a complete physical, mental, and social well-being and not merely the absence of disease or infirmity." An important implication of this definition is that mental health is more than just the absence of mental disorders or disabilities.

Review of literature:

Makri Christina et al. (2025) revealed a significant relationship between children's reading challenges and mental health problems such as depression and anxiety. Special focus was laid on the significance of early individualized support through integrated educational and psychological interventions. Approximately 20% of children were found to suffer from severe mental health issues, and stigma was identified as the key hindrance to intervention. Other difficulties were noted among vulnerable populations, such as deaf children. The efficacy of school-based mental

health services was questioned, and a call for increased training and inter professional collaboration was noted.

Das, R.K., & Singha, Anuradha (2024) addressed the central position of reading habits in shaping the academic and personal growth of college students with the help of a mixed methods strategy. Quantitative questionnaires and qualitative interviews were used to identify how reading influences cognitive skills, critical thinking, and academic achievement. It was found that there is a strong correlation between students' reading habits and their overall development. The research findings have identified that reading habits play an important role in different aspects of student life, and it has been inferred that reading culture must be developed in educational institutions to increase learning results and facilitate total student development.

Miyata (2016) explored daily reading habits, reading time, and speed with mindfulness and psychological well-being in 881 Japanese adults without mindfulness or reading training. Reading time was positively correlated with mindfulness, well-being, positive affect, and empathy, and negatively with depression. Self-reported speed of reading revealed a positive relationship with affect, whereas measured speed was correlated with greater depression and less empathy. Mediation analysis showed that mindfulness mediated these associations, particularly between reading time and psychological outcomes. The study implies that frequent reading might provide benefits comparable to mindfulness exercises. Limitations like a lack of content specificity and cross-sectional design limit causal conclusions, and recommendations for longitudinal research are made.

Objectives of the Study:

- To examine and compare the reading habits of male and female students.
- To assess the perceived impact of reading on students' mental, emotional, and psychological well-being.
- To compare the impact of reading on well-being between students who read daily and those who do not.
- To explore the role of reading in promoting mental well-being among young adults.

Benefits of Reading:

Reading is indeed brain food. It nourishes the mind, keeps it awake and alert, and maintains long-term mental capacity (Willard & Budd, 2020). Reading is a means of gaining knowledge and an essential practice for improving mental well-being. It promotes cognitive skills such as enhanced focus, stronger memory, more refined analytical thinking, and increased vocabulary. Reading keeps the mind active, much like physical activity keeps the body healthy.

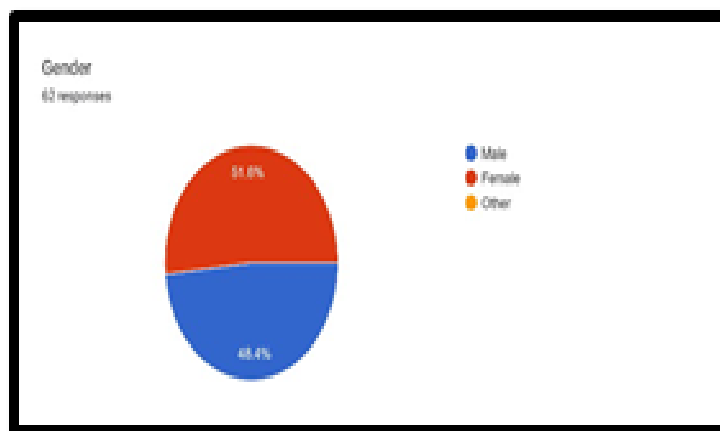
Apart from the above cognitive benefits, reading exercises powerful emotional and psychological influences. Becoming transported by a novel or work of non-fiction could be a grand way of getting out of your head and escaping life's tension, fretting, and cacophony. As discovered through the University of Sussex study, reading for half an hour might reduce stress by as much as 68%, higher than listening to music or walking (The Telegraph, 2009).

Narratives that expose a person to diverse perspectives foster empathy and emotional intelligence, which are essential for personal development and social relationships. Reading is especially beneficial for students in terms of academic and emotional well-being. Reading enables a person to reflect, acquire self-esteem, and attain safe emotional expression. Self-help books, in particular, help individuals develop coping styles and a healthy attitude, emphasizing the principle of bibliotherapy, which is a method where books promote mental recuperation and flourishing (National Library of Medicine, 2020).

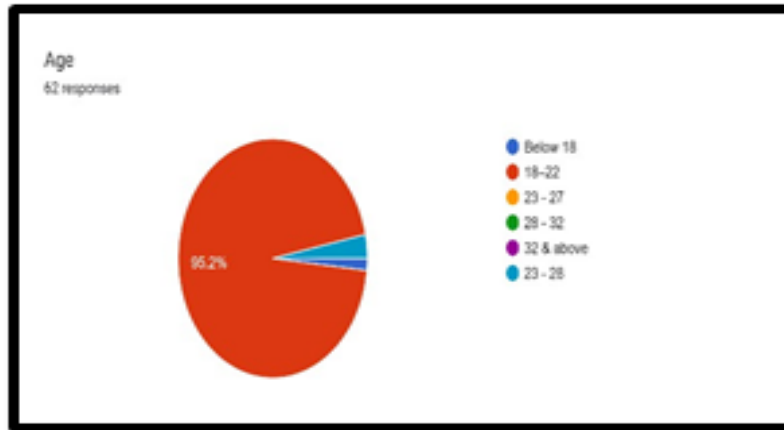
Methodology:

The questionnaire was sent to 100 students of commerce, and 62 responded. A Google Form ([Click here to see the Google Form](#)) was created and sent out as a questionnaire to gauge their reading habits, genre preference, reading time, emotional reactions, and general mental health. The Reading Habits Inventory used in this study is based on the standardized tool developed by Dr. M. Senthilkumaran and B. Revathi, as published in the Journal of Positive School Psychology. The Warwick–Edinburgh Mental Well-being Scale (WEMWBS) used in this study is adapted from the official version of the University of the West of England.

Data Interpretation:

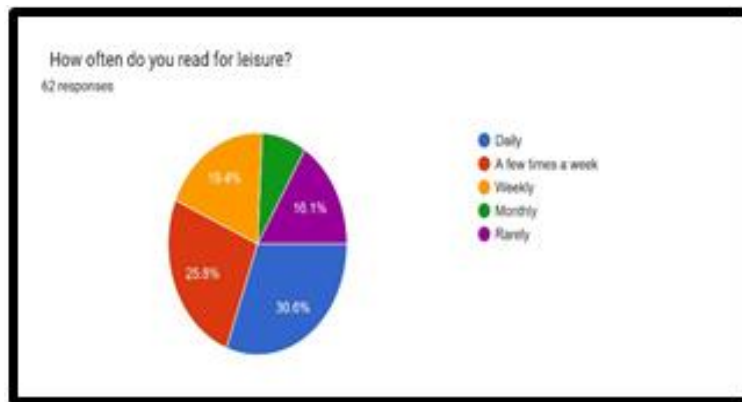


The demographic data from the survey reveals a balanced representation across gender, with 51.6% of respondents identifying as female and 48.4% as male, reflecting an almost equal split.



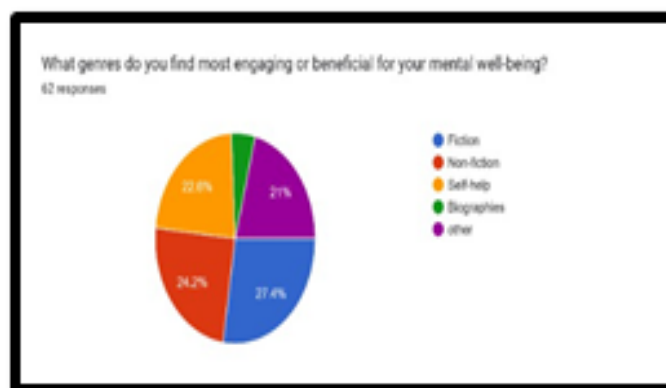
The age distribution shows a strong concentration of respondents in the 18-22 age group, making up a dominant 95.2%, while other age groups, such as below 18, 23-27, and 28-32, are minimally represented, indicating the survey largely reached young adults, likely students.

In terms of education level, the vast majority (98.8%) are undergraduates, with very few from postgraduate or other levels. This suggests that the reading habits' findings largely reflect the undergraduate student demographic, which may influence their reading choices, time availability, and preferences toward study-related or self-improvement reading material. The survey data on reading habits offers some insightful observations about the participants' preferences and practices.

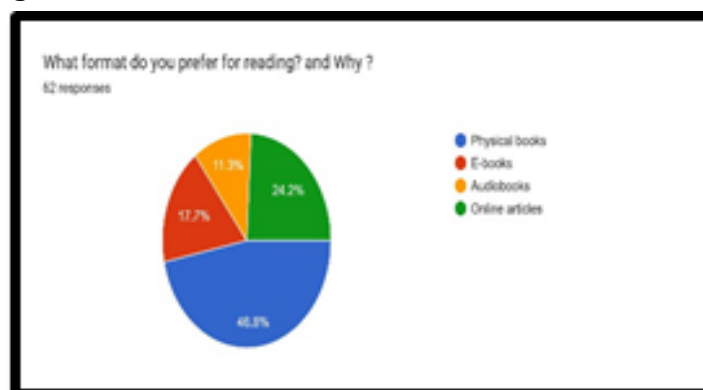


A significant portion, 38.6%, read daily for leisure, while 29.8% read a few times a week, indicating a healthy engagement with reading.

Regarding material preferences, books are the clear favourite, with 100% of respondents choosing them, followed by newspapers (62.5%) and magazines (46.9%), suggesting a blend of in-depth and quick reads. Regarding time spent, most people (40.4%) read for 1-3 hours a week, while 32.5% dedicate less than an hour, and only a smaller group reads for more than 7 hours, highlighting a moderate time commitment overall.



Genre-wise, fiction leads with 27.4%, closely followed by self-help (24.2%) and non-fiction (22.5%), showcasing a balanced interest in entertainment, personal growth, and factual reading.



As for format preferences, physical books dominate at 48.6%, followed by e-books (24.2%), indicating that traditional reading still holds strong appeal despite digital alternatives. Overall, the data suggests that while digital formats and various content types are popular, there remains a strong attachment to physical books and a consistent interest in reading for leisure and personal enrichment.

The “Reading Habits Inventory” reveals that respondents view reading as both purposeful and enriching. A significant majority agree that reading helps them gain real-world knowledge (58), draw inferences (57), and summarize content effectively (62). Most respondents do not face difficulties while reading (49) and enjoy good books (47), highlighting strong engagement and positive attitudes. Traditional habits like visiting bookstalls (10), subscribing to magazines (6), and attending book fairs (2) are less popular, and only 11 are members of readers’ clubs, pointing to a preference for solo reading.

Digital reading habits are well established — 35 enjoy digital texts and 59 download study materials using electronic gadgets, suggesting a tech-friendly shift. Economically, only 19 spend savings on books and 15 prefer buying over borrowing,

indicating cautious spending. Despite workload, most make time for reading, and 56 invest hours studying new topics, showing curiosity. Leisure habits vary: 41 search for good books, 34 visit libraries, 14 read only fiction, and 44 read newspapers for knowledge. Few read while eating (1) or reread favourite books (8). Finally, 38 percent browse for new books, but only 11 percent use Kindle, showing a broader use of digital resources beyond e-readers.

The survey shows that reading positively impacts personal wellbeing, with most respondents feeling optimistic, helpful, relaxed, and clear-minded "some of the time" or "often." Emotional benefits like confidence, problem-solving, and interest in others were common, though social connection and constant cheerfulness were less frequent.

Regarding habits, reading is strongly linked to knowledge-seeking and personal growth. Many enjoy summarizing, drawing inferences, and updating knowledge, especially through newspapers and digital formats. Despite the workload, most make time to study new things and seek quality books. Digital reading is popular, though traditional habits like visiting libraries and owning books persist.

Reading enhances emotional well-being and intellectual curiosity, especially among young undergraduates, with digital tools playing a growing role.

The independent samples t-test was conducted to compare male and female participants on the Reading Habits Inventory and the Impact of Reading on Personal Development. Reading Habits Inventory. There was a statistically significant difference in the reading habits of male and female participants. Female participants ($M = 63.56$, $SD = 7.96$) scored significantly higher than male participants ($M = 42.97$, $SD = 8.94$), $t(60) = 9.73$, $p < 0.05$. This suggests that females in the sample demonstrated stronger or more consistent reading habits than their male counterparts. Impact of Reading on Personal Development Similarly, the impact of reading on personal development was significantly higher for female participants ($M = 60.77$, $SD = 7.25$) compared to male participants ($M = 40.50$, $SD = 9.69$), $t(60) = 9.17$, $p < 0.05$. This indicates that females reported a greater influence of reading on their personal growth and development.

CATEGORY					
BETWEEN Male and Female	Reading Inventory	Impact of Reading		Female (Inventory Vs Impact)	Male (Inventory Vs Impact)
MEAN					
M1	63.56	42.97	Female	63.56	60.77
M2	60.77	40.5	Male	42.97	40.5
M1 - M2	2.8	2.47		20.59	20.27
Standard Deviation: SD					
SD1	7.96	8.94	Female	7.96	7.25
SD2	7.25	9.69	Male	8.94	9.69
SD12	63.42	79.97	Female	63.42	52.6
SD22	52.6	93.98	Male	79.97	93.98
Number					
N1	32	32	Female	32	30
N2	30	30	Male	32	30
SD2 / N					
SD12 / N1	1.98	2.5		1.98	1.75
SD22 / N2	1.75	3.13		2.5	3.13
SD12 /N1 + SD22 / N2	3.74	5.63		4.48	4.89
SEd = SQR (SD12 /N1 + SD22 / N2)	1.93	2.37		2.12	2.21
t calculated value	1.45	1.04		9.73	9.17
TABLE VALUE (LEVEL OF SIGNIFICANCE AT 0.05)	2	2	df=60	2	2
S / NS	NS	NS		S	S

Conclusion:

In conclusion, although reading is linked to intellectual curiosity, emotional benefits like relaxation and confidence, and personal growth, these effects seem to be influenced by a variety of other factors. For instance, while reading has a positive impact on emotions such as optimism and clarity of thought, it is clear that other elements, such as social connections, physical health, and personal circumstances, also play a crucial role in shaping overall wellbeing. Therefore, while reading can contribute to personal development and emotional wellness, it should be seen as one of many factors, rather than a sole determinant of wellbeing.

Suggestions:

Institutions should actively organize programs to promote reading, as it plays a crucial role in shaping students' futures and enhancing their mental wellbeing. Programs like **Vachan Sankalp Maharashtra** serve as an excellent example, encouraging students to embrace reading as a habit. By creating platforms that promote the joy of reading, institutions can help students develop critical thinking, broaden their knowledge, and improve emotional health. These programs can also address the growing digital distraction by reinforcing the benefits of reading physical books, fostering a balanced relationship with both digital and traditional media. With a focus on cultivating reading habits early, educational institutions can empower students to build strong intellectual foundations, which, in turn, contribute to their overall development and emotional resilience, preparing them for a successful future.

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MUDRAS AND BHEDAS AS TOOLS OF TRANSFORMATIVE TEACHING: A CONCEPTUAL FRAMEWORK FOR CLASSROOM PEDAGOGY

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Abstract:

This paper explores the integration of mudras (hand gestures) and bhedas (bodily movements) from Indian Classical Dance (ICD) into mainstream classroom pedagogy as tools for transformative teaching. Drawing from the vision of India's National Education Policy (NEP) 2020—which advocates holistic, experiential, and culturally rooted learning—the paper proposes a conceptual framework for sowing the seeds of an embodied, arts-integrated methods across school curricula. Rooted in theories of embodied cognition and interdisciplinary learning, the framework uses ICD techniques such as hasta mudras, drishti bhedas, and abhinaya to promote multisensory engagement, enhance emotional intelligence, and foster cultural literacy.

Building on the works of Hanna (2008), Bhargava (2020), and hooks (2003), the study situates ICD not merely as a co-curricular art form but as a legitimate pedagogical language. Literature and experiential insights indicate that ICD supports cognitive development, improves posture and coordination, and strengthens emotional self-regulation—benefits particularly relevant for early and primary education. Furthermore, references to classical texts like Nāṭyaśāstra and Abhinaya Darpaṇa are used to design age-appropriate modules that align with educational goals.

The methodology draws from observational data in ICD classes, practitioner insights, and curricular mapping. The paper outlines structured pedagogical applications for pre-primary to higher secondary levels and suggests practical implementation strategies, including teacher training, time allocation, and curriculum development. It argues that when supported by institutional systems, ICD can create inclusive and joyful classrooms that promote deep learning and community engagement.

Ultimately, the paper offers a culturally resonant, inclusive, and transformative vision for education—where performing arts do not just supplement learning but embody

it. This approach affirms the NEP's call to nurture empathy, creativity, multilingualism, and cultural rootedness through integrated, experiential pedagogy.

Keywords: *Indian Classical Dance, Transformative Teaching, Experiential Pedagogy, Embodied Cognition, Arts-Integrated Education.*

List of Illustrations:

- Fig. 1. *Hasta Bhedas* from *Abhinaya Darpana*
- Fig 2. *Drishti Bhedas* as illustrated in *The Odissi Dance Path Finder* (Vol. 1)

Introduction:

"To bring a spirit of study to learning that takes place both in and beyond classroom settings, learning must be understood as an experience that enriches life in its entirety."

— bell hooks (hooks, 2003, p. 43)

As per the National Education Policy (NEP) 2020,

Learning Should be Holistic, Integrated, Enjoyable, and Engaging...

4.6. In all stages, experiential learning will be adopted, including hands-on learning, arts-integrated and sports-integrated education, story-telling-based pedagogy, among others, as standard pedagogy within each subject, and with explorations of relations among different subjects...

4.7 As a part of the thrust on experiential learning, art-integrated education will be embedded in classroom transactions not only for creating joyful classrooms, but also for imbibing the Indian ethos through integration of Indian art and culture in the teaching and learning process at every level. This art-integrated approach will strengthen the linkages between education and culture....

4.12. As research clearly shows that children pick up languages extremely quickly between the ages of 2 and 8 and that multilingualism has great cognitive benefits to young students, children will be exposed to different languages early on (but with a particular emphasis on the mother tongue), starting from the Foundational Stage onwards.

(National Education Policy 2020)

The NEP 2020 with its emphasis on multimodal learning and emphasis on Sanskrit and Classical languages envisions holistic, experiential, and integrated learning that nurtures not only cognitive development but also cultural rootedness and emotional intelligence. It advocates the use of performing arts, storytelling, and experiential methods to enhance engagement, deepen learning, and promote multilingual exposure during the formative years (Ministry of Education, 2020). The rich oral

tradition of Indian Performing Arts has a repository of training modules that enhance the experience of a student across disciplines and scope.

In today's fast-paced educational environment, where attention spans are shrinking and content overload is common, educators are increasingly seeking innovative, embodied, and inclusive pedagogical tools. Indian Classical Dance (ICD), with its rich tradition of expressive gestures (*mudras*), structured movements (*bhedas*), and lyrical language, offers one such untapped tool that aligns seamlessly with NEP's vision. As students learn ICD, they also encounter Sanskrit shlokas, emotion-centered expressions (*bhava*), and symbolic thinking—skills that extend beyond artistic performance and contribute to deeper cognitive and linguistic development. Traditionally perceived as a co-curricular or hobby activity, ICD is now gaining renewed relevance as a pedagogical medium. With the formal inclusion of theatre-in-education and art-integrated methods in mainstream pedagogy, the integration of ICD is not only feasible but pedagogically powerful. If incorporated into the curricula with measured intention and equipped with a trained faculty, students can learn to use gestures and signs of a more universal, inclusive language. This paper argues that embedding ICD techniques in classroom instruction—from early childhood to higher secondary levels—can facilitate measurable transformative learning. The approach bridges academic content with creative exploration, supports multisensory engagement, and promotes cultural literacy alongside core skills such as coordination, memory, emotional regulation, and collaboration.

Literature Review:

The role of dance as a nonverbal language in education has been powerfully established by Judith Lynne Hanna (2008), who argues for its legitimacy as a complex cognitive and communicative tool. Drawing from interdisciplinary research, she shows how dance engages multiple intelligences, including bodily-kinesthetic, interpersonal, linguistic, and spatial domains. Hanna highlights dance's potential to enhance symbolic thinking, critical reasoning, and emotional expression, positioning it as a form of embodied cognition that makes abstract ideas more accessible to learners. Her work validates the incorporation of movement-based learning within K–12 settings and reinforces the argument for ICD's inclusion as an educational resource. Complementing Hanna's cognitive framework, Bhargava (2020) explores the therapeutic and expressive potential of *mudras*, showing that children aged 7–11 exhibited improved emotional regulation, self-expression, and body-based coping when engaged with gesture-based movement therapy. This supports the idea that even simple elements of ICD—such as hand gestures—can promote emotional and psychological well-being when integrated into educational settings. In *Teaching*

Community: A Pedagogy of Hope (2003), bell hooks puts forth a compelling argument of transformative education by emphasizing the role of community, emotional connectedness, and mutual respect in the learning process. She envisions a pedagogy rooted in compassion, inclusivity, and cultural relevance where the emotional, spiritual, and intellectual needs of students are integrated into their academic journey.

This paper is structurally inspired by the article 'Integration of Performing Arts in Education to Ensure Joyful, Retentive and Transformative Learning' by Agarwal & Verma (2023), which serves as a foundational model for organizing key themes around the integration of Indian Classical Dance (ICD) within educational frameworks. Agarwal & Verma emphasize the role of performing arts—specifically music, dance, drama, and puppetry—in enhancing classroom engagement and fostering creativity among students. Building upon this approach, the present study adopts a similar interdisciplinary lens, framing ICD as both a pedagogical and transformative tool. By situating ICD within the broader scope of arts-integrated education, the study aims to demonstrate how traditional performance forms can be effectively mobilized to ensure joyful and retentive learning experiences that move beyond rote memorization.

In addition to this structural and thematic alignment, the paper also incorporates the insights of Totaram (2024), who proposes that ICD can be used for therapeutic and creative processes through kinesthetic empathy. Extending this proposition, the authors argue that foundational classical texts such as the *Natyashastra* and *Abhinaya Darpana* already outline pedagogical frameworks conducive to the gradual integration of ICD into the curriculum. These texts offer detailed guidance on gestures (*mudras*), movement vocabulary, and expressive techniques, which can be aligned with modern movement-based therapies. Basu (2024) further supports this by highlighting how specific facets of ICD—such as postures, *abhinaya* (expression), and structured movement—can serve as powerful tools in movement therapy, thereby bridging the domains of education, wellbeing, and cultural knowledge.

The use of gestural and somatic language allows for a liberty of not only expression but also physical movement. It is no secret that physical mobility during early childhood engenders better joint and bone health in later years. ICD also instills a certain sense of discipline through the codification of the movements. As seen in the practice of yoga, movements (*asanas*) and *mudras* benefit the overall health of practitioners across ages. In relation to school children, there are studies that discuss the role of physical activity in creating more engaged learners. González-Devesa et al. (2025), through a meta-analysis of preschool dance programs, find that early

dance exposure significantly improves fundamental motor skills, especially posture, coordination, and neuromuscular readiness—skills that are directly relevant to the motor development goals of early education. In the context of ICD, traditional postures like *aramandi*, *murumandi* (Bharatnatyam), *abhanga* or *chauka* (Odissi) in early-school curricula can serve not only artistic but developmental purposes, enhancing balance, spatial orientation, and tactile awareness.

Moreover, Deekshitulu (2020) and Katz-Buonincontro et al. (2020) contribute evidence that performing arts—particularly mudra therapy and drama-based instruction—help learners manage anxiety, enhance emotional awareness, and improve gestural language comprehension. These findings, along with Mehling et al.'s (2017) research on facial emotional recognition in children with autism through theatre practices, collectively underscore the inclusive and therapeutic value of integrating performing arts into general education. Together, these studies affirm the authors' core proposition: when performed with structured, age-appropriate guidance, the techniques of ICD can enhance cognitive, emotional, linguistic, and physical development. Importantly, this pedagogical shift not only promotes academic performance but also nurtures empathy, cultural appreciation, and self-confidence—core elements of holistic education envisioned by NEP 2020.

Methodology:

This paper adopts an experiential and observational methodology rooted in practice-based insights from institution-based dance classes where Indian Classical Dance (ICD) is taught. It combines insights from autoethnographic observation, curricular engagement with Indian Classical Dance (ICD), and conceptual mapping of pedagogical possibilities that align with India's National Education Policy (NEP) 2020. Drawing from longitudinal classroom experiences and anecdotal data, the authors propose that certain ICD techniques—particularly *mudras* (gestural signs), *bhedas* (bodily movements), and recitation of Sanskrit shlokas—are hugely beneficial to early years of development. When applied in lessons across primary, middle, and secondary education, these ICD tools would improve behavioral, cognitive, emotional, and motor skill responses among students, even for traditional content.

The literature indicates that students exposed to arts-based pedagogy showed higher levels of engagement, retention of abstract concepts, improved posture and body awareness, and increased enthusiasm for traditional subjects like language or science. Application of the same tools with a cultural backing will inculcate a sense of community and belonging, along with a new language of self-expression. This paper posits a need for a systematic study of embodied learning frameworks in education with ICD tools to open possibilities for future empirical evaluation.

Conceptual Framework:

The pedagogical model proposed here draws on the theory of embodied cognition, which asserts that knowledge is constructed not only mentally but also through physical experience and movement. This model is further strengthened by an oral tradition of initial rote learning that was seen commonly in the traditional pedagogy of ICD. The elements enumerated and elaborated in the *Abhinaya Darpana* can be utilised systematically to build the language of *abhinaya* (acting). This paper takes certain primary training modules from Nandikesvara's seminal work to create a slow familiarity to the text.

Starting at the pre-primary level, students are introduced to everyday concepts such as animals, plants, and greetings through mudras and Sanskrit shlokas, which enhance tactile awareness, pronunciation, and symbolic understanding. In primary education, viniyogas (applications of gestures) and simple *bhedas* such as *drishti* (eye) and *griva* (neck) movements are used to build fine motor skills and improve concentration. The integration of rhythmic movement helps counterbalance increased screen exposure and sedentary habits. As students progress to secondary levels, dramatization and enactment of stories, including mythological narratives and historical episodes, serve as vehicles for internalizing abstract academic content such as scientific principles or historical timelines. In higher secondary education, the pedagogy evolves to collaborative performance projects—such as group choreography and storytelling through navarasa (nine emotions)—which reinforce advanced skills in language, emotion, and interpretation.

This conceptual paper proposes that integrating ICD techniques into daily classroom instruction can serve as an age-appropriate, transformative learning model aligned with the goals of NEP 2020. By gradually exposing students to the nonverbal language of dance, starting from foundational learning stages, the curriculum fosters the following educational outcomes:

- Enhanced cognitive flexibility and symbolic reasoning
- Stronger vocabulary in Sanskrit and regional languages
- Improved speech articulation and phonetics
- Cultural literacy and appreciation for Indian traditions
- Stronger self-confidence, emotional regulation, and creativity
- Development of psychomotor coordination, balance, and posture
- Increased participation from introverted or inhibited learners
- Fostering more inclusive safe spaces

This proposal supports the broader aim of making learning joyful, holistic, and rooted in Indian knowledge systems, while simultaneously preparing students with 21st-

century learning skills. It aims to create a more democratic, community-based pedagogy that instills life-skills and cultural belonging.

Pedagogical Applications:

1. Pre-Primary and Primary Education

Using hasta mudras for storytelling allows children to engage in visual-tactile learning. This can be incorporated for rhymes, games, sing-along and similar language activities. The use of symbolism in varied contexts will also present the learners with the opportunity to be openly imaginative.

For example:

Mudra	Symbolizes	Educational Purpose
Mayura	Peacock	Animal identification
Tripataka	Tree	Nature awareness
Kapittha	Bird	Exploring fauna
Ardha Chandra	Moon	Introduction to celestial objects
Padmakosha	Fruit	Visualizing nutrition, health
Simhamukha	Lion	Introducing wildlife and mythology

Manomohan Ghosh's (1957) translation of the *Abhinaya Darpana* carries an illustration of the enlisted *asamyukta* and *samyukta hastas* (single and joined hand gestures) as follows (pg. 73 to 79) (fig. 1):



Fig. 1. Hasta Bhedas from *Abhinaya Darpana*

2. Middle School

Students are introduced to *bhedas*, which develop concentration and awareness. These become bases of vital lifelong exercises which strengthen mobility. Each movement is paired with Sanskrit verses, enhancing both linguistic skills and motor learning. The specific movements can be useful as follows:

- Drishti Bhedas (Eye Movements): Improve visual tracking and focus.
- Griva Bhedas (Neck Movements): Address posture and reduce screen fatigue.
- Chari Bhedas (Leg and Walk Patterns): Help teach differences in animal/character locomotion or historical reenactment.

The Odissi Dance Path Finder, Volume 1 (Misra, N., et al. 1988) has detailed illustrations of these *bhedas* and other movements, an example of which is included here (pg. 33) (fig. 2).

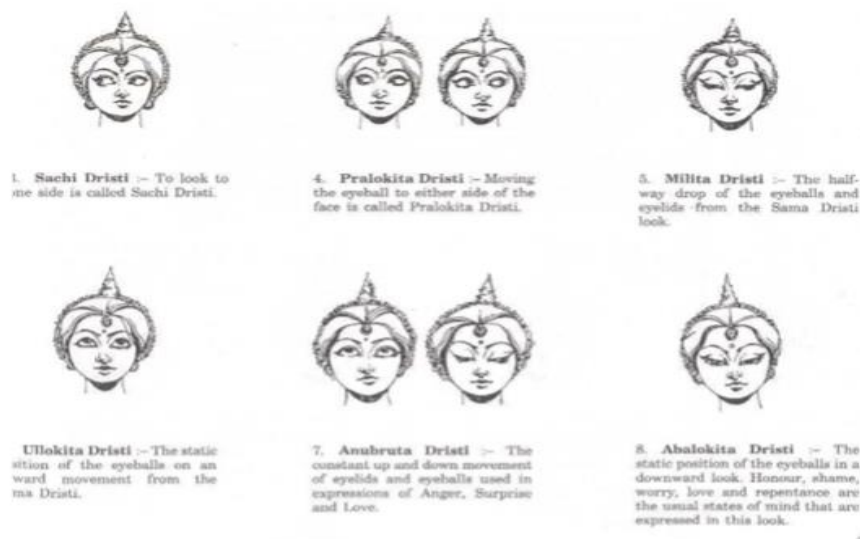


Fig 2. Drishti Bhedas as illustrated in *The Odissi Dance Path Finder* (Vol. 1)

3. Secondary and Higher Secondary

Secondary students explore myriad range of hastas for elaborated enactments:

- Devahasta- to symbolise the various gods and goddesses
- Dashavatarhasta- to learn the storytelling of the evolution
- Jatiyahasta- to showcase the hierarchies of caste inequality
- Bandhavhasta- to indicate relationships like spouse, mother, father, siblings etc.
- Navgrahahasta- for cosmic elements and other mythological figures, linking movement with spiritual symbolism, storytelling and history.

These hastas with layered meanings will promote an understanding of contextual usage and relativity. Activities such as storytelling, dance-drama enactments, and staging events like the Dashavatara or Navadurga encourage collaboration, creative

expression, and historical-cultural immersion. They also allow for the exploration of self and identity through somatic senses and semiotics. The application of ICD extends to mainstream subjects like geography, science and social science as well. Performing arts have the unique potential to creatively interpret and embody a wide spectrum of subjects—ranging from the minutiae of an atom to the grandeur of a mountain.

Implementation Needs:

There is compelling evidence to support the integration of Indian Classical Dance (ICD) elements into school curricula, as such inclusion has the potential to benefit learners on multiple levels. Beyond its artistic value, ICD serves as a dynamic medium through which foundational academic concepts can be taught in more engaging and memorable ways. Its emphasis on rhythm, pattern, coordination, and expression naturally aligns with interdisciplinary learning, while also fostering emotional intelligence, focus, and bodily awareness. Furthermore, the practice of ICD contributes significantly to both physical and mental wellbeing, offering students an outlet for self-expression, stress relief, and holistic development.

Despite its immense potential, ICD remains an underutilized wellspring of embodied knowledge within mainstream education. Rooted in centuries of cultural and philosophical insight, this performative tradition offers a unique repository of pedagogical and therapeutic possibilities. To ensure its continued relevance and impact, it is essential that ICD be transmitted to future generations through well-structured and thoughtfully designed educational frameworks. Laying a strong foundation in schools can not only preserve these classical forms but also enable learners to access their transformative power in ways that are meaningful and contextually appropriate.

This paper suggests a few ways in which the groundwork be laid fruitfully—

- **Teacher Training:** Generalist teachers need orientation in basic ICD tools or support from visiting performing arts educators. They may be engaged in Development Programmes and Short Term Programmes for capacity building.
- **Time Allocation:** Dedicated weekly slots or theme-based integration (e.g., during language, social science) are recommended. In keeping with the national credit framework, a recommended percentage of time in the modules be fixed for art-based activities.
- **Community Support:** Parents, like teachers, must be sensitised to such nonverbal languages through workshops and events. Parent and teacher involvement is crucial for implementation and for organizing performances or

exhibitions. The idea of a multimodal education is to bring the community together.

- **Curriculum inclusion:** At the level of planning, experts of ICD and art-based pedagogy should be engaged in the creation of curricula. Conducting a pilot study will help assess both the effectiveness and the practical implementation of the proposed modules, ensuring they function smoothly in real-world educational settings,
- **Funding:** Modest resources are required for the training and equipment of ICD tools. The transformative impact of this renewed knowledge can be brought to fruition only if the systems and structures are in place. Teachers and trainers need the institutional funds to allow for designated areas for movement, mobility and practice. Although major events and exhibitions can be funded through the schools' art or annual day budgets, regular expenses for this novel pedagogy will need to be handled dedicatedly.

Conclusion:

As India charts a path towards educational transformation through NEP 2020, integrating Indian Classical Dance into pedagogy offers a compelling, culturally rooted strategy to engage the whole learner—mind, body, and spirit. ICD techniques like *mudras* and *bhedas*, especially through *abhinaya*, provide a language of learning that is inclusive, expressive, and deeply resonant with Indian epistemologies. When applied through age-appropriate, curriculum-aligned frameworks, and with the desired structural support, this embodied pedagogy has the potential to boost academic growth, emotional development, and cultural rootedness. It offers a sustainable way to revitalize classrooms and ensure that learning is not only informative, but truly transformative.

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ENCOURAGING CRITICAL THINKING AND SOCIAL RESPONSIBILITIES IN LEARNERS

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Abstract:

Literature imbibes profound learning for development of comprehensive outlook which will assist for shaping out future of nation. Youth of this nation shouldn't be judgmental about the concepts like anthropological, ethical, cultural, historical, political and literal. A miss-conceptual person never will be worth surviving in this relentlessly fastening world. For nurturing an impartial perspective and belief system, critical thinking assists appropriately. Social responsibilities of this nation should be entrusted on the strong shoulders of this youth, learning in our schools, colleges, and universities. For this build up, perfection in thinking and cognitive process, critical thinking should be encouraged. If a person can differentiate between various concepts, base lines, fundamentals and norms, formation of opinions and thinking set becomes easy to comprehend. In this world, full with fake and illusive promises, evasive narratives, biased opinions, pretentious talks, a rational mindset having well calculative approach will never lose a ground. So, deliberate development and cultivation of critical thinking should be owned as a part of our academics. When in the classrooms, our learners have been listening such studious discussions on variety of subjects and reforming their cognitive into meta- cognitive, it will be the real success of our education system. We, as their guides, teachers and masters, have to inculcate essentiality of full-fledged thinking which will never allow our disciples to move from the rightful path, although less trodden. For successful voyages, hurricanes should be faced and dealt out with patient learning and thoughtful teaching. Worldly philosophers like Socrates, Descartes, Dewey, Bacon, also claimed supremacy of critical thinking over anything else. When our learners get the power of interpretation of what is served to them? they will never be on the shallow waters. As we imagine our future, we imagine our future leaders also and the heritage we carry till the date, will be entrusted to them without ounce of hesitation. Now to shoulder this responsibility, they should be disciplined in verdicts, impartial in sentiments, and critical in impression.

These qualities will make them a person with iconic caliber to take care of the age old heritage and not to be biased with anything.

Keywords: *Self correction, critical thinking, impartial outlook, logic, discipline.*

Introduction:

Literature of any language becomes so knowledgeable, radical, precise, competitive, and a guiding light for those who are novice to this fields. So, it becomes the need of hour to encourage critical thinking in our learners and make them aware about their future responsibilities as the pillars of the nation. For the guiding light, we have to take patronage in the ancient domains of knowledge spread all over the world. So, while thinking over polishing our thinking abilities, we should be rather universal in disposition. Progression of our journey should be from classical to modern, from scattered to a composed one, from half verified to the authentic version. Such antidotes may remove disparities and efficiently bring a sorted sense in our learners. Further, when they will be in the authority chairs, critical thinking may provide them with the firmness of thinking and selfless verdicts. For deeper understanding of human history and nature, texts embellished in allegory and symbolism, understanding paradoxes and ironical trends, faculty of criticism helps sharply. Francis Bacon, the sixteenth century renaissance scholar and the father of English Essays, once quoted about the same,

“Critical thinking is a desire to seek, patience to doubt. Fondness to meditate, slowness to assert, readiness to consider, carefulness to dispose and set in order; and hatred for every kind of imposture.”¹

Even our education system goes under sea changes to integrate critical thinking as a wholesome part of today’s learning system. National Education Policy introduces thought provoking subjects like Creative Writing, Indian Knowledge System, and Basics in research, and Opportunities in Tourism, Entrepreneurship and Start-Up etc. For providing proper encouragement to our learners and making them efficient in earning their livestock is a purpose, no doubt, but to make them accomplish in critical faculty to stuff their young minds with affirmation and strength is also included. This will be the creative tool to make them responsible citizens of the largest growing economy. For bringing total transformation and progressive vision, to boost capacity building in our youth is a thing to be prioritized in the first place.

Classical critics built up the theories, provoking faithful dissection to curtail down what is unconventional and out of context. Such thoughtful discourses traveled through the time and space to make us acquainted with the old time Athenian courts, squares, which were crowded with the masters like Socrates, Plato, Aristotle, the trio of master – disciple tradition. People were patiently listening the painstaking efforts poured to build up the theories and tend to infiltrate such discussions in their

memories to consolidate their conscious with the incredible vouches. The classic Greek civilization made a special province for criticism and the masters.

Socrates, the uncrowned king of this province, put the foundation stones of this multi-gabled structure with his unique method of "Questioning". To the young minds, he provided with a strict training of this method to rule out all contradictions and to care for relevancies embedded. Plato, his disciple and the great critic himself quoted, "The death sentence handed down to him would guarantee that he would be known to history as a heroic figure, who died for the "crime" of thinking for himself and for encouraging others to do likewise." ²

Socrates vouched vastness of knowledge and need of logic and reasoning. Through the investigation, contradictions and irrelevancies can be eliminated for the formation of solid and consolidate learning. To weed out incongruities and inconsistencies, for better understanding approach, questioning is necessary. To answer one's own thinking, reasoning and studious justification free from colored views, matters a lot. Everyone is purely dependent on knowledge when it comes to justification. For obtaining an unbiased and just standpoint and progressing towards healthy understanding, we have to formulate our questioning system likewise. The person with zero questioning, according to Socrates, is out of logic and reasoning. For more exploration of knowledge province, raising the fundamental questions and seeking their reasonable and logical answers to know the nature of reality, philosophy of questioning makes the verified sense. So. Socrates, the pivotal figure of Ancient and Greek philosophy adds the perk in the history of criticism. As he enunciated the wheel of knowledge, it speeded to reach to the existing time too. His unique style to ask the probing questions which were evenly open ended and carefully stimulating critical thinking is even applicable in today's teaching –learning system. The journey we prepare till this time, is full with multiple references regarding diversified fields and disciplines. To some masterpieces, mainly political in instinct, shaping the world history and striking us with what is faithful to the facts? We can apply the questioning theory popularized by Socrates to the popular literary genres, political allegory. Social –political-religious satires, allegories, symbolisms, ironical anecdotes are serving a great purpose for to be critical and not judgmental. The purpose of such satires are not ridiculing mere follies and mistakes of society but to bring positive and affirmative changes. Before fading out the echoing guffaws, the readers or learners become contemplative and meditative about the reforms.

George Orwell's "*Animal Farm*", 1917, summing up the events providing a strong boost to Russian Revolution, stands out as a political allegory fixing an ultimate benchmark in such kind of writing. The novel keeps relevancy with the time and

nature of all time politics. Manor Farm is owned by Mr., Jones, an alcoholic farmer. Old Major, a boar, organized a conference and intended to overthrow human masters. Snowball and Napoleon, two young pigs commanded the revolt and drove the master out of the field. Now, they are the masters and managers of the field. They accepted "Seven Commandments", animals are not going to wear clothe, drinking alcohol is banned, a cozy bed shouldn't be used by animals, creatures having two legs will be enemies, four legged will be friends without hesitation, killing other animals will be against the rules of animalism, the last of which is the most celebrated one, "All animals are equal."³

The atmosphere of the farm is so plentiful and exotic in the initial days. The green flag is fixed as the symbol of freedom. The pigs are the leaders. Snowball proclaims his manifesto to build up the windmills for modernization of the farm. Napoleon protests against and makes his dogs to chase Snowball to make him out of breath. Now, sitting as a supreme commander, Napoleon, claims the credit of windmill and modernization. Due to deadly accident of windmill, Napoleon convinces his animals that it was an attack of his rival, Snowball. "Beasts of England" becomes a new anthem of Animal Farm. Animals face hardship but Napoleon pacifies them ultimately. Mr. Fredrick, neighbor to Animal Farm members, attacks windmill and in this fatal assault, Boxer, a horse, is inflicted with major wounds. Benjamin, a donkey, warns animals about this loss. Squealer reports Boxer's death and to honor him, he declares a festival. In reality, Napoleon betrays Boxer for money and liquor. With the passing years, true and loyal animals get easily forgotten and new facilities are enjoyed by all. Animals who participated in the rebel are dead or out of system due to old age. Pigs mimics humans and walk upright, consuming alcohol, wearing nice cloths, sleeping in cosy beds, already killed their farm mate animals, considering two legged better, the green flag was replaced with plane green banner and the most important modification is done with the seventh commandment,

"All animals are equal but some animals are more equal than others."⁴

Now, Napoleon readily makes peace with the neighboring farmers and befriended with them which is strictly opposite to his maxims. As a friendly gesture, he organizes a dinner party with the farmers but selected animals are invited and others are left to watch them distantly. The old name of the farm is being restored and men and pigs started to play the cards. The animals watching from distant, now, can't recognize the difference between men and pigs.

All maxims commemorating the unity and brotherhood have been superseded by the maxims serving the personal interests of the people in boss chair. Animal Farm has been portraying the politics of whole world in microcosm. When the learners

investigate the novella to understand loopholes of current politics and history, questioning philosophy fulfills the purposes of our study. When they form a questioning body regarding knowledgeable understanding of leading facts regarding international affairs and world politics, they can get better insight into hypocrisy of fake leaderships. To whom our youth is going to accept as their masters and leaders and worshipping their ideologies, they will take it as a time to introspect. So, by keeping Socrates' questioning philosophy at the central one, we make our learners theist about verified belief system not charged with any trait of skepticism.

For our learners, how our world economy has been running? It is a thing to introspect over. As we are moving in the globalized village, trends in economy should be interpreted. No boundaries segregating us in various nationalities and ethnicities exist now. Universal citizenship is a household concept to follow up. Modern approaches binding voluminous critical theories are imbued with inspirations supplied from past. Capitalism, Socialism, Communism, are progressed over the time to meet the need of time in turn. These critical approaches are ruling all over the world as some countries are accepting capitalist economy, some other are making pace with socialism and some are with communism. Karl Marx, the father of Marxist Theory lashed capitalist tendencies relentlessly in his celebrated writings, *Das Capital* and *Communist Manifesto*. He blamed capitalist mindset for creating a deep chasm in society, haves and have's not. Industrial revolution set the whole world in the space of the widest workshops. People controlling capital formed a syndicate, the upper class and the labors toiling ceaselessly were forming the class, working class. The leaders like Karl Marx led the campaign with wit and wisdom but some discrepancies were left and the war against capitalism lost the ground. Communism arguing for the total control of properties by the governments and the citizens would be catered with the day to day needs were not also a concept to come up in with common agreement. China and Russia like countries are supporting and following the philosophy of communism. The United States of America, Australia, Switzerland and Singapore like countries are believing in Capitalism's principles. How do capitalist economies work? And in which space, Communist economies make the sense are the questions making sense for the youth, the learners. But the most applauded type of governance is democracy and in this system, total power is owed to the populace. If it is not recognized by them, then manipulation and ultimate exploitation will be the definite repercussions. So, citizens of democratic country should be in a way critical about the practices and policies regulated by the government. The slender book of civics science may help our learners to be analytical and creatively critical about our governing bodies.

The most ancient type of teaching moral lessons and make the listeners keen and vigilant is fable stories, as they are very simple to analyses and comprehend the real meaning. To encourage critical thinking in children, the stories are told and even incorporated in our scriptures too. Since the childhood, we listen the stories and entangle the meaning and thus will be efficient learners. *Aesop's Fables* in western context and *Panchatantra* stories in Indian panorama are the ultimate examples of dispensing morality and ethical values among children. So, they can become capable in recognizing the thin line between virtues and vices. The thin lines of discriminations imbibe life values and capacity to identify evils. Such kind of encouragement works on di- folded levels, make them critical in thinking and socially responsible. So, the learners learn how to be the innovators, pathbreakers and leaders. Through small stories and animal characters, the stories become easy to understand and easily placed in the selves of our brains. Our predecessors were very intellectual in disposition and did know how to develop our sub- conscious mind to sustain more in life? The strategical learning won the race and fables became indivisible part of our culture and tradition. In nursery rhymes, we listen the tuned fables stories and although everything will be forgotten in the course of time, the melody of these rhymes and one liners staye orchestrated with our fond memories and keep us warned about any wrongdoings. This is the good vibe energy, critical thinking. In short maxims, easy to remember manner, moral message is delivered and now the ball is in their court, how to take out the real meaning hidden under the surface level. So, the faculty of critical thinking is being introduced in the early age when human brain is magnificently receptive by nature, as stated by the scholars of psychoanalytic.

Theaters are also playing a pivotal and substantial role in making audience critical in thinking. Throgh their performers, actors are playing various roles and audience appreciate the performances. French actor, Antonin Artaud coined the term, "Theatre of Cruelty", which liberally talks about unfettering human subconscious from the traditional theatre in which an audience played a passive role and accepting everything which has been served to them by the performers. Antonin Artaud, the founder, played with a new thought that an audience should not come for the sake of entertainment only. They should criticize the performances and should take some moral lesson, should segregate between good or bad. He refuted the traditional idea that 'Nothing is beyond text and heavy dialogues". Instead he emphasized the physical expressions, gesturer, sounds, and lights to enhance text and bring the audience into the performance. Assaulting the senses of audience helps to separate them from their repressions. He asserted theatre does mean by gestures, sounds,

screams, lights, and darkness/ black out and words. If the things are left for critical thinking, audience will feel their responsibility to read between the lines for the sake of more awaken society.

All research regarding improvisation of critical thinking and learning experiences are intended of making critical thinking as just a normal and natural gesture in today's education system. Researchers are continuous in framing their theories regarding theories and this absolute input of encouragement for critical thinking will be for the ultimate goal of inculcating social responsibilities among our learners.

Dewey rightfully stated that,

" ..It is.. the business of education .. to cultivate deep –seated and effective habits of discrimination tested beliefs from mere assertion , guesses, and opinions; to a lively sincere and open minded preferences for conclusions that are properly grounded, and to ingrain into the individual's working habits ,methods of inquiry and reasoning appropriate to the various problems that present themselves. The formation of these habit is the Training of Minds."⁵

Conclusion:

In the present research paper, the prime emphasis is given on the capacity building abilities of the learners through the instrumental tool of encouragement to critical thinking. For bringing total transformation in the learning experiences, bottom to top changes should be stemmed out. Training and disciplining of mind in the direction will facilitate in a substantial way. Future will be more demanding and assertive in all sectors of knowledge oriented sectors. So, to fortify our future brigade in curative measures, inductive and deductive methods, grounded attitude, all inclusive approach, balanced cognitive, sensible verdicts and justified in arguments will be the moral and ethical responsibility of old wizards of the field education.

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**AWARENESS ABOUT POCSO ACT AMONG TEACHERS AND PARENTS OF
CHILDREN AGED 8 TO 17 YEARS IN MUMBAI**

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Abstract:

The Protection of Children from Sexual Offences (POCSO) Act, enacted in 2012, is a comprehensive legislation in India aimed at safeguarding children from sexual abuse. This study investigates the level of awareness about the POCSO Act among two crucial stakeholder groups—teachers and parents of children aged 8 to 17 years in Mumbai. Employing a descriptive quantitative methodology, data were gathered from 575 respondents, comprising 265 teachers and 310 parents from various school boards (State, Central, and International). Structured questionnaires were used to assess knowledge on two fronts: general awareness about the POCSO Act and understanding of child sexual abuse.

The analysis, conducted using t-tests and critical ratio tests at the 0.05 significance level, revealed no significant difference in awareness levels between teachers and parents, nor among sub-groups based on age, gender, or school board. However, pre-service teachers were found to possess significantly higher awareness than in-service teachers. Overall, both parents and teachers demonstrated moderate levels of awareness, but there remains a critical gap in comprehensive understanding and implementation of the Act's provisions.

The findings highlight an urgent need for systemic awareness initiatives. Schools should incorporate legal literacy regarding child protection into teacher training programs and orientation sessions for parents. Regular workshops, sensitization drives, and policy reviews should be instituted to enhance practical understanding of the Act. Additionally, integrating age-appropriate legal awareness into the school curriculum can empower children while reinforcing the roles of educators and caregivers as proactive protectors. This study underscores the shared responsibility of schools, families, and policymakers in creating safer environments for children.

Keywords: *POCSO Act, Child Protection, Awareness, Teachers and Parents, Sexual Offences.*

Introduction:

The Protection of Children from Sexual Offences (POCSO) Act, enacted in 2012, is a vital legal framework in India designed to safeguard children from sexual abuse and exploitation. It ensures child-friendly procedures during investigation and trial, emphasizing the importance of protecting the rights and dignity of minors. For this law to be truly effective, it is crucial that those closest to children — particularly teachers and parents — are fully aware of its provisions. Their understanding and vigilance can play a pivotal role in prevention, timely intervention, and ensuring a safe, nurturing environment for children in both schools and homes.

Significance:

The decision to explore awareness of the POCSO Act among teachers and parents stems from the crucial role these stakeholders play in a child's safety and well-being. Despite the existence of a strong legal framework, rising cases of child abuse indicate a possible gap in awareness and understanding. Teachers are often the first to observe behavioural changes in children, while parents are the primary caregivers. If either group lacks knowledge about the Act, it could delay action or support. This study was undertaken to assess these awareness levels and highlight areas needing attention to strengthen child protection mechanisms.

Objectives of the Study:

1. To study overall awareness about the POCSO Act among:
 - a) Teachers of children aged 8 to 17 years in Mumbai.
 - b) Parents of children aged 8 to 17 years in Mumbai.
2. To find differences in awareness about POCSO Act between teachers and parents of children aged 8 to 17 years in Mumbai.
3. To find differences in awareness about POCSO Act between teachers based on:
 - a) Age
 - b) Gender
 - c) Status of teaching
 - d) Board of Teaching
4. To find differences in awareness about POCSO Act between parents based on:
 - a) Age
 - b) Gender
 - c) Board

Hypotheses of the Study:

1. There is no significant difference in awareness about POCSO Act between teachers and parents.
2. There is no significant difference in awareness about POCSO Act between teachers based on:
 - a) Age
 - b) Gender
 - c) Status of teaching
 - d) Board of Teaching
3. There is no significant difference in awareness about POCSO Act between parents based on:
 - a) Age
 - b) Gender
 - c) Board

Tool Used: To study the awareness about POCSO Act among teachers and parents of children aged 8 to 17 years in Mumbai, the primary data collection tools were structured questionnaires designed separately for parents and teachers. The questionnaires were designed with reference to the questionnaire used by Shwetha Prabhu, Savitha Prabhu and Flavia Noronha for their article titled 'Knowledge of child sexual abuse and attitudes towards reporting it among teachers and parents of children studying in selected primary schools of Udupi Taluk, India', published by Egyptian Journal of Forensic Sciences; and questionnaire used by Afzal Haroon & Kashif Ali for their research article titled 'Assessment of Knowledge and Attitude about POCSO Act among Medical Interns: A Questionnaire based Study', published in Indian Journal of Forensic Medicine and Toxicology. Each questionnaire consisted a total of 38 questions divided majorly into of two sections:

1) Awareness about POCSO Act and 2) Awareness about Child Sexual Abuse. Responses were collected using both online and in-person methods to maximize participation.

Sample Size and Composition:

DATA COLLECTION COUNT							
	GENDER	BOARD					TOTAL
		SSC	CBSE	ICSE	IGCSE	HSC	
Parents	Male	35	20	19	18	14	106
	Female	53	33	37	36	45	204
Teachers	Male	30	17	18	21	0	86
	Female	67	32	44	36	0	179
TOTAL		185	102	118	111	59	575

Sampling Technique: For the present study, the researcher has used the descriptive method of the quantitative type and the researcher randomly selected 575 participants (310 parents, 265 teachers) of age ranged from 20 to 60 years belonging to State Board schools (147 parents, 97 teachers) , Central Board schools (53 parents, 49 teachers) and International Board schools (110 parents, 119 teachers) of Mumbai. After the appropriate instructions, the questionnaires were filled by the required teachers and parents under the supervision of the researcher. To study the awareness of POCSO Act among teachers and parents of Mumbai, critical ratio test was applied at 0.05 level of significance.

Table of Scoring Pattern: A structured scoring pattern was used to assess awareness levels, wherein every correct answer was awarded 1 point and every wrong answer was given a 0 point. The total awareness score was summation of all correct and wrong responses. Respondents were categorized based on their awareness levels: 1) Low Awareness: 0 to 12 marks 2) Moderate Awareness: 13 to 25 marks 3) High Awareness: 26 to 38 marks.

Low Awareness	Moderate Awareness	High Awareness
0 – 12 marks	13 – 25 marks	26 – 38 marks

Analysis of Data:

In the present study t-test was applied at 0.05 level of significance to compare awareness about POCSO Act between teachers and parents based on their roles, among teachers based on age, gender, status of teaching and board of teaching, among parents based on age, gender and the board their child is studying in. Along with that Mean, Standard Deviation was calculated for better interpretation and understanding of the data. Data analysis was performed using the Microsoft excel application which comes under the Microsoft office program.

Hypothesis 1: There is no significant difference in awareness about POCSO Act between teachers and parents.

Table 1: Relevant Statistics of mean scores of awareness about the POCSO Act among the teachers and parents of children aged 8 to 17 years.

Relevant statistics of mean scores of awareness about POCSO Act between teachers and parents of children aged 8 to 17 years in Mumbai									
Hy	Groups	N	df	Mean	SD	SEd	t (cal)	t (tab)	L. of Sign.
1	Teachers	265	573	19.29	3.18	0.26	0.5	1.984	NS at 0.05
	Parents	310		19.42	3.09				

From the preceding table, it is evident that the calculated t-value is 0.5, which is not significant at 0.05 level with $df = 573$. It reflects that mean scores of awareness about POCSO Act among teachers and parents of children aged 8 to 17 years do not differ significantly. In this context the null hypothesis that there is no significant difference in awareness about POCSO Act between teachers and parents is accepted. Further the mean score of awareness about POCSO Act among teachers is 19.29 which is not significantly higher than the awareness about POCSO Act among parents whose mean score is 19.42.

It may therefore be said that teachers were found to possess not significantly higher awareness about POCSO Act as compared to parents.

Hypothesis 2 a): There is no significant difference in awareness about POCSO Act between teachers based on their age.

Table 2 a): Relevant Statistics of mean scores of awareness about POCSO Act among teachers based on their age.

Relevant statistics of mean scores of awareness about POCSO Act between teachers of different age groups									
Hy	Groups	N	df	Mean	SD	SEd	t (cal)	t (tab)	L. of Sign.
2. a)	20 - 40 years	157	263	19.38	3.19	0.39	0.56	1.984	NS at 0.05
	40 - 60 years	108		19.16	3.17				

From the preceding table, it is evident that the calculated t-value is 0.56, which is not significant at 0.05 level with $df = 263$. It reflects that mean scores of awareness about POCSO Act among teachers of age group 20-40 years and teachers of age group 40-60 years do not differ significantly. In this context the null hypothesis that there is no significant difference in awareness about POCSO Act between teachers based on their age is accepted. Further the mean score of awareness about POCSO Act among teachers of age group 20-40 years is 19.38 which is not significantly higher than the awareness about POCSO Act among teachers of age group 40-60 years whose mean score is 19.42.

It may therefore be said that teachers of age group 20-40 years were found to possess not significantly higher awareness about POCSO Act as compared to teachers of age group 40-60 years.

Hypothesis 2 b): There is no significant difference in awareness about POCSO Act between teachers based on their gender.

Table 2 b): Relevant Statistics of mean scores of awareness about POCSO Act among teachers based on their gender.

Relevant statistics of mean scores of awareness about POCSO Act between teachers of different genders									
Hy	Groups	N	df	Mean	SD	SEd	t (cal)	t (tab)	L. of Sign.
2. b)	Females	179	263	19.33	3.27	0.4	0.27	1.984	NS at 0.05
	Males	86		19.22	2.99				

From the preceding table, it is evident that the calculated t-value is 0.27, which is not significant at 0.05 level with $df = 263$. It reflects that mean scores of awareness about POCSO Act among female teachers and male teachers do not differ significantly. In this context the null hypothesis that there is no significant difference in awareness about POCSO Act between teachers based on their gender is accepted. Further the mean score of awareness about POCSO Act among female teachers is 19.33 which is not significantly higher than the awareness about POCSO Act among male teachers whose mean score is 19.22.

It may therefore be said that female teachers were found to possess not significantly higher awareness about POCSO Act as compared to male teachers.

Hypothesis 2 c): There is no significant difference in awareness about POCSO Act between teachers based on their status of teaching.

Table 2 c): Relevant Statistics of mean scores of awareness about POCSO Act among teachers based on their teaching status.

Relevant statistics of mean scores of awareness about POCSO Act between teachers with different teaching status									
Hy	Groups	N	df	Mean	SD	SEd	t (cal)	t (tab)	L. of Sign.
2. c)	In-service teachers	117	263	18.85	3.01	0.39	2.05	1.984	S at 0.05
	Pre- service teachers	148		19.65	3.27				

From the preceding table, it is evident that the calculated t-value is 2.05, which is significant at 0.05 level with $df = 263$. It reflects that mean scores of awareness about POCSO Act among in-service and pre-service teachers differs significantly. In

this context the null hypothesis that there is no significant difference in awareness about POCSO Act between teachers based on their status of teaching is rejected. Further the mean score of the awareness about POCSO Act among pre-service teachers is 19.65 which is significantly higher than the awareness of the in- service teachers whose mean score is 18.85 .

It may therefore be said that the pre-service teachers were found to possess significantly higher awareness about the POCSO Act as compared to the in-service teachers.

Hypothesis 2 d): There is no significant difference in awareness about POCSO Act between teachers based on their board of teaching.

Table 2 d) i): Relevant Statistics of mean scores of awareness about POCSO Act among teachers teaching in State Boards and Central Board.

Relevant statistics of mean scores of awareness about POCSO Act between teachers teaching in State and Central Boards									
Hy	Groups	N	df	Mean	SD	SEd	t (cal)	t (tab)	L. of Sign.
2. d)	State Boards	97	144	19.56	2.79	0.57	0.38	1.984	NS at 0.05
	Central Board	49		19.34	3.54				

From the preceding table, it is evident that the calculated t-value is 0.38, which is not significant at 0.05 level with df = 144. It reflects that mean scores of awareness about POCSO Act among State Board teachers and Central Board teachers do not differ significantly. In this context the null hypothesis that there is no significant difference in awareness about POCSO Act between teachers based on their board of teaching is accepted. Further the mean score of awareness about POCSO Act among State Board teachers is 19.56 which is not significantly higher than the awareness about POCSO Act among Central Board teachers whose mean score is 19.34 .

It may therefore be said that State Board teachers were found to possess not significantly higher awareness about POCSO Act as compared to Central Board teachers.

Table 2 d) ii): Relevant Statistics of mean scores of awareness about POCSO Act among teachers teaching in Central Board and International Boards.

Relevant statistics of mean scores of awareness about POCSO Act between teachers teaching in Central and International Boards									
Hy	Groups	N	df	Mean	SD	SEd	t (cal)	T (tab)	L. of Sign.
2. d)	Central Board	49	166	19.34	3.54	0.58	0.5	1.984	NS at 0.05
	International Board	119		19.05	3.31				

From the preceding table, it is evident that the calculated t-value is 0.5, which is not significant at 0.05 level with $df = 166$. It reflects that mean scores of awareness about POCSO Act among Central Board teachers and International Board teachers do not differ significantly. In this context the null hypothesis that there is no significant difference in awareness about POCSO Act between teachers based on their board of teaching is accepted. Further the mean score of awareness about POCSO Act among Central Board teachers is 19.34 which is not significantly higher than the awareness about POCSO Act among International Board teachers whose mean score is 19.05 . It may therefore be said that Central Board teachers were found to possess not significantly higher awareness about POCSO Act as compared to International Board teachers.

Table 2 d) iii): Relevant Statistics of mean scores of awareness about POCSO Act among teachers teaching in State Boards and International Boards.

Relevant statistics of mean scores of awareness about POCSO Act between teachers teaching in State and International Boards									
Hy	Groups	N	df	Mean	SD	SEd	t (cal)	t (tab)	L. of Sign.
2. d)	State Board	97	214	19.56	2.79	0.41	1.24	1.984	NS at 0.05
	International Board	119		19.05	3.31				

From the preceding table, it is evident that the calculated t-value is 1.24, which is not significant at 0.05 level with $df = 214$. It reflects that mean scores of awareness about POCSO Act among State Board teachers and International Board teachers do not differ significantly. In this context the null hypothesis that there is no significant

difference in awareness about POCSO Act between teachers based on their board of teaching is accepted. Further the mean score of awareness about POCSO Act among State Board teachers is 19.56 which is not significantly higher than the awareness about POCSO Act among International Board teachers whose mean score is 19.05 . It may therefore be said that State Board teachers were found to possess not significantly higher awareness about POCSO Act as compared to International Board teachers.

Hypothesis 3 a): There is no significant difference in awareness about POCSO Act between parents based on their age.

Table 3 a): Relevant Statistics of mean scores of awareness about POCSO Act among parents based on their age.

Relevant statistics of mean scores of awareness about POCSO Act between parents of different age groups									
Hy	Groups	N	df	Mean	SD	SEd	t (cal)	t (tab)	L. of Sign.
3. a)	20 - 40 years	165	308	19.2	3.33	0.35	1.34	1.984	NS at 0.05
	40 - 60 years	145		19.67	2.78				

From the preceding table, it is evident that the calculated t-value is 1.34, which is not significant at 0.05 level with df = 308. It reflects that mean scores of awareness about POCSO Act among parents of age group 20-40 years and teachers of age group 40-60 years do not differ significantly. In this context the null hypothesis that there is no significant difference in awareness about POCSO Act between parents based on their age is accepted. Further the mean score of awareness about POCSO Act among parents of age group 20-40 years is 19.2 which is not significantly higher than the awareness about POCSO Act among parents of age group 40-60 years whose mean score is 19.67.

It may therefore be said that parents of age group 20-40 years were found to possess not significantly higher awareness about POCSO Act as compared to parents of age group 40-60 years.

Hypothesis 3 b): There is no significant difference in awareness about POCSO Act between parents based on their gender.

Table 3 b): Relevant Statistics of mean scores of awareness about POCSO Act among parents based on their gender.

Relevant statistics of mean scores of awareness about POCSO Act between parents of different genders									
Hy	Groups	N	df	Mean	SD	SEd	t (cal)	t (tab)	L. of Sign.
3. b)	Females	203	308	19.21	3.01	0.36	1.66	1.984	NS at 0.05
	Males	107		19.81	3.21				

From the preceding table, it is evident that the calculated t-value is 1.66, which is not significant at 0.05 level with $df = 308$. It reflects that mean scores of awareness about POCSO Act among female parents and male parents do not differ significantly. In this context the null hypothesis that there is no significant difference in awareness about POCSO Act between parents based on their gender is accepted. Further the mean score of awareness about POCSO Act among female parents is 19.21 which is not significantly higher than the awareness about POCSO Act among male parents whose mean score is 19.81.

It may therefore be said that female parents were found to possess not significantly higher awareness about POCSO Act as compared to male parents.

Hypothesis 3 c): There is no significant difference in awareness about POCSO Act between parents of children studying in different boards.

Table 3 c) i): Relevant Statistics of mean scores of awareness about POCSO Act among parents of children studying in State Boards and Central Board.

Relevant statistics of mean scores of awareness about POCSO Act between parents of children State and Central Boards									
Hy	Groups	N	df	Mean	SD	SEd	t (cal)	t (tab)	L. of Sign.
3. c)	State Board	147	198	19.43	3.19	0.4	0.97	1.984	NS at 0.05
	Central Board	53		19.04	2.39				

From the preceding table, it is evident that the calculated t-value is 0.97, which is not significant at 0.05 level with $df = 198$. It reflects that mean scores of awareness

about POCSO Act among parents of children studying in State Board and parents of children studying in Central Board do not differ significantly. In this context the null hypothesis that there is no significant difference in awareness about POCSO Act between parents of children studying in different boards is accepted. Further the mean score of awareness about POCSO Act among parents of children studying in State Board is 19.43 which is not significantly higher than the awareness about POCSO Act among parents of children studying in Central Board whose mean score is 19.04 .

It may therefore be said that parents of children studying in State Board were found to possess not significantly higher awareness about POCSO Act as compared to parents of children studying in Central Board.

Table 3 c) ii): Relevant Statistics of mean scores of awareness about POCSO Act among parents of children studying in Central Board and International Boards.

Relevant statistics of mean scores of awareness about POCSO Act between parents of children Central and International Boards									
Hy	Groups	N	df	Mean	SD	SEd	t (cal)	t (tab)	L. of Sign.
3. c)	Central Board	53	161	19.04	2.39	1.05	0.52	1.984	NS at 0.05
	International Board	110		19.59	3.25				

From the preceding table, it is evident that the calculated t-value is 0.52, which is not significant at 0.05 level with df = 161. It reflects that mean scores of awareness about POCSO Act among parents of children studying in Central Board and parents of children studying in International Board do not differ significantly. In this context the null hypothesis that there is no significant difference in awareness about POCSO Act between parents of children studying in different boards is accepted. Further the mean score of awareness about POCSO Act among parents of children studying in Central Board is 19.04 which is not significantly higher than the awareness about POCSO Act among parents of children studying in International Board whose mean score is 19.59 .

It may therefore be said that parents of children studying in Central Board were found to possess not significantly higher awareness about POCSO Act as compared to parents of children studying in International Board.

Table 3 c) iii): Relevant Statistics of mean scores of awareness about POCSO Act among parents of children studying in State Boards and International Boards.

Relevant statistics of mean scores of awareness about POCSO Act between parents of children State and International Boards									
Hy	Groups	N	df	Mean	SD	SEd	t (cal)	t (tab)	L. of Sign.
3. c)	State Board	147	251	19.43	3.19	0.38	0.42	1.984	NS at 0.05
	International Board	110		19.59	3.25				

From the preceding table, it is evident that the calculated t-value is 0.42, which is not significant at 0.05 level with $df = 251$. It reflects that mean scores of awareness about POCSO Act among parents of children studying in State Board and parents of children studying in International Board do not differ significantly. In this context the null hypothesis that there is no significant difference in awareness about POCSO Act between parents of children studying in different boards is accepted. Further the mean score of awareness about POCSO Act among parents of children studying in State Board is 19.43 which is not significantly higher than the awareness about POCSO Act among parents of children studying in International Board whose mean score is 19.59 .

It may therefore be said that parents of children studying in State Board were found to possess not significantly higher awareness about POCSO Act as compared to parents of children studying in International Board.

Findings:

For Hypothesis 1: There is no significant difference in awareness about POCSO Act between teachers and parents.

The research study fails to reject the hypothesis which states that there is no significant difference in awareness about POCSO Act between teachers and parents. Thus, it can be concluded that the said hypothesis has been accepted. It may therefore be said that teachers and parents were found to have almost same awareness about the POCSO Act.

For Hypothesis 2 a): There is no significant difference in awareness about POCSO Act between teachers based on their age.

The research study fails to reject the hypothesis which states that there is no significant difference in awareness about POCSO Act between teachers based on their age. Thus, it can be concluded that the said hypothesis has been accepted. It may therefore be said that teachers of age group 20-40 years and teachers of age group 40-60 years were found to have almost same awareness about the POCSO Act.

For Hypothesis 2 b): There is no significant difference in awareness about POCSO Act between teachers based on their gender.

The research study fails to reject the hypothesis which states that there is no significant difference in awareness about POCSO Act between teachers based on their gender. Thus, it can be concluded that the said hypothesis has been accepted. It may therefore be said that female teachers and male teachers were found to have almost same awareness about the POCSO Act.

For Hypothesis 2 c): There is no significant difference in awareness about POCSO Act between teachers based on their status of teaching.

The research study fails to accept the hypothesis which states that there is no significant difference in awareness about POCSO Act between teachers based on their status of teaching. Thus, it can be concluded that the said hypothesis has been rejected. It may therefore be said that the pre-service teachers were found to possess significantly higher awareness about the POCSO Act as compared to the in-service teachers.

For Hypothesis 2 d): There is no significant difference in awareness about POCSO Act between teachers based on their board of teaching.

The research study fails to reject the hypothesis which states that there is no significant difference in awareness about POCSO Act between teachers based on their board of teaching. Thus, it can be concluded that the said hypothesis has been accepted. It may therefore be said that State Board teachers, Central Board teachers and International Board teachers were found to have almost same awareness about the POCSO Act.

For Hypothesis 3 a): There is no significant difference in awareness about POCSO Act between parents based on their age.

The research study fails to reject the hypothesis which states that there is no significant difference in awareness about POCSO Act between parents based on their age. Thus, it can be concluded that the said hypothesis has been accepted. It may therefore be said that parents of age group 20-40 years and parents of age group 40-60 years were found to have almost same awareness about the POCSO Act.

For Hypothesis 3 b): There is no significant difference in awareness about POCSO Act between parents based on their gender.

The research study fails to reject the hypothesis which states that there is no significant difference in awareness about POCSO Act between parents based on their gender. Thus, it can be concluded that the said hypothesis has been accepted. It may therefore be said that female parents and male parents were found to have almost same awareness about the POCSO Act.

For Hypothesis 3 c): There is no significant difference in awareness about POCSO Act between parents of children studying in different boards.

The research study fails to reject the hypothesis which states that there is no significant difference in awareness about POCSO Act between parents of children studying in different boards. Thus, it can be concluded that the said hypothesis has been accepted. It may therefore be said that parents of children studying in State Board, Central Board and International Board were found to have almost same awareness about the POCSO Act.

Conclusions and Discussions:

For Hypothesis 1: There is no significant difference in awareness about POCSO Act between teachers and parents.

Teachers were found to possess not significantly higher awareness about POCSO Act as compared to parents.

For Hypothesis 2 a): There is no significant difference in awareness about POCSO Act Teachers of age group 20-40 years were found to possess not significantly higher awareness about POCSO Act as compared to teachers of age group 40-60 years.

For Hypothesis 2 b): There is no significant difference in awareness about POCSO Act between teachers based on their gender.

Female teachers were found to possess not significantly higher awareness about POCSO Act as compared to male teachers.

For Hypothesis 2 c): There is significant difference in awareness about POCSO Act between teachers based on their status of teaching.

Pre-service teachers were found to possess significantly higher awareness about the POCSO Act as compared to in-service teachers.

For Hypothesis 2 d): There is no significant difference in awareness about POCSO Act between teachers based on their board of teaching.

State Board teachers were found to possess not significantly higher awareness about POCSO Act as compared to Central Board teachers. Central Board teachers were found to possess not significantly higher awareness about POCSO Act as compared to International Board teachers. State Board teachers were found to possess not significantly higher awareness about POCSO Act as compared to International Board teachers.

For Hypothesis 3 a): There is no significant difference in awareness about POCSO Act between parents based on their age.

Parents of age group 20-40 years were found to possess not significantly higher awareness about POCSO Act as compared to parents of age group 40-60 years.

For Hypothesis 3 b): There is no significant difference in awareness about POCSO Act between parents based on their gender.

Female parents were found to possess not significantly higher awareness about POCSO Act as compared to male parents.

For Hypothesis 3 c): There is no significant difference in awareness about POCSO Act between parents of children studying in different boards.

Parents of children studying in State Board were found to possess not significantly higher awareness about POCSO Act as compared to parents of children studying in Central Board. Parents of children studying in Central Board were found to possess not significantly higher awareness about POCSO Act as compared to parents of children studying in International Board. Parents of children studying in State Board were found to possess not significantly higher awareness about POCSO Act as compared to parents of children studying in International Board.

The study highlights a gap in awareness about the POCSO Act among both teachers and parents, reinforcing the need to incorporate legal literacy and child protection laws as part of teacher training programs and school orientations for parents. Educational institutions should initiate regular workshops, seminars, and awareness drives about child safety laws for all stakeholders – especially teachers and parents – to ensure a safer school environment.

Since teachers are often the first to observe signs of abuse, the study suggests that schools must train teachers to identify, report, and appropriately respond to such incidents in accordance with the POCSO Act. Child safety, personal boundaries, and basic legal rights must be integrated into the school curriculum in age-appropriate ways to empower students while also making adults more accountable and informed. Schools must review and strengthen child protection policies, ensuring every staff member, teaching or non-teaching, is sensitized to the provisions of the POCSO Act and the procedures for handling disclosures.

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A STUDY OF CRITICAL THINKING AMONG PRE - SERVICE TEACHERS

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Abstract:

In the fast-changing educational world, it is very crucial that teachers should be capable of making thoughtful decisions, foster problem solving and critical thinking (CT) in their students. Therefore it is important to develop CT skills during a teacher training program. The purpose of this research was to compare CT abilities of B.Ed and D.El.Ed students of Mumbai, using purposive sampling technique. There were a total 100 participants among which 58 were B.Ed students and 42 were D.El.Ed. students. CT was determined using Critical Thinking Questionnaire (CTHQ) developed by Aleksander Kobylarek. This tool was based on Benjamin Bloom's Taxonomy, consisting of 25 items, each rated on 5-point Likert scale. The range of total score was from 25 to 125, with higher scores meaning better CT skills. The data analysis focused on comparing scores across the six domains- Remembering, Understanding, Applying, Analyzing, Evaluating and Creating. The findings indicated that B.Ed. Pre-service teachers were found to possess significantly higher Remembering, Understanding, Applying, Analyzing, Evaluating and Creating skills as compared to D.El.Ed pre-service teachers.

Keywords: *Remembering, Understanding, Applying, Analyzing, Evaluating, Creating, Critical Thinking, Pre-service Teachers.*

Introduction:

In the 21st century, teaching is no longer limited to entering a classroom and delivering a lecture. Teachers are expected to make learning engaging through practical and theoretical approaches, encouraging decision-making and problem solving among students. To achieve this, developing CT skills in teachers is very essential.

Pre-service teachers need to cultivate these skills to become effective educators. It helps them to make smart decisions, analyze students' needs and use diverse teaching methods effectively. Unfortunately many teacher education programs fall

short to nourish CT skills. But since these two courses are structured differently, they may affect students' CT development in different ways. This study helps to compare the CT skills of both classes and will help uncover existing gaps and support the enhancement of the Teacher education program.

Significance of the Study:

In today's classrooms, teachers need to think critically, solve problems, and make sound decisions. So, it's important for future teachers to develop critical thinking (CT) skills during their training. Since B.Ed. and D.El.Ed. students go through different training programs, their CT skills may develop differently.

This study aims to find out if there's a real difference between the two groups. As few studies have explored this comparison, it helps fill an important gap. The findings can improve teacher training methods, helping both B.Ed. and D.El.Ed. students become more confident and effective educators.

Objective:

1. To compare the Overall Critical Thinking scores of B.Ed and D.El.Ed pre-service teachers.
2. To compare the remembering skills scores of B.Ed and D.El.Ed pre-service teachers.
3. To compare the understanding skills scores of B.Ed and D.El.Ed pre-service teachers.
4. To compare the applying skills scores of B.Ed and D.El.Ed pre-service teachers.
5. To compare the analyzing skills scores of B.Ed and D.El.Ed pre-service teachers.
6. To compare the evaluating skills scores of B.Ed and D.El.Ed pre-service teachers.
7. To compare the creating skills scores of B.Ed and D.El.Ed pre-service teachers.

Hypothesis of the study:

Null hypothesis

1. There is no significant difference in the Overall Critical Thinking scores between B.Ed and D.El.Ed pre-service teachers
2. There is no significant difference in the remembering skills scores between B.Ed and D.El.Ed pre-service teachers.
3. There is no significant difference in the understanding skills scores between B.Ed and D.El.Ed pre-service teachers.
4. There is no significant difference in the applying skills scores between B.Ed and D.El.Ed pre-service teachers.
5. There is no significant difference in the analyzing skills scores between B.Ed and D.El.Ed pre-service teachers

6. There is no significant difference in the evaluating skills scores between B.Ed and D.El.Ed pre-service teachers.
7. There is no significant difference in the creating skills scores between B.Ed and D.El.Ed pre-service teachers.

Sample and Sampling technique:

The sample for this study consisted of pre-service teachers from Mumbai. The number of participants were 100 including first-year and second-year student teachers from both B.Ed. and D.El.Ed. programs, selected using purposive sampling.

Size and Composition

Course	Sample Size
B.ED	58
D.EL.ED	42
TOTAL	100

Tool Used for the Study:

The tool used was the Critical Thinking Questionnaire developed by Aleksander Kobylarek, based on Bloom's Taxonomy. It consists of 25 statements, each answered using a 5-point scale.

ANALYSIS OF DATA

In the present study t-test was applied and the hypotheses were tested at 0.05 level of significance to compare CT abilities of B.Ed and D.El.Ed students of Mumbai on the bases of six domains of bloom's taxonomy.

Null Hypothesis 1

There is no significant difference in the Overall Critical Thinking scores among B.Ed and D.El.Ed pre-service teachers.

Table 1. Relevant Statistics of mean scores of Overall Critical Thinking among B.Ed. and D.El.Ed pre-service teachers.

Group	N	df	Mean	SD	SEd	T(cal)	T(tab)	L. of Sig.
B.Ed.	58	98	99.21	9.28	1.72	7.22	1.984	S at 0.05
D.El.Ed	42		86.79	27.88				

From the preceding table, it is evident that the calculated t-value is 7.22, which is significant at 0.05 level with df = 98. It reflects that mean scores of Overall Critical Thinking among B.Ed. and D.El.Ed pre-service teachers differ significantly. In this context the null hypothesis states that there is no significant difference among the Overall Critical Thinking scores between B.Ed and D.El.Ed pre-service teachers is not

accepted. Further the mean score of Overall Critical Thinking of B.Ed. Pre-service teachers are 99.21 which is significantly higher than the Overall Critical Thinking of D.El.Ed pre-service teachers whose mean score is 86.79.

It may therefore be said that B.Ed. pre-service teachers were found to possess significantly higher Overall Critical Thinking as compared to D.El.Ed pre-service teachers.

Null Hypothesis 2

There is no significant difference in the Remembering skills scores between B.Ed and D.El.Ed pre-service teachers.

Table 5. Relevant Statistics of mean scores of Remembering skills among B.Ed. and D.El.Ed pre-service teachers.

Group	N	df	Mean	SD	SEd	T(cal)	T(tab)	L. of Sig.
B.Ed.	58	98	10.88	1.78	0.30	4.06	1.984	S at 0.05
D.El.Ed	42		9.67	1.20				

From the preceding table, it is evident that the calculated t-value is 4.06, which is significant at 0.05 level with $df = 98$. It reflects that mean scores of Remembering skills among B.Ed. and D.El.Ed pre-service teachers differ significantly. In this context the null hypothesis that there is no significant difference in the Remembering skills scores between B.Ed and D.El.Ed pre-service teachers is not accepted. Further the mean score of Remembering skills of B.Ed. Pre-service teachers is 10.88 which is significantly higher than the Remembering skills of D.El.Ed pre-service teachers whose mean score is 9.67.

It may therefore be said that B.Ed. pre-service teachers were found to possess significantly higher Remembering skills as compared to D.El.Ed pre-service teachers.

Null Hypothesis 3

There is no significant difference in the Understanding skills scores between B.Ed and D.El.Ed pre-service teachers.

Table 6. Relevant Statistics of mean scores of Understanding skills among B.Ed. and D.El.Ed pre-service teachers.

Group	N	df	Mean	SD	SEd	T(cal)	T(tab)	L. of Sig.
B.Ed.	58	98	14.53	1.85	0.32	3.99	1.984	S at 0.05
D.El.Ed	42		13.26	1.33				

From the preceding table, it is evident that the calculated t-value is 3.99, which is significant at 0.05 level with $df = 98$. It reflects that mean scores of Understanding

skills among B.Ed. and D.El.Ed pre-service teachers differ significantly. In this context the null hypothesis that there is no significant difference in the Understanding skills scores between B.Ed and D.El.Ed pre-service teachers is not accepted. Further the mean score of Understanding skills of B.Ed. Pre-service teachers is 14.53 which is significantly higher than the Understanding skills of D.El.Ed pre-service teachers whose mean score is 13.26.

It may therefore be said that B.Ed. pre-service teachers were found to possess significantly higher Understanding skills as compared to D.El.Ed pre-service teachers.

Null Hypothesis 4

There is no significant difference in the Applying skills scores between B.Ed and D.El.Ed pre-service teachers.

Table 7. Relevant Statistics of mean scores of Applying skills among B.Ed. and D.El.Ed pre-service teachers.

Group	N	df	Mean	SD	SEd	T(cal)	T(tab)	L. of Sig.
B.Ed.	58	98	16.14	2.25	0.43	4.67	1.984	S at 0.05
D.El.Ed	42		14.12	2.05				

From the preceding table, it is evident that the calculated t-value is 4.67, which is significant at 0.05 level with df = 98. It reflects that mean scores of Applying skills among B.Ed. and D.El.Ed pre-service teachers differ significantly. In this context the null hypothesis that there is no significant difference in the Applying skills scores between B.Ed and D.El.Ed pre-service teachers is not accepted. Further the mean score of Applying skills of B.Ed. Pre-service teachers are 16.14 which is significantly higher than the Applying skills of D.El.Ed pre-service teachers whose mean score is 14.12.

It may therefore be said that B.Ed. pre-service teachers were found to possess significantly higher Applying skills as compared to D.El.Ed pre-service teachers.

Null Hypothesis 5

There is no significant difference in the Analysing skills scores between B.Ed and D.El.Ed pre-service teachers

Table 2. Relevant Statistics of mean scores of Analysing skills among B.Ed. and D.El.Ed pre-service teachers.

Group	N	df	Mean	SD	SEd	T(cal)	T(tab)	L. of Sig.
B.Ed.	58	98	18.34	2.52	0.47	6.60	1.984	S at 0.05
D.El.Ed	42		15.26	2.13				

From the preceding table, it is evident that the calculated t-value is 6.60, which is significant at 0.05 level with df = 98. It reflects that mean scores of Analysing skills among B.Ed. and D.El.Ed pre-service teachers differ significantly. In this context the

null hypothesis that there is no significant difference in the Analysing skills scores between B.Ed and D.El.Ed pre-service teachers is not accepted. Further the mean score of Analysing skills of B.Ed. Pre-service teachers are 18.34 which is significantly higher than the Analysing skills of D.El.Ed pre-service teachers whose mean score is 15.26.

It may therefore be said that B.Ed. pre-service teachers were found to possess significantly higher Analysing skills as compared to D.El.Ed pre-service teachers.

Null Hypothesis 6

There is no significant difference in the Evaluating skills scores between B.Ed and D.El.Ed pre-service teachers.

Table 3. Relevant Statistics of mean scores of Evaluating skills among B.Ed. and D.El.Ed pre-service teachers.

Group	N	df	Mean	SD	SEd	T(cal)	T(tab)	L. of Sig.
B.Ed.	58	98	15.81	1.81	0.40	5.01	1.984	S at 0.05
D.El.Ed	42		13.79	2.11				

From the preceding table, it is evident that the calculated t-value is 5.01, which is significant at 0.05 level with df = 98. It reflects that mean scores of Evaluating skills among B.Ed. and D.El.Ed pre-service teachers differ significantly. In this context the null hypothesis that there is no significant difference in the Evaluating skills scores between B.Ed and D.El.Ed pre-service teachers is not accepted. Further the mean score of Evaluating skills of B.Ed. Pre-service teachers is 15.81 which is significantly higher than the Evaluating skills of D.El.Ed pre-service teachers whose mean score is 13.79.

It may therefore be said that B.Ed. pre-service teachers were found to possess significantly higher Evaluating skills as compared to D.El.Ed pre-service teachers.

Null Hypothesis 7

There is no significant difference in the Creating skills scores between B.Ed and D.El.Ed pre-service teachers.

Table 4. Relevant Statistics of mean scores of Creating skills among B.Ed. and D.El.Ed pre-service teachers.

Group	N	df	Mean	SD	SEd	T(cal)	T(tab)	L. of Sig.
B.Ed.	58	98	23.5	2.51	0.46	6.11	1.984	S at 0.05
D.El.Ed	42		20.69	2.08				

From the preceding table, it is evident that the calculated t-value is 6.11, which is significant at 0.05 level with $df = 98$. It reflects that mean scores of Creating skills among B.Ed. and D.El.Ed pre-service teachers differ significantly. In this context the null hypothesis that there is no significant difference in the Creating skills scores between B.Ed and D.El.Ed pre-service teachers is not accepted. Further the mean score of Creating skills of B.Ed. Pre-service teachers is 23.50 which is significantly higher than the Creating skills of D.El.Ed pre-service teachers whose mean score is 20.69.

It may therefore be said that B.Ed. pre-service teachers were found to possess significantly higher Creating skills as compared to D.El.Ed pre-service teachers.

Major Findings:

1. There is a significant difference in the Overall Critical Thinking scores between B.Ed and D.El.Ed pre-service teachers
2. There is a significant difference in the remembering skills scores between B.Ed and D.El.Ed pre-service teachers.
3. There is a significant difference in the understanding skills scores between B.Ed and D.El.Ed pre-service teachers.
4. There is a significant difference in the applying skills scores between B.Ed and D.El.Ed pre-service teachers.
5. There is significant difference in the analyzing skills scores between B.Ed and D.El.Ed pre-service teachers
6. There is a significant difference in the evaluating skills scores between B.Ed and D.El.Ed pre-service teachers.
7. There is a significant difference in the creating skills scores between B.Ed and D.El.Ed pre-service teachers.

Conclusion & Discussions

For Hypothesis 1: There is a significant difference in the Overall Critical Thinking scores among B.Ed and D.El.Ed pre-service teachers.

Discussion on Hypothesis 1

- B.Ed. students are generally graduates and post - graduates who have prior college experience, which gives them more exposure to academic thinking.
- D.El.Ed. students often enter teacher training right after school, so they may lack academic experiences that build critical thinking.

For Hypothesis 2: There is a significant difference in the remembering skills scores between B.Ed and D.El.Ed pre-service teachers.

Discussion on Hypothesis 2

- B.Ed. students have already completed higher education (under graduation or post graduation), which involves preparing for multiple academic exams. This helps them build strong memorization and recall skills.
- D.El.Ed. students with relatively less exposure to higher-level exams, they may have had fewer opportunities to develop advanced memory techniques, which could influence their ability to recall academic content effectively.

For Hypothesis 3: There is significant difference in the understanding skills scores between B.Ed and D.El.Ed pre-service teachers.

Discussion on Hypothesis 3

- B.Ed. students usually have a background in college-level education, so they're used to understanding complex topics and can easily relate new ideas to what they already know.
- D.El.Ed. students may find it harder to connect or interpret new teaching ideas, especially if those ideas are explained in a more theoretical or advanced way.

For Hypothesis 4: There is significant difference in the applying skills scores between B.Ed and D.El.Ed pre-service teachers.

Discussion on Hypothesis 4

- B.Ed. students, who are trained to teach at the secondary level, often apply educational theories to secondary students, which may involve handling more complex content and diverse classroom situations.
- D.El.Ed. students, trained for the primary level, apply teaching strategies suited for young learners, focusing on foundational skills and using age-appropriate methods effectively in early education settings.

For Hypothesis 5: There is a significant difference in the Analyzing skills scores between B.Ed and D.El.Ed pre-service teachers.

Discussion on Hypothesis 5

- B.Ed. Students, preparing to teach at the secondary level, are often exposed to various educational theories and complex classroom scenarios, which helps them build stronger analyzing skills by comparing ideas and exploring multiple perspectives.
- D.El.Ed. students, focused on the primary level, also develop analyzing skills, but their training emphasizes simpler concepts and age-appropriate strategies, which may offer fewer chances to deeply analyze abstract or layered teaching situations.

For Hypothesis 6: There is significant difference in the Evaluating skills scores between B.Ed and D.El.Ed pre-service teachers.

Discussion on Hypothesis:

- B.Ed. students are trained to teach (secondary level), they often deal with more complex content and are encouraged to evaluate teaching materials and students' understanding more critically. This builds their judgment and decision-making skills.
- D.El.Ed. students, who are trained to teach (primary level), usually follow set guidelines and structured materials. Because primary teaching focuses more on clarity and consistency, they may get fewer chances to evaluate and modify content independently.

For Hypothesis 7: There is a significant difference in the applying skills scores between B.Ed and D.El.Ed pre-service teachers.

Discussion on Hypothesis 7

- B.Ed. students, who teach secondary level students, are also encouraged to employ creative strategies to maintain student engagement, even though secondary school students may not always show the same level of enthusiasm for the subject matter.
- D.El.Ed. students demonstrate creativity in designing lessons that are engaging and age-appropriate for younger children, fostering a stimulating learning environment.

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EQUIPPING MINDS FOR TOMORROW: PREPARING STUDENTS TO NAVIGATE GLOBAL CHALLENGES

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Abstract:

In an increasingly interconnected and rapidly changing world, education must evolve to prepare students to face complex global challenges. This paper explores how junior college education can be enhanced to equip students with the knowledge, skills, and values necessary for active participation in addressing issues such as climate change, inequality, public health crises, and technological disruption. It examines key areas including global awareness, curriculum relevance, critical thinking, problem-solving, communication, collaboration, innovation, and global citizenship. Through a review of current educational practices and emerging needs, the paper highlights gap and opportunities in equipping students to become responsible, adaptable, and proactive global citizens. Data was collected through Google form to conduct a survey among junior college students. Various aspects taken in consideration were- General Awareness of Global Challenges; Education, Curriculum, and Global Issues; Critical Thinking and Problem Solving; Communication and Collaboration; Innovation and Technology; Values and Global Citizenship. The findings emphasize the importance of a holistic, future-focused educational approach that empowers students not only to understand global issues but also to contribute effectively to sustainable and inclusive solutions.

Keywords: *Minds for Tomorrow, Students, Global Challenges.*

Introduction:

In an era defined by rapid technological advancements, environmental uncertainties, and complex geopolitical shifts, the world is evolving at an unprecedented pace. As the global landscape continues to change, it becomes increasingly essential for education systems to equip students not just with academic knowledge, but with the critical skills, adaptability, and global awareness necessary to face emerging challenges.

This paper explores how education can evolve to prepare students for the multifaceted global challenges of tomorrow. By analyzing current educational models and proposing

strategic reforms, this research aims to highlight the importance of a holistic, future-oriented approach to learning—one that empowers junior college students to become proactive, informed, and responsible global citizens. The study was distributed in the following areas.

1. General Awareness of Global Challenges

As the world grapples with pressing global issues such as climate change, pandemics, technological disruption, and socio-economic inequality, it is increasingly important for young people to be informed and aware of these challenges. Junior college students, standing at the threshold of adulthood and future leadership roles, play a crucial part in shaping responses to these global concerns.

This section explores the current state of general awareness among junior college students regarding major global challenges. It aims to identify the extent of their understanding, the sources of their information, and the gaps that may exist in their knowledge.

2. Education, Curriculum, and Global Issues

In a world increasingly shaped by interconnected global forces, junior college students, positioned at a critical transitional stage between adolescence and adulthood, must be equipped with the knowledge, skills, and perspectives necessary to navigate and contribute to a rapidly changing world.

This section examines the extent to which global issues are embedded within junior college curricula, the effectiveness of current teaching approaches, and the potential for educational reforms that better align learning outcomes with global realities.

3. Critical Thinking and Problem Solving

In today's complex and interconnected world, critical thinking and problem-solving skills are essential for understanding and addressing global issues. For junior college students—future leaders, professionals, and citizens—developing these skills is crucial in preparing them to contribute to solving real-world problems.

This section explores how well junior college students are equipped with critical thinking and problem-solving abilities in the context of global challenges.

4. Communication and Collaboration

Communication and collaboration skills enable students to express their thoughts clearly, listen to others, and build on diverse viewpoints to achieve common goals. This section examines the importance of fostering strong communication and teamwork skills among junior college students in the context of global issues.

5. Innovation and Technology

Innovation and technology play a central role in addressing the world's most urgent challenges—from developing clean energy solutions and improving global health systems to enhancing access to education and solving food insecurity. For junior college students, understanding and leveraging these tools is essential in becoming active participants in creating a better future.

This section explores how junior college students perceive, access, and apply innovation and technology in the context of global issues.

6. Values and Global Citizenship

In a world increasingly marked by shared challenges fostering a strong sense of values and global citizenship in young people is more important than ever. Junior college students are at a critical stage where they begin to form their identities and worldviews.

This section explores how confronting global challenges can serve as a powerful context for cultivating values and a sense of global citizenship among junior college students.

Collection and Analysis of Data:

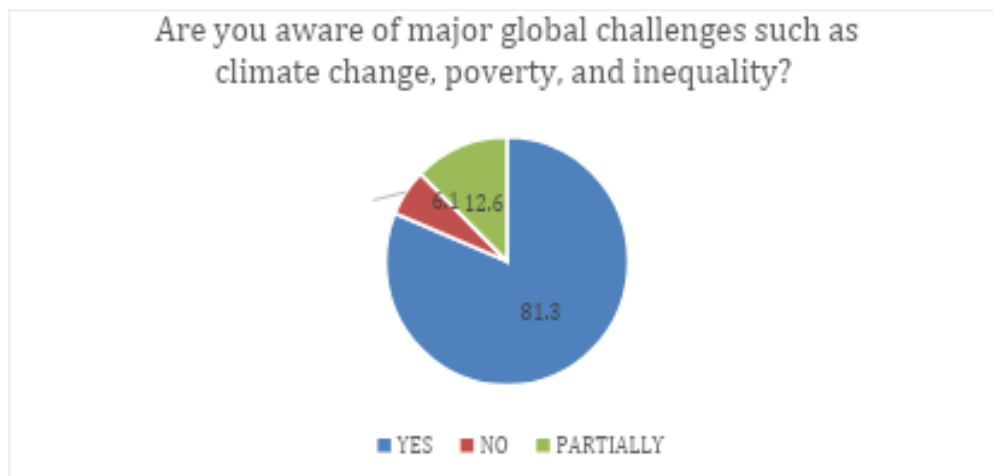
Collection of data was done through the following link of the Google form.

<https://forms.gle/X79gsLrKwKKLeL5J9>

252 junior college students studying in grade 11 responded to it. The questions were distributed in different subgroups. Analysis of data was then carried out as follows.

Section A: General Awareness of Global Challenges

1. Following pie chart displays responses to the question: *"Are you aware of major global challenges such as climate change, poverty, and inequality?"*



81.3% of respondents answered "Yes", indicating that a large majority are aware of major global challenges. 12.6% responded "Partially", suggesting that while they have some knowledge, it may be limited or incomplete. 6.1% answered

"No", showing a small portion of the population is unaware of these issues. Educational efforts, media coverage, and community engagement could help bridge this gap.

2. Following pie chart presents responses to the question: "How often do you discuss global issues in your classes?"



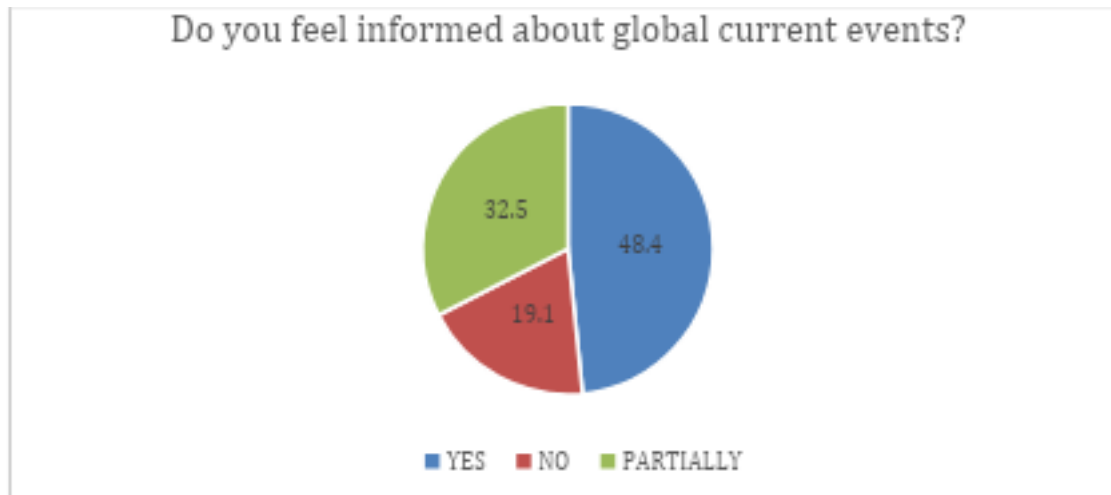
The data shows that while a majority of students are at least occasionally exposed to discussions on global issues, regular and consistent engagement is less common.

3. The pie chart illustrates responses to the question: "Do you believe global challenges will affect your future career?"



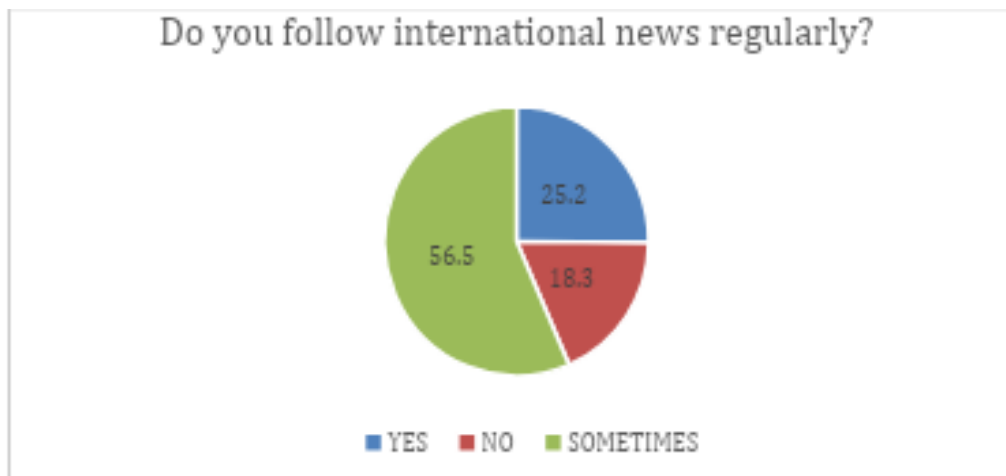
Only 2.4% answered "No", suggesting that very few believe their careers will remain unaffected by global challenges. The strong majority (over 97%) who answered "Yes" or "May be" suggests that educational and career guidance programs should incorporate discussions around resilience, adaptability, and sustainable development to better prepare youth for future challenges.

4. The pie chart presents responses to the question: "Do you feel informed about global current events?"



Data suggests that a significant portion has some awareness but may not follow global events regularly or in depth. 19.1% answered "No", meaning almost one in five respondents do not feel informed about what's happening globally. Strengthening news literacy, promoting reliable sources, and integrating current events into educational settings could help enhance global awareness across the board.

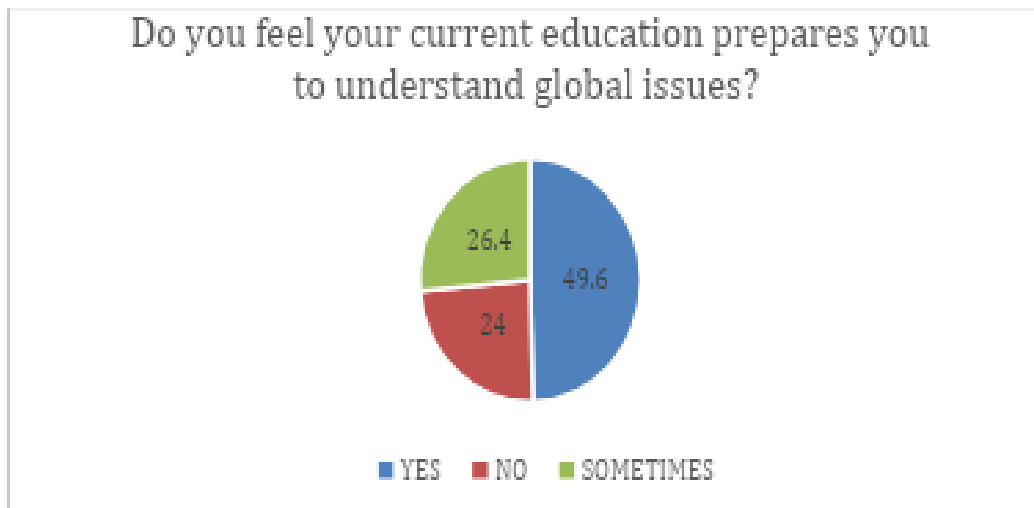
1. The pie chart shows responses to the question: "Do you follow international news regularly?"



Nearly one in five do not follow international news at all. With only a quarter following international news regularly, there's an opportunity to encourage habits of global awareness—perhaps by integrating news discussions into classrooms or promoting accessible, youth-friendly news platforms. Strengthening this habit is essential in fostering informed global citizens.

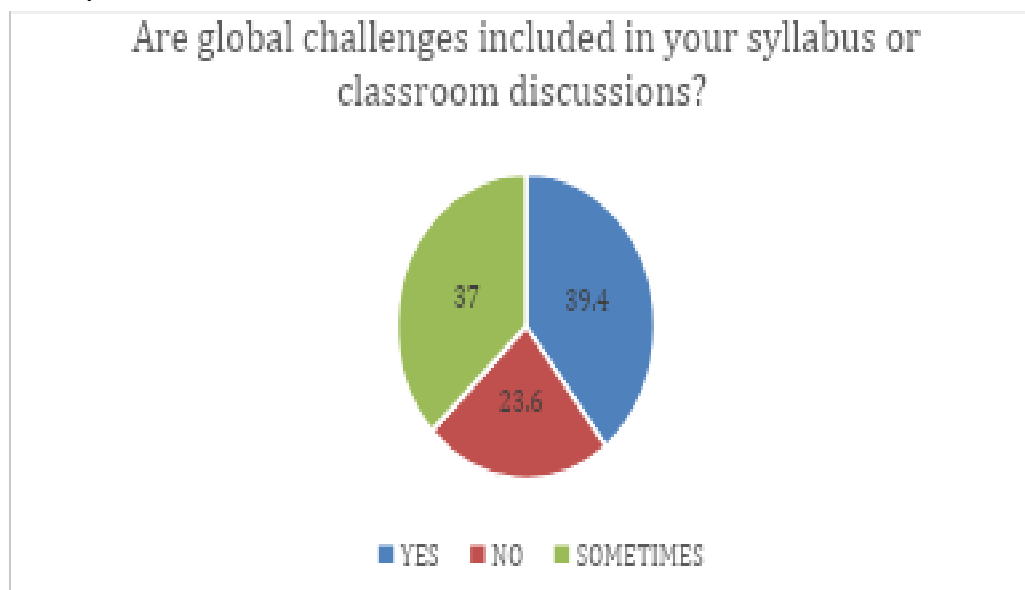
Section B: Education and Curriculum

6. The pie chart illustrates responses to the question: "Do you feel your current education prepares you to understand global issues?"



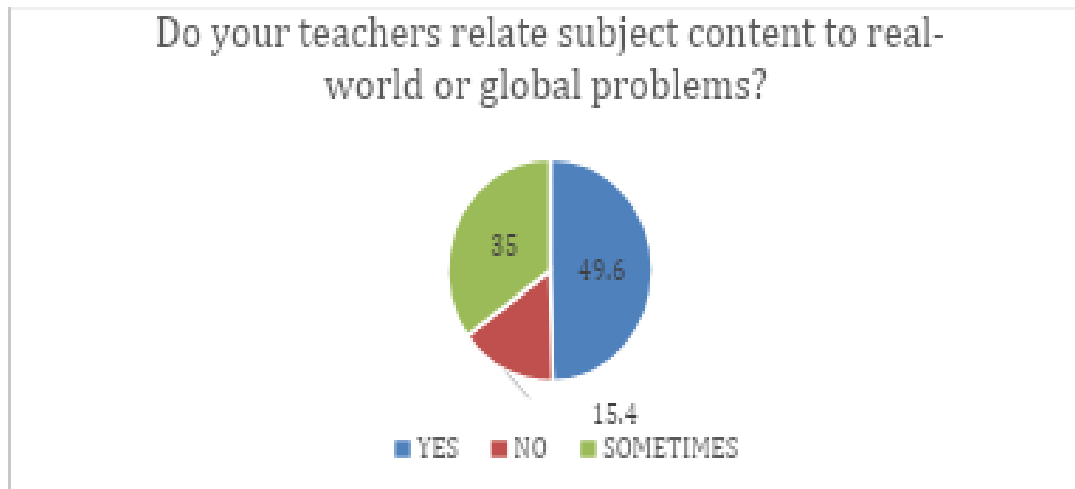
Data reflects that about a quarter of the respondents feel unprepared by their education to engage with global issues. This highlights a need for educational institutions to strengthen their curricula with more comprehensive and consistent coverage of global topics.

7. The pie chart displays responses to the question: "Are global challenges included in your syllabus or classroom discussions?"



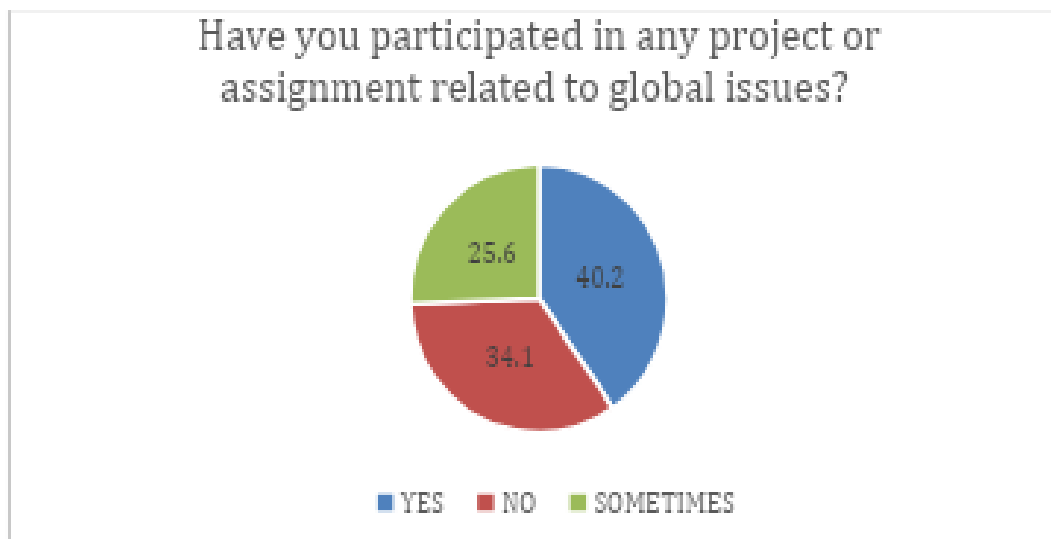
With about 60.6% of students experiencing limited or no exposure, educational institutions have an opportunity to enhance learning by more consistently integrating global topics into syllabi and discussions.

8. Following pie chart displays responses to the question: "Do your teachers relate subject content to real-world or global problems?"



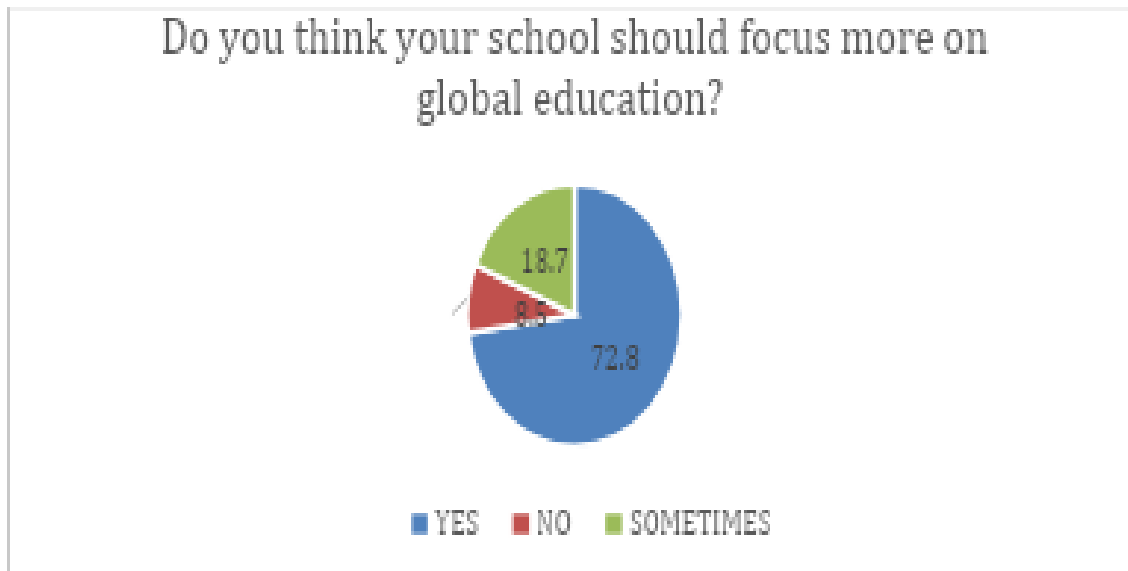
The data suggests that with over one-third of respondents saying it only happens occasionally and 15.4% not seeing it at all, schools could benefit from encouraging more consistent integration of global and real-life contexts into teaching.

9. Following pie chart displays responses to the question: "Have you participated in any project or assignment related to global issues?"



40.2% of respondents answered "Yes", indicating that they participated in any project or assignment related to global issues. 25.6% responded "Sometimes", suggesting that while they participated in any project or assignment related to global issues they may not be regular in their participation. 34.1% said "No", showing that students do not participated in any project or assignment related to global issues

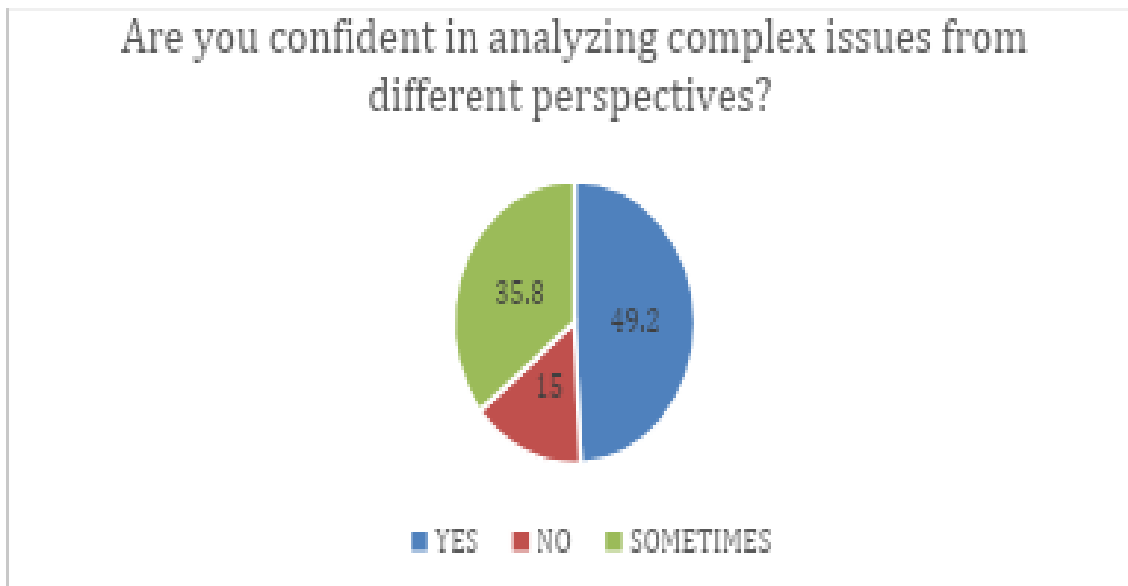
9. Following pie chart displays responses to the question: "Do you think your school should focus more on global education?"



The data demonstrates a clear consensus among students in favor of enhancing global education in schools.

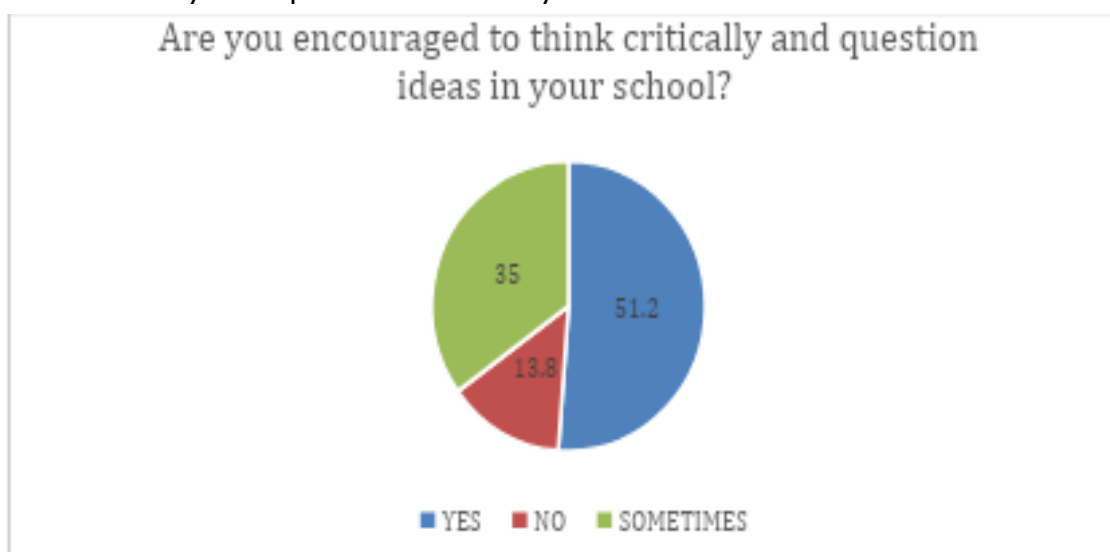
Section C: Critical Thinking and Problem Solving

11. Following pie chart displays responses to the question: "Are you confident in analyzing complex issues from different perspectives?"



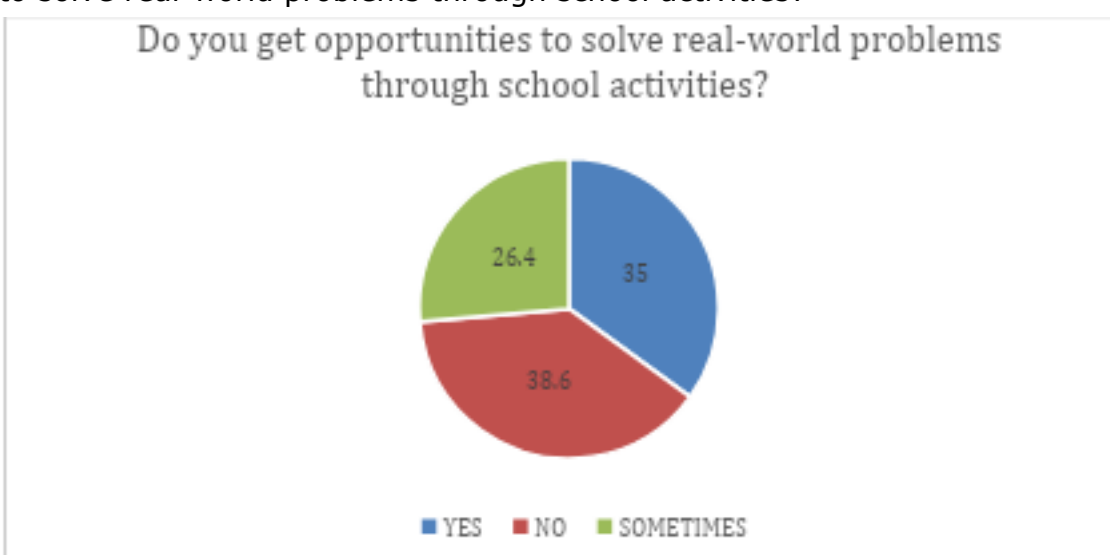
Overall, the majority of respondents (85%) demonstrate at least some level of confidence in analyzing complex issues from various perspectives, with nearly half expressing full confidence.

12. Following pie chart displays responses to the question: "Are you encouraged to think critically and question ideas in your school?"



The data suggests that most students perceive their school environment as supportive of critical thinking, either consistently or occasionally.

13. Following pie chart displays responses to the question: "Do you get opportunities to solve real-world problems through school activities?"



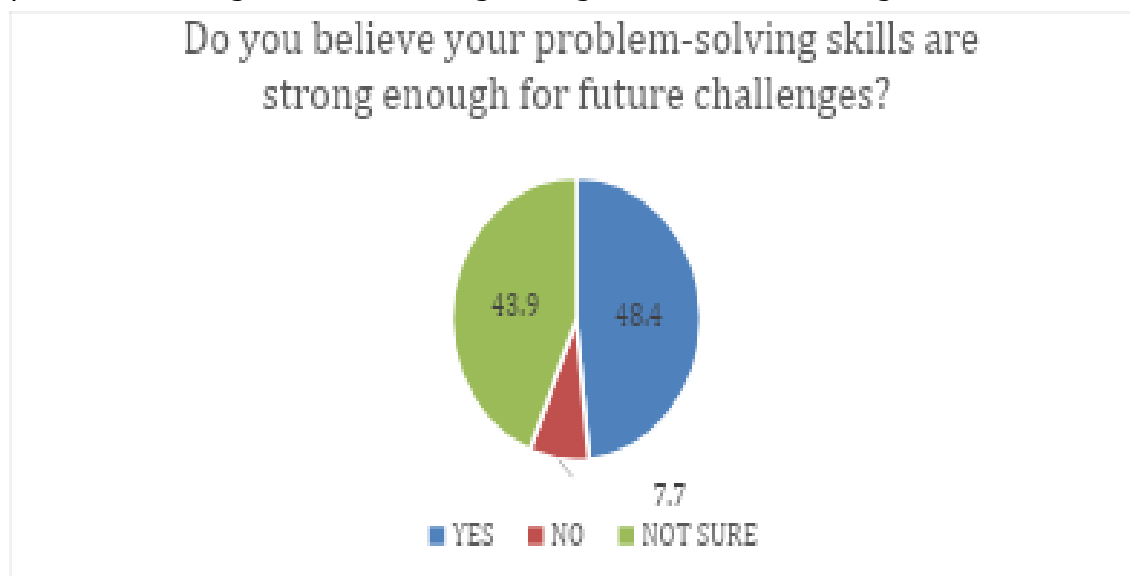
The data highlights a potential gap in experiential learning within the school curriculum. Schools may need to enhance their programs and teaching methods to ensure more consistent and meaningful engagement with real-world challenges.

- 14.** Following pie chart displays responses to the question: “Have you ever worked on a team project to find solutions to community or global?”



The data reveals that many students lack experience in working collaboratively on real-world community or global issues, which are vital for developing teamwork, problem-solving, and social responsibility skills.

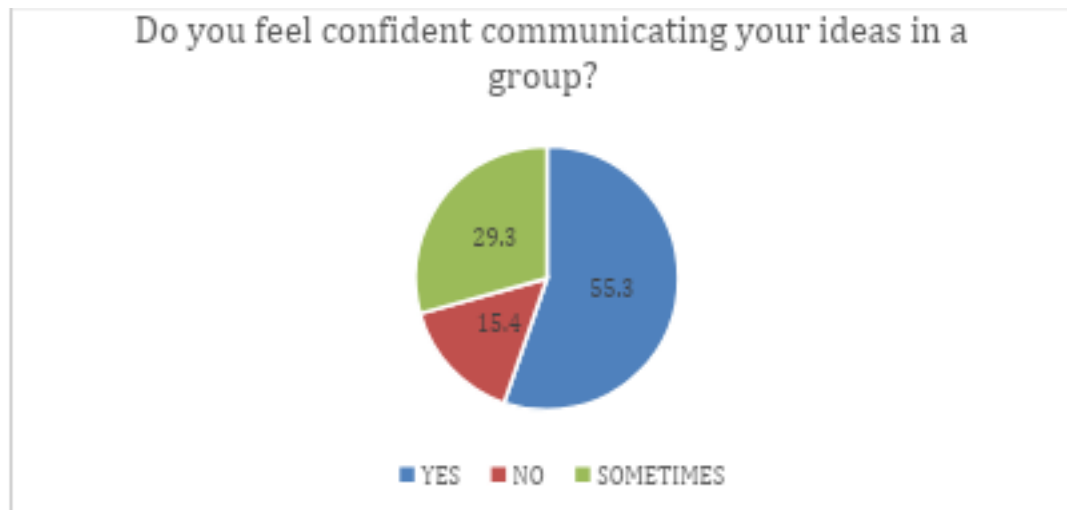
- 15.** Following pie chart displays responses to the question: “Do you believe your problem-solving skills are strong enough for future challenges?”



This data highlights a need for schools to provide more opportunities for students to practice and reflect on their problem-solving abilities through real-life applications, feedback, and support systems.

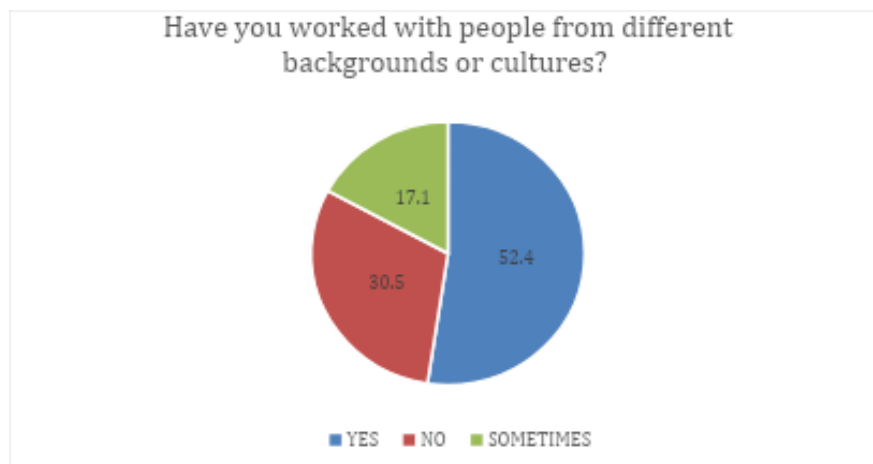
Section D: Communication and Collaboration

16. Following pie chart displays responses to the question: "Do you feel confident communicating your ideas in a group?"



A majority of 55.3% responded "Yes," indicating they feel confident sharing their thoughts with others. Meanwhile, 29.3% chose "Sometimes," suggesting that their confidence may vary depending on the situation or group dynamics. A smaller segment, 15.4%, answered "No," indicating a lack of confidence in group communication. Activities such as group projects, discussions, and presentations could help build greater confidence across the board.

17. Following pie chart displays responses to the question: "Have you worked with people from different backgrounds or cultures?"



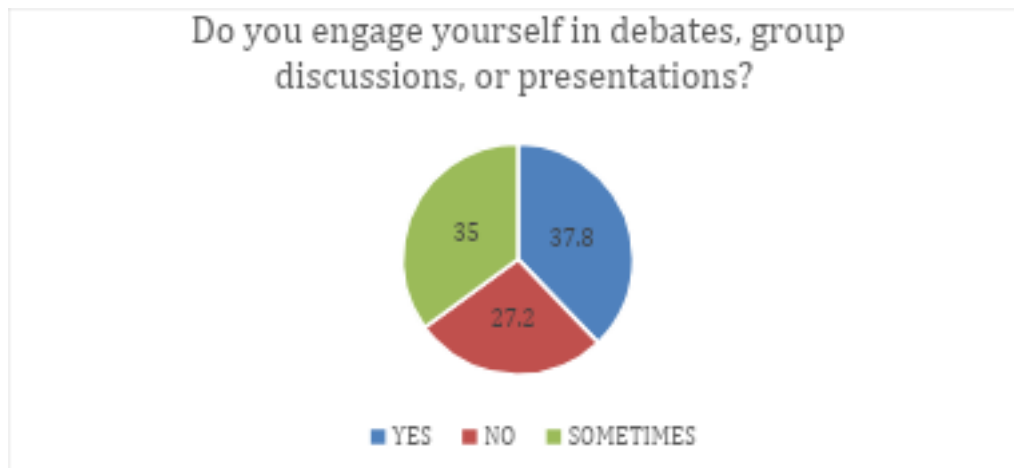
The data shows that while most students have engaged in culturally diverse teamwork, a significant number still lack such experiences. This highlights the need for schools to create more inclusive and multicultural opportunities to ensure all students gain valuable exposure to working with people from different backgrounds.

18. Following pie chart displays responses to the question: "Do school activities promote collaboration and teamwork?"



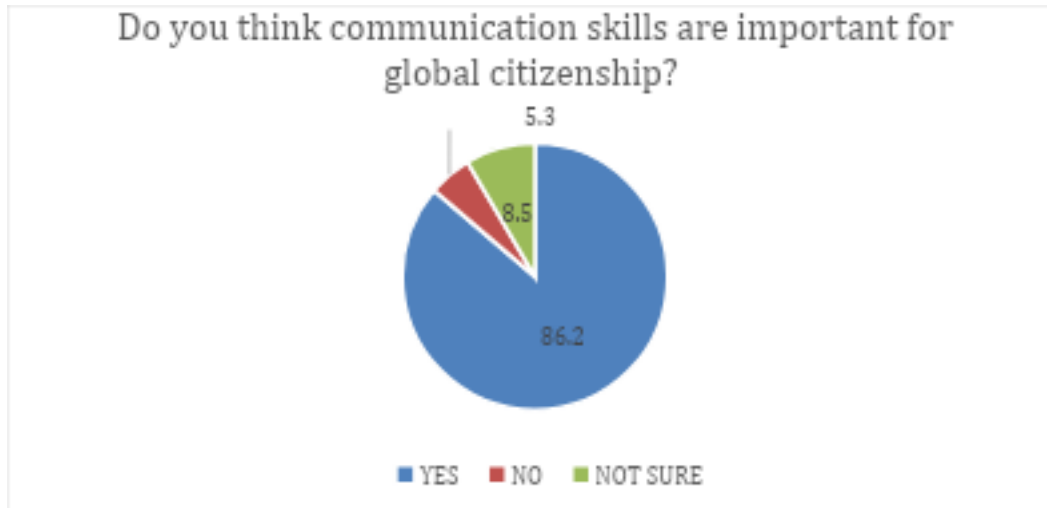
The data suggests that most students recognize school efforts to encourage collaboration and teamwork, either consistently or occasionally. However, the 15% who disagree show there is still room for improvement. To ensure all students benefit from collaborative experiences, schools should continue to design engaging, inclusive, and cooperative learning environments that promote teamwork across all subjects and activities.

19. Following pie chart displays responses to the question: "Do you engage yourself in debates, group discussions, or presentations?"



The chart reflects a fairly balanced distribution, with most students having at least some experience with debates, discussions, or presentations. However, the 27.2% who are not involved at all highlights a need for schools to create more accessible and supportive opportunities for all students to build their confidence and communication skills.

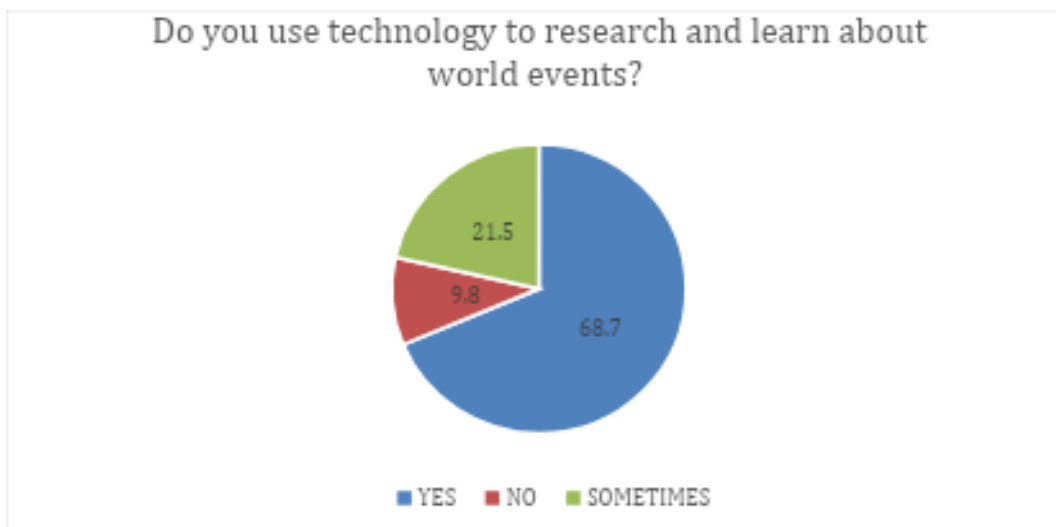
20. Following pie chart displays responses to the question: "Do you think communication skills are important for global citizenship?"



The overwhelming response indicates that most people recognize communication skills as essential in navigating the complexities of global citizenship. Effective communication is likely seen as a key tool in fostering understanding, cooperation, and conflict resolution in diverse global contexts.

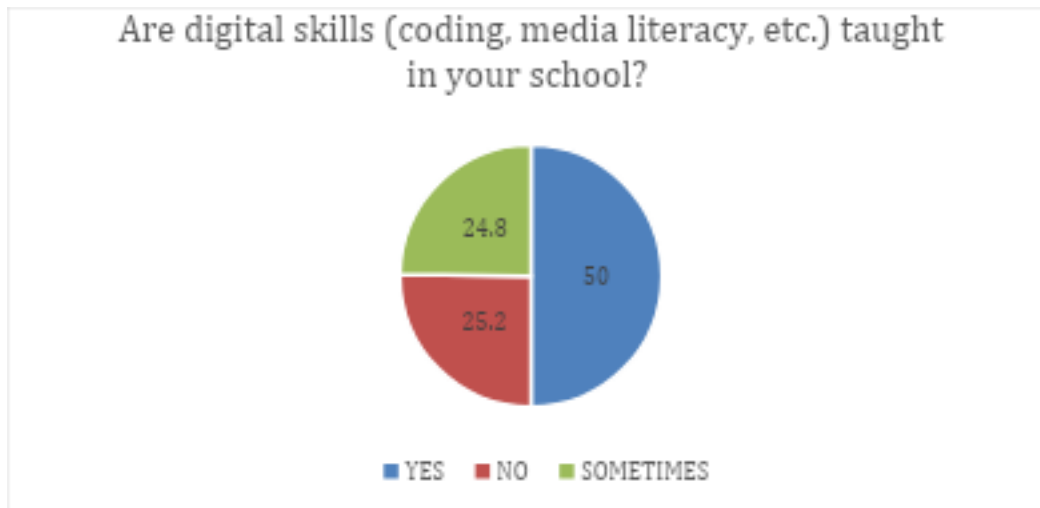
Section E: Innovation and Technology

21. Following pie chart displays responses to the question: "Do you use technology to research and learn about world events?"



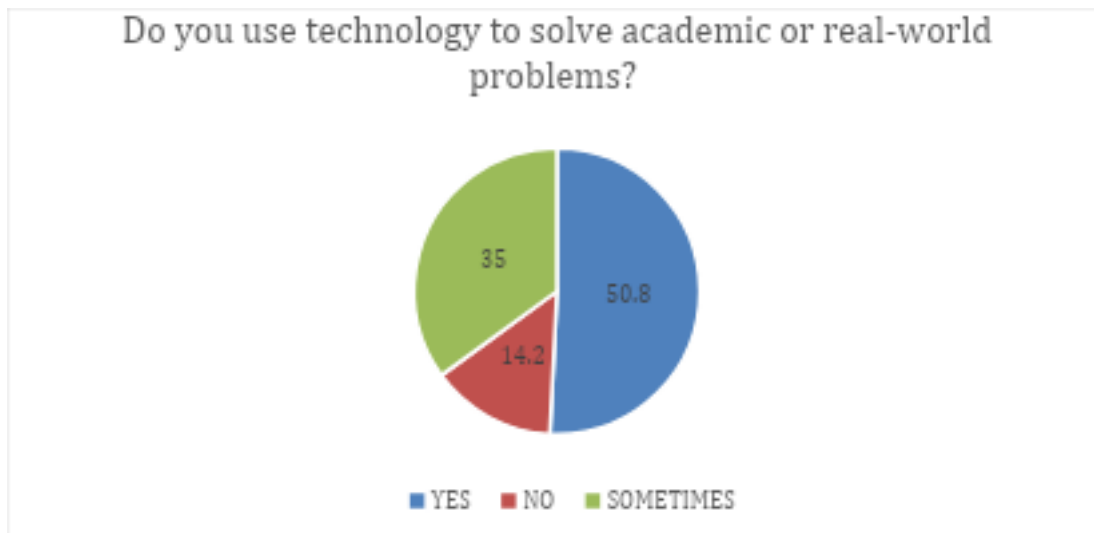
The data suggests that technology plays a significant role in how people stay informed about world events. With nearly 90% of respondents either using or sometimes using technology to research world events, it is clear that digital platforms and tools are central to modern learning and global awareness. This highlights the growing dependence on technology for information.

22. Following pie chart displays responses to the question: "Are digital skills (coding, media literacy, etc.) taught in your school?"



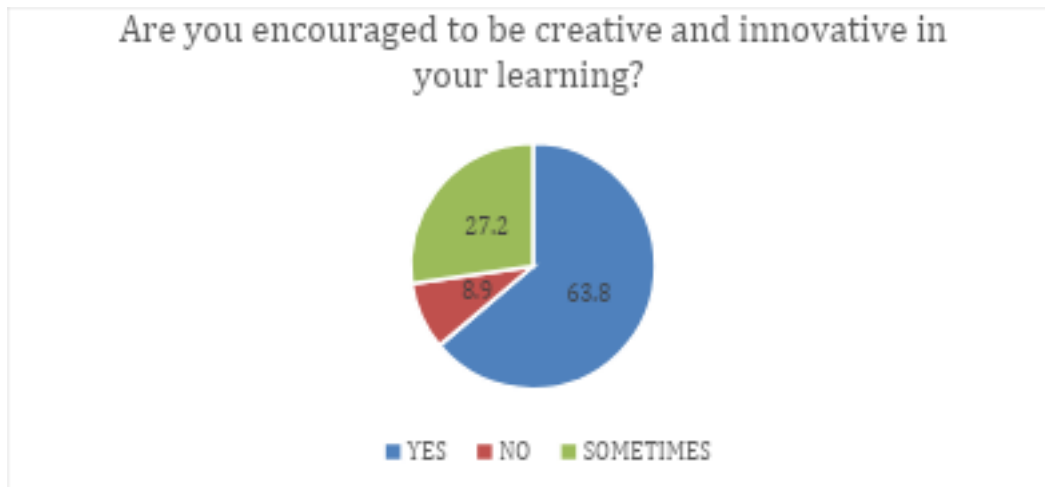
The data suggests that while digital skills are recognized as important, there is inconsistency in how widely they are integrated into school curricula. With half of respondents affirming that their schools teach digital skills, it is clear that many schools are prioritizing these competencies, which are vital in the digital age.

23. Following pie chart displays responses to the question: "Do you use technology to solve academic or real-world problems?"



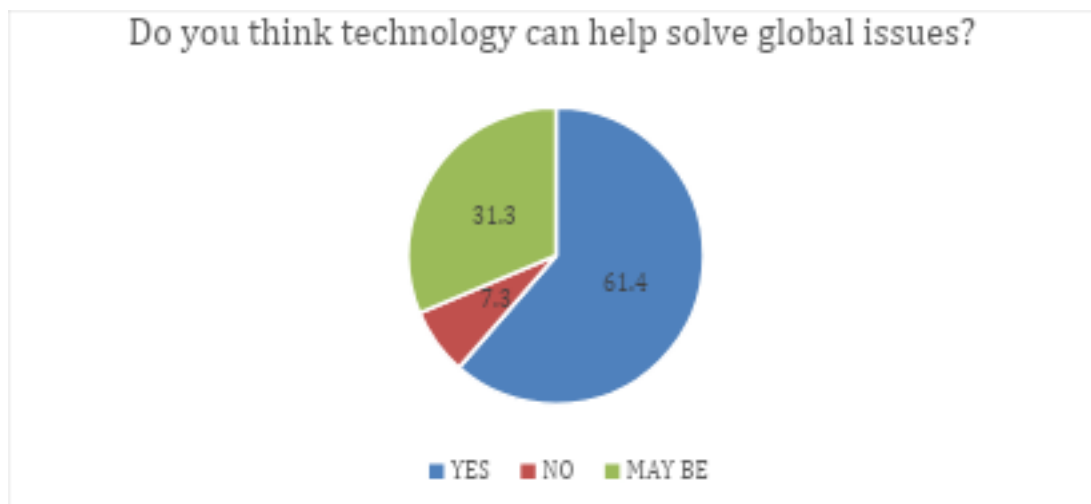
The results show that technology plays a significant role in solving both academic and real-world problems for many respondents, with over half actively using it for such purposes. These findings suggest that while technology is an important tool for many, there may still be barriers to its widespread and consistent use, such as access issues, skill levels, or personal preference.

24. Following pie chart displays responses to the question: "Are you encouraged to be creative and innovative in your learning?"



The results suggest that creativity and innovation are encouraged in the learning environments of most respondents, with over 60% indicating they are supported in thinking creatively. There is potential to expand and strengthen efforts to nurture innovation in education, ensuring that all students have opportunities to develop creative problem-solving skills, which are essential for success in both academic and real-world contexts.

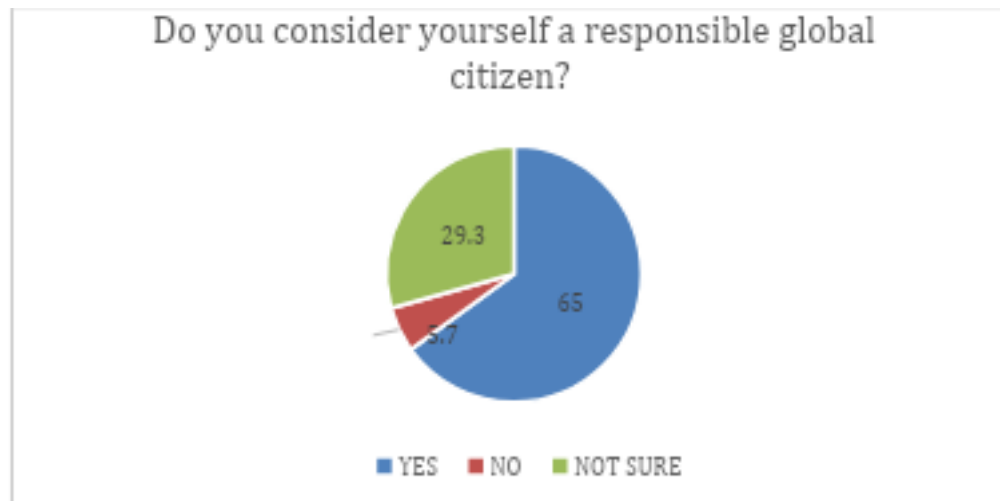
25. Following pie chart displays responses to the question: "Do you think technology can help solve global issues?"



The small percentage (7.3%) who believe technology cannot help highlights a minority perspective that may reflect concerns over technology's limitations or the complexities of global problems. Overall, there is a strong belief that technology has a role to play, but more work may be needed to demonstrate its effectiveness in solving global issues in practical and scalable ways.

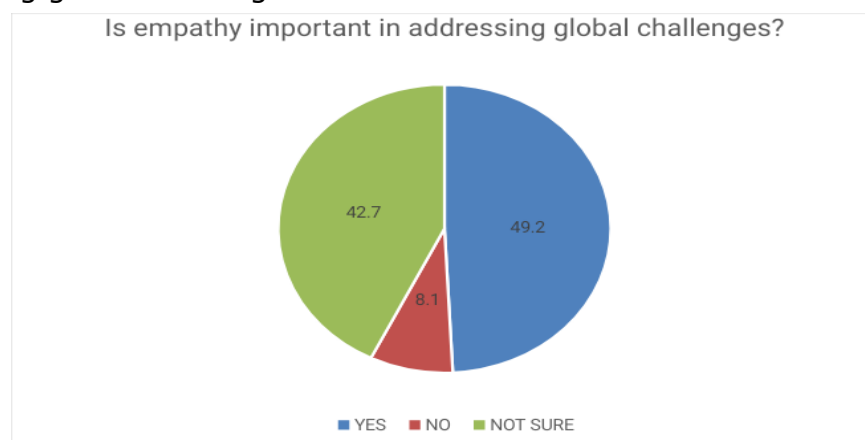
Section F: Values and Global Citizenship

26. Following pie chart displays responses to the question: "Do you consider yourself a responsible global citizen?"



The results show that a significant portion of respondents (65%) view themselves as responsible global citizens, indicating a strong sense of global awareness and responsibility. However, the 29.3% who are unsure reflects a need for further education and clarification about what it means to be a responsible global citizen. The small group (5.7%) who do not consider themselves responsible highlights an opportunity to foster greater engagement and self-awareness regarding global citizenship. Efforts to encourage responsibility and provide clear examples of global citizenship could help more individuals feel empowered.

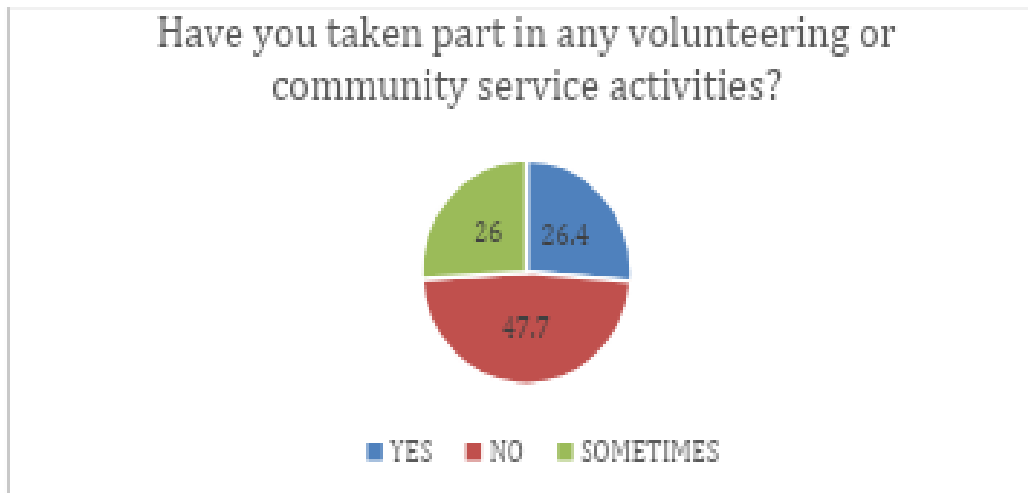
27. Following pie chart displays responses to the question: "Is empathy important in addressing global challenges?"



The results reveal that while a significant number of people (49.2%) view empathy as important in addressing global challenges, a high level of uncertainty (42.7%) indicates the need for more awareness and education about the role of

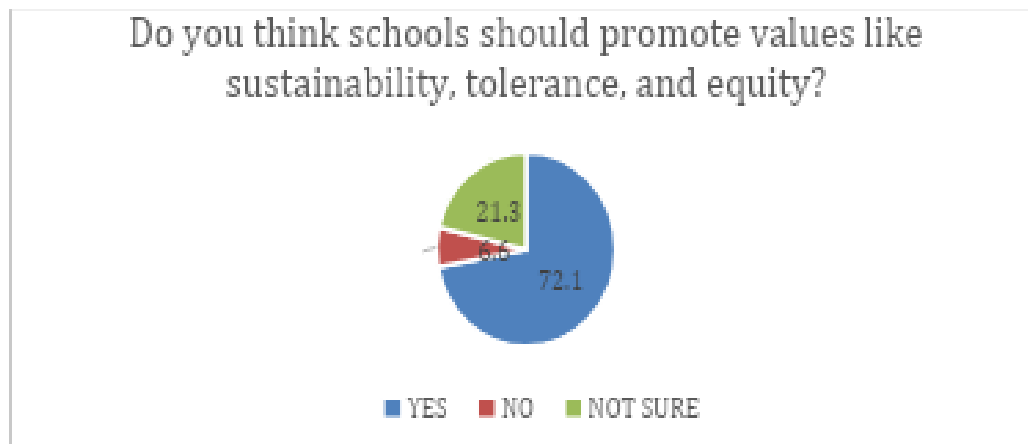
empathy in global cooperation and conflict resolution. The small percentage (8.1%) who disagrees may reflect differing views on the most effective ways to approach global issues.

28. Following pie chart displays responses to the question: "Have you taken part in any volunteering or community service activities?"



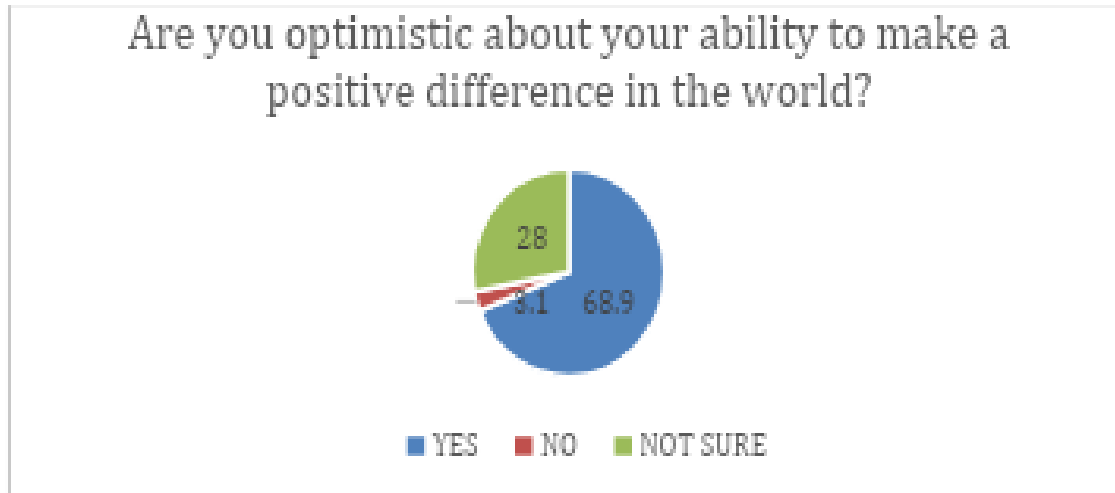
The data shows that participation in volunteering or community service among respondents is quite low, with less than one-third having engaged in such activities. The high percentage of non-participation (47.7%) and the uncertainty among 26% of respondents point to a need for greater encouragement, awareness, and opportunities for community involvement.

29. Following pie chart displays responses to the question: "Do you think schools should promote values like sustainability, tolerance, and equity?"



The results highlight a clear consensus that schools have an important role in promoting key global values and the data supports the idea that value-based education is essential in preparing students to contribute positively to a diverse and interconnected world.

30. Following pie chart displays responses to the question: "Are you optimistic about your ability to make a positive difference in the world?"



The data reveals a generally positive outlook among respondents regarding their potential to create change. The very small percentage of those who are not optimistic indicates that most individuals still see value in their actions, reinforcing the importance of nurturing this mindset through support and opportunities for meaningful engagement.

Conclusion:

As the world continues to evolve amid complex global challenges, the role of education must also transform to meet the demands of the future. Preparing students to thrive in an interconnected and uncertain world requires more than traditional academic knowledge—it calls for the intentional development of critical thinking, problem-solving, communication, collaboration, innovation, and a deep sense of global citizenship. Junior college students, in particular, stand at a pivotal point in their personal and academic development, and equipping them with these essential competencies is key to shaping a generation capable of leading meaningful change. This paper has highlighted the importance of integrating global issues into education and the need to reform curricula, teaching methods, and student engagement strategies. By fostering awareness, values, and 21st-century skills, educators can empower students to not only understand the world around them but also to take initiative and contribute to solutions. Equipping minds for tomorrow begins today—with education that is relevant, inclusive, and forward-looking.

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A STUDY ON TEACHING STYLES AMONG THE PRE-SERVICE TEACHERS

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Abstract:

Teaching style refers to the way a teacher delivers instructions, interacts with students, manages the classroom and facilitates learning. It also reflects the teacher's personality, beliefs about education, communication methods and instructional strategies. This research aims to explore the teaching styles adopted by the pre-service teachers. The study explores the predominant teaching style among these future educators. The goal was to understand how these future teachers approach teaching and what shapes their preferences in the classroom. A quantitative research approach was adopted, based on Grasha's Teaching Style as the primary tool for data collection. Grasha's Teaching Style Model identifies five distinct teaching styles as expert, formal authority, personal model, facilitator, and delegator. A scale consists of 60 items, each rated on a 5 point Likert scale. The total score varied from 60 to 300, showing lowest teaching style to highest teaching style. The study involved participants included first-year and second-year student teachers B.Ed programs, allowing for a comparative understanding of teaching style preferences across different levels of teacher education. The findings indicated that there is an overall significant difference between F.Y.B.Ed and S.Y.B.Ed pre-service teachers. The findings also highlighted that there is significant difference in Formal Authority style between F.Y.B.Ed and S.Y.B.Ed pre-service teachers. Additionally there was no significant difference in Expert, Demonstration, Facilitator and delegator style between F.Y.B.Ed and S.Y.B.Ed pre- service teachers.

Keywords: *Teaching Style, Pre-service teachers, Expert, Formal Authority, Demonstration, Facilitator, Delegator*

Introduction:

Each teacher has a unique approach towards the classroom based on their experiences, personality and background. The approach which a teacher brings to teach is known as teaching style. Teaching style plays a very important role in shaping the learning experience and outcomes of students. Teaching style defines how the teacher communicates with the students and manages the classroom, supports learning and delivers the content. As a future teacher it is important to understand teaching style during teacher training as this is the time when future educators begin shaping how they will teach and who they will be as a profession. Grasha's Teaching Style Model helps us to understand different styles teachers teach and how teacher interacts with students and deliver instructions, by dividing them into five main types. Expert, Formal Authority, Demonstration, Facilitator and Delegator.

Expert This teacher shares deep knowledge of the subject and aims to guide students by being a reliable source of information and answers.

Formal Authority This style involves setting clear rules and expectations, with the teacher maintaining structure and order to support learning.

Demonstration The teacher leads by example, showing students how to approach tasks by doing them first and letting students learn through observation.

Facilitator This teacher supports students as they explore, ask questions, and work together, encouraging them to think for themselves and take an active role in learning.

Delegator With this style, the teacher gives students more independence, allowing them to take responsibility, make decisions, and learn through self-directed activities. This study explores the teaching style preferences of pre-service teachers to gain insight into how they are starting to develop their teaching identity, and how teacher training programs can support them in this process.

Significance of the study:

Pre-service teachers are at a very crucial stage where they begin to shape their personality as future educators. Their teaching style such as how they present lessons, interact with students, and manage the classroom starts to take form during this teacher training programme. By learning more about teaching styles pre service teachers naturally lean towards, educators and trainers can support their growth better by introducing a wider range of strategies and helping them to adapt a perfect teaching style for future teachers. With this knowledge mentors and trainers can guide students in exploring different approaches, stepping out of their comfort zone and developing the flexibility needed in today's diverse classroom. Overall this study

is important because teaching is not the same for everyone. The more we understand how future teachers perceive their role in the classroom the better we can help them grow into confident, adaptable, responsive, thoughtful educators.

Objectives of the study:

1. To study the dominant teaching styles among B.Ed. students.
2. To compare the teaching styles between F.Y.B.Ed. students and S.Y.B.Ed. students.
3. To compare the expert teaching style between F.Y.B.Ed. students and S.Y.B.Ed. students.
4. To compare the Formal authority teaching style between F.Y.B.Ed. students and S.Y.B.Ed. students.
5. To compare the Demonstration teaching style between F.Y.B.Ed. students and S.Y.B.Ed. students.
6. To compare the Facilitator teaching style between F.Y.B.Ed. students and S.Y.B.Ed. students.
7. To compare the Delegator teaching style between F.Y.B.Ed. students and S.Y.B.Ed. students.

Hypotheses:

1. There is no significant difference in the overall teaching styles preferred by F.Y.B.Ed. students and S.Y.B.Ed. students.
2. There is no significant difference in the expert teaching style between F.Y.B.Ed. students and S.Y.B.Ed. students.
3. There is no significant difference in the Formal authority teaching style between F.Y.B.Ed. students and S.Y.B.Ed. students.
4. There is no significant difference in the Demonstration teaching style between F.Y.B.Ed. students and S.Y.B.Ed. students.
5. There is no significant difference in the Facilitator teaching style between F.Y.B.Ed. students and S.Y.B.Ed. students.
6. There is no significant difference in the Delegator teaching style between F.Y.B.Ed. students and S.Y.B.Ed. students.

Tools used:

A standardized tool "Teaching style scale" by Dr. Sapna Sharma and Divya Saran was used for collection and analysis of data. This tool was developed on the basis of the theories of GRASHA & GRASHA (1996). This tool consists of 60 items in 5-point likert scale.

Table 1: Scoring system

Nature of the item	Strongly agree	Agree	Undecided	Disagree	Strongly disagree
Positive	5	4	3	2	1
Negative	1	2	3	4	5

Methodology:

This study has employed descriptive-comparative research design of quantitative approach. A sample size of total 63 was selected using purposive non-random sampling. The sample size belonged to the age group of age 18 and above. Self-administered google form was used to collect data from samples. It was circulated among the target population by providing links through WhatsApp.

Analysis of data:

Null Hypothesis 1

There is no significant difference in overall teaching style between F.Y.B.Ed and S.Y.B.Ed student teachers.

Table 1. Relevant Statistics of mean scores of Overall Teaching Style among F.Y.B.Ed and S.Y.B.Ed student teachers.

Group	N	df	Mean	SD	SEd	T(cal)	T(tab)	L.of Sig
F.Y.B.Ed	33	62	260.76	27.28	14.21	4.08	1.99	S at 0.05
S.Y.B.Ed	31		205.11	21.20				

From the preceding table, it is evident that the calculated t-value is 4.08, which is significant at 0.05 level with df = 62. It reflects that mean scores of overall teaching styles of B.Ed. students differ significantly. In this context the null hypothesis that there is significant difference in teaching styles preferred by F.Y.B.Ed. students and S.Y.B.Ed. students. The mean score F.Y.B.Ed. students is 260.76 which is significantly higher than S.Y.B.Ed. whose mean score is 205. It may therefore be said that F.Y.B.Ed. scored higher teaching styles as compared to S.Y.B.Ed.

Null Hypothesis 2

There is no significant difference in Expert teaching style between F.Y.B.Ed and S.Y.B.Ed student teachers.

Table 2. Relevant Statistics of mean scores of Expert Teaching Style among F.Y.B.Ed and S.Y.B.Ed student teachers.

Group	N	df	Mean	SD	SEd	T(cal)	T(tab)	L.of Sig
F.Y.B.Ed	33	62	51.09	3.36	0.97	0.86	1.99	NS at 0.05
S.Y.B.Ed	31		51.93	4.24				

From the preceding table, it is evident that the calculated t-value is 0.86, which is not significant at 0.05 level with $df = 62$. It reflects the mean scores of the expert teaching style of B.Ed. students do not differ significantly. In this context the null hypothesis is that there is no significant difference in expert teaching styles preferred by F.Y.B.Ed. students and S.Y.B.Ed. students. The mean score F.Y.B.Ed. students is 51.09 which is not significantly higher than S.Y.B.Ed. whose mean score is 51.93. It may therefore be said that S.Y.B.Ed. scored higher in expert teaching styles as compared to F.Y.B.Ed.

Null Hypothesis 3

There is no significant difference in Formal Authority teaching style between F.Y.B.Ed and S.Y.B.Ed student teachers.

Table 3. Relevant Statistics of mean scores of Formal Authority Teaching Style among F.Y.B.Ed and S.Y.B.Ed student teachers.

Group	N	Df	Mean	SD	SEd	T(cal)	T(tab)	L.of Sig
F.Y.B.Ed	33	62	103.78	4.83	0.70	12.66	1.99	S at 0.05
S.Y.B.Ed	31		49.3	4.21				

From the preceding table, it is evident that the calculated t-value is 12.66, which is significant at 0.05 level with $df = 62$. It reflects that mean scores of formal authority teaching styles of B.Ed. students differ significantly. In this context the null hypothesis that there is significant difference in formal teaching styles preferred by F.Y.B.Ed. students and S.Y.B.Ed. students. The mean score F.Y.B.Ed. students is 103.78, which is significantly higher than S.Y.B.Ed. whose mean score is 49.3.

It may therefore be said that F.Y.B.Ed. scored higher formal teaching styles as compared to S.Y.B.Ed.

Null Hypothesis 4

There is no significant difference in Demonstration teaching style between F.Y.B.Ed and S.Y.B.Ed student teachers.

Table 4. Relevant Statistics of mean scores of Demonstration Teaching Style among F.Y.B.Ed and S.Y.B.Ed student teachers.

Group	N	df	Mean	SD	SEd	T(cal)	T(tab)	L.of Sig
F.Y.B.Ed	33	62	35	6.85	7.9	0.12	1.99	NS at 0.05
S.Y.B.Ed	31		34.03	3.94				

From the preceding table, it is evident that the calculated t-value is 0.12, which is not significant at 0.05 level with df =62. It reflects the mean scores of the demonstration teaching style of B.Ed. students do not differ significantly. In this context the null hypothesis is that there is no significant difference in demonstration teaching styles preferred by F.Y.B.Ed. students and S.Y.B.Ed. students. The mean score F.Y.B.Ed. students is 35 which is significantly higher than S.Y.B.Ed. whose mean score is 34.03.

It may therefore be said that S.Y.B.Ed. have not scored higher in expert teaching styles as compared to F.Y.B.Ed.

Null Hypothesis 5

There is no significant difference in Facilitator teaching style between F.Y.B.Ed and S.Y.B.Ed student teachers.

Table 5. Relevant Statistics of mean scores of Facilitator Teaching Style among F.Y.B.Ed and S.Y.B.Ed student teachers.

Group	N	df	Mean	SD	SEd	T(cal)	T(tab)	L.of Sig
F.Y.B.Ed	33	62	36.12	7.88	9.22	0.16	1.99	NS at 0.05
S.Y.B.Ed	31		34.63	4.78				

From the preceding table, it is evident that the calculated t-value is 0.16, which is not significant at 0.05 level with df = 62. It reflects that mean scores of facilitator teaching styles of B.Ed. students do not differ significantly. In this context the null hypothesis that there is no significant difference in formal teaching styles preferred by F.Y.B.Ed. students and S.Y.B.Ed. students is accepted. The mean score F.Y.B.Ed. students is 36.12, which is significantly higher than S.Y.B.Ed. whose mean score is 34.63.

It may therefore be said that F.Y.B.Ed. scored higher facilitator teaching styles as compared to S.Y.B.Ed.

Null Hypotheses 6

There is no significant difference in Delegator teaching style between F.Y.B.Ed and S.Y.B.Ed student teachers.

Table 6. Relevant Statistics of mean scores of Delegator Teaching Style among F.Y.B.Ed and S.Y.B.Ed student teachers.

Group	N	df	Mean	SD	SEd	T(cal)	T(tab)	L.of Sig
F.Y.B.Ed	33	62	34.76	4.34	5.91	0.05	1.99	NS at 0.05
S.Y.B.Ed	31		35.1	4.01				

From the preceding table, it is evident that the calculated t-value is 0.05, which is not significant at 0.05 level with $df = 62$. It reflects the mean scores of delegator teaching styles of B.Ed. students do not differ significantly. In this context the null hypothesis that there is no significant difference in delegator teaching styles preferred by F.Y.B.Ed. students and S.Y.B.Ed. students is accepted. The mean score F.Y.B.Ed. students is 34.76, which is significantly less than S.Y.B.Ed. whose mean score is 35.1.

It may therefore be said that S.Y.B.Ed. scored higher formal teaching styles as compared to F.Y.B.Ed.

Findings:

1. There is a significant difference between the overall teaching styles preferred by F.Y.B.Ed. students and S.Y.B.Ed. students.
2. There is no significant difference between the expert teaching style between F.Y.B.Ed. students and S.Y.B.Ed. students.
3. There is a significant difference between the Formal authority teaching style between F.Y.B.Ed. students and S.Y.B.Ed. students.
4. There is no significant difference between the Demonstration teaching style between F.Y.B.Ed. students and S.Y.B.Ed. students.
5. There is no significant difference between the Facilitator teaching style between F.Y.B.Ed. students and S.Y.B.Ed. students.
6. There is no significant difference between the Delegator teaching style between F.Y.B.Ed. students and S.Y.B.Ed. students.

Conclusion and discussion:

Hypothesis 1

There is a significant difference between the overall teaching styles preferred by F.Y.B.Ed. students and S.Y.B.Ed. students.

Discussion:

The significant difference between both the classes may be attributed to the exposure and experience

- S.Y.B.Ed. students have more practical experience due to the internships. This provides them with a more differentiated understanding of teaching styles with practical sense.
- F.Y.B.Ed. students lack this practical understanding as they are still in the exploring phase.

Hypothesis 2

There is no significant difference between the expert teaching style between F.Y.B.Ed. students and S.Y.B.Ed. students.

Discussion:

- There is no significant difference between both the classes with respect to expert teaching style because students of both the classes are still in the learning phase.
- They have the notion of prioritizing knowledge and expertise in the content matter.

Hypothesis 3

There is a significant difference between the Formal authority teaching style between F.Y.B.Ed. students and S.Y.B.Ed. students.

Discussion:

- The significant difference between both the classes may be attributed to the exposure and experience.
- S.Y.B.Ed. students have undergone real-life classroom management challenges. They have first hand experience of disciplining and the authoritative nature of teachers.
- F.Y.B.Ed. students have more theoretical understanding leading with no practical experiences.

Hypothesis 4

There is no significant difference between the Demonstration teaching style between F.Y.B.Ed. students and S.Y.B.Ed. students.

Discussion:

- There is no significant difference between both the classes because both the classes are trained to use illustrations and models while teaching.

- Both classes have students mostly ranging from 18-25 and above, these young pre-service teachers come up with a prototype for new thinking and behaviour.

Hypothesis 5

There is no significant difference between the Facilitator teaching style between F.Y.B.Ed. students and S.Y.B.Ed. students.

Discussion:

- There is no significant difference between both the classes with respect to facilitator teaching style because both the classes don't have enough experience of facilitator teaching style.
- S.Y.B.Ed. though have some experience with the internships but they had little autonomy in their hands to facilitate students.

Hypothesis 6

There is no significant difference between the Delegator teaching style between F.Y.B.Ed. students and S.Y.B.Ed. students.

Discussion:

- S.Y.B.Ed. students had less autonomy to delegate students with learning in autonomous fashion in their internship period.
- F.Y.B.Ed. students had no such experience with delegating task leading to their less understanding of delegator style.

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EXPLORING THE RELATIONSHIP BETWEEN MENTAL HEALTH, STRESS, AND ACADEMIC ACHIEVEMENT

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Abstract:

*This mixed-methods study examines the relationships among mental health, stress, coping mechanisms, and academic achievement in a sample of pre-service teachers. Data were collected from 42 participants enrolled in B.Ed., D.El.Ed., and E.C.E.P. programs via a Google Forms questionnaire comprising **standardized** items and open-ended questions. Quantitative results indicate a negative association between high stress levels and academic performance, while better self-reported mental health is associated with higher academic achievement. Qualitative responses show that peer support and self-regulation strategies function as protective factors; however, institutional mental health support was largely absent or underutilized. The findings support integrating structured mental health services, resilience workshops, and improved teacher–student communication within teacher education programs. Limitations include a small convenience sample and reliance on self-report measures; recommendations for longitudinal and intervention research are discussed.*

Keywords: *mental health, stress, academic achievement, coping mechanisms, pre-service teachers*

Introduction:

Academic achievement is a key determinant of students' career opportunities, socioeconomic outcomes, and life satisfaction. Increasing academic demands—exams, deadlines, and competitive pressures—have been associated with elevated stress and related mental health problems among students (Reddy, Menon, & Thattil, 2018). Chronic stress impairs executive functions such as concentration, memory, and decision-making, which in turn undermine academic performance (ISMINC, n.d.). The relationship between mental health and academic performance is especially salient for pre-service teachers, who must manage dual responsibilities of academic work and professional preparation (Akanpaadgi, Binpimbu, & Kuuyelleh, 2023). This study investigates how stress, mental health, and coping mechanisms

interrelate with academic achievement in a sample of pre-service teachers and explores institutional supports that might strengthen student well-being and academic success.

Theoretical Framework:

The study is taught by two complementary frameworks:

Transactional Model of Stress and Coping (Lazarus & Folkman, 1984): Stress arises from individual appraisal of external demands and perceived coping resources; coping strategies (problem-focused and emotion-focused) mediate the stress–outcome relationship.

Conservation of Resources Theory (Hobfoll, 1989): Individuals strive to acquire and preserve valued resources (e.g., emotional energy, time, attention); stress occurs when these resources are threatened or depleted, leading to diminished functioning and performance.

By situating stress and coping within these frameworks, the study considers both subjective appraisal and resource-based explanations for variations in academic outcomes.

Literature Review:

Empirical studies consistently show that elevated stress negatively affects academic performance. Akanpaadgi et al. (2023) identified workload, inadequate facilities, and financial pressures as sources of student stress that impaired academic outcomes.

Hachintu and Kasisi (2022) reported that ineffective stress management among adolescents may lead to substance use, absenteeism, and school dropout.

At the university level, Reddy et al. (2018) found that fear of failure, perceived inadequacy, and strained teacher–student relations were key contributors to academic stress, which reduced concentration and motivation.

ISMINC highlighted that mental health problems (e.g., low self-esteem, anxiety) are associated with decreased engagement and poorer academic performance.

Although these studies affirm the link between stress and academic outcomes, fewer investigations focus specifically on pre-service teachers, a population that faces unique academic and professional pressures. The present study contributes to this gap by examining stress, mental health, and coping mechanisms within teacher education programs.

Research Questions:

1. How do pre-service teachers perceive their academic performance and satisfaction with performance?
2. What are the primary sources and levels of academic stress experienced by pre-service teachers?

3. How frequently do pre-service teachers report stress-related physical and emotional symptoms?
4. What coping strategies do pre-service teachers use, and how effective are these perceived to be?
5. To what extent do pre-service teachers access institutional or professional mental health support?
6. Do pre-service teachers believe that improved institutional mental health support would enhance academic performance?

Objectives:

1. To examine the effect of mental health on academic achievement among pre-service teachers.
2. To identify common sources and levels of academic stress.
3. To assess the relationship between stress levels and academic performance.
4. To explore how mental health conditions (e.g., anxiety, depression) influence academic functioning.
5. To evaluate coping strategies used by pre-service teachers and their perceived effectiveness.
6. To provide recommendations for institutional strategies to promote student mental health and academic resilience.

Method:

Research Design:

A mixed-methods cross-sectional design was used. Quantitative items provided descriptive and correlational data; open-ended qualitative items supplied contextual detail and participant perspectives.

Participants:

The convenience sample comprised **42 pre-service teachers** enrolled in B.Ed., D.El.Ed., and E.C.E.P. programs at BTTC, HSNC University, Mumbai. Participants varied in age and educational background.

Measures and Procedure:

Data were collected via a Google Forms questionnaire containing: (a) demographic items; (b) self-rated academic performance and satisfaction (Likert-type); (c) items on study hours and perceived pressure; (d) frequency measures for stress-related emotional and physical symptoms; (e) items on coping strategies and their perceived effectiveness; and (f) open-ended questions about support systems and suggestions. Participation was voluntary and anonymous; informed consent was obtained electronically. No identifying information was collected. Responses were exported for descriptive quantitative analysis and thematic review of qualitative responses.

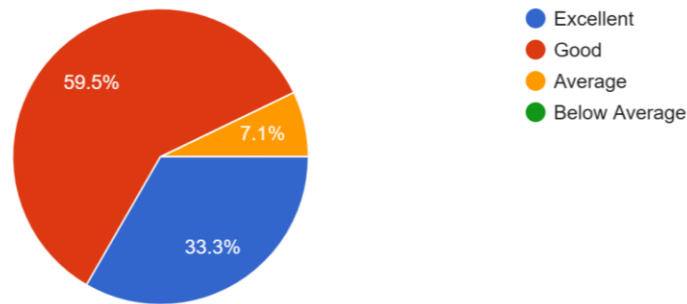
Ethical Considerations:

Ethical procedures included voluntary participation, anonymity, and digital informed consent. The study followed institutional norms for human-subjects research.

Results:

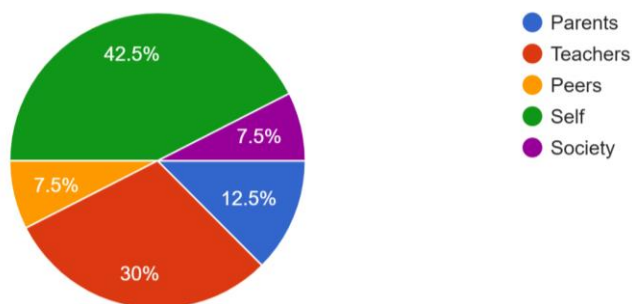
Demographic Analysis:

- **Pre-service Teachers rating their own performance.**



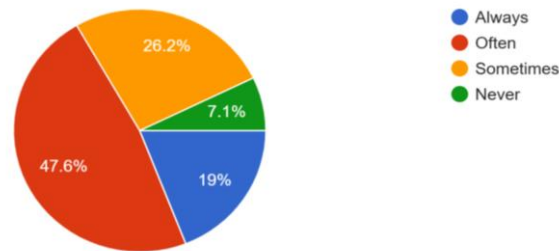
The pie chart shows that a majority of pre-service teachers rated their academic performance as good (59.5%), while 33.3% rated it as excellent and 7.1% as average. This indicates that most participants have a positive perception of their academic performance, reflecting overall confidence and satisfaction with their achievements.

- **The main source of academic stress in pre service teachers**



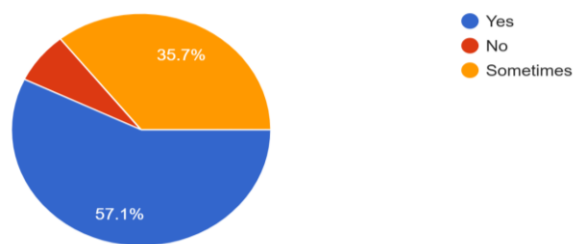
The data reveals that the majority of pre-service teachers (42.5%) identify self-imposed expectations as their primary source of academic stress. This is followed by stress from teachers (30%), while smaller percentages attribute it to parents (12.5%), peers (7.5%), and society (7.5%). This indicates that internal pressure plays a greater role in causing academic stress than external factors.

- **Pressure for performance**



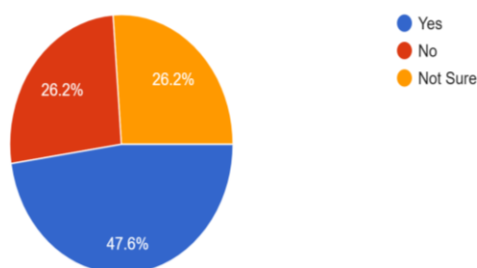
The chart shows that 47.6% of pre-service teachers often feel pressure to perform, while 26.2% experience it sometimes and 19% experience it always. Only 7.1% report never feeling such pressure. This suggests that a significant number of pre-service teachers frequently experience performance-related pressure in their academic lives.

- **Positive changes due to support from peers or faculty**



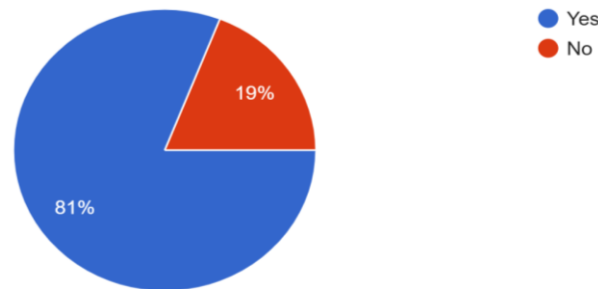
The data indicates that 57.1% of pre-service teachers have experienced positive changes in their mental health and academic performance due to support from peers or faculty. Meanwhile, 35.7% reported experiencing such positive effects sometimes, and only 7.1% said no. This highlights the crucial role of social and academic support systems in enhancing well-being.

- **Competition amongst peers contribute to the academic stress**



Nearly half of the participants (47.6%) believe that peer competition contributes to academic stress, while 26.2% disagree and another 26.2% are not sure. This suggests that although competition can be motivating for some, it also serves as a significant stress factor for many pre-service teachers.

- **Mental Stress awareness program in college**



More than 80% of the pre-service teachers are aware about the mental stress awareness program that took place in the college. This suggests that they participated in the seminars regarding their mental health.

Demographics & Academic Self-Assessment:

- The majority of participants rated their academic performance as **good to excellent**.
- Most reported studying **several hours daily**, but hours varied by individual schedules and course requirements.

Sources and Levels of Stress

- **Self-imposed expectations** (perfectionism) emerged as the most frequently reported source of academic pressure, exceeding family or faculty demands.
- Other notable stressors included **exam pressure, deadlines, and competition among peers**.

Symptoms of Stress

- Commonly reported physical symptoms: **fatigue, headaches, and sleep disturbances**.
- Psychological symptoms: **anxiety, emotional exhaustion, and moments of doubt about career choice**.

Coping Strategies and Support

- Frequently cited coping strategies: **peer support, time management, structured study plans, relaxation techniques, and brief breaks**.
- Many participants reported that coping strategies were **somewhat effective**, but a minority reported sustained difficulties despite these strategies.

- Institutional mental health resources were **underused or perceived as insufficient**; few participants reported discussing problems with faculty or counselors.

Discussion:

The results align with prior research demonstrating a **negative relationship between stress and academic performance** (Reddy et al., 2018) and showing that self-imposed expectations (academic perfectionism) are prominent stressors (Hachintu & Kasisi, 2022). The prevalence of physical and emotional symptoms highlights the biopsychosocial impact of academic stress, consistent with ISMINC's (n.d.) synthesis of mental health effects on learning.

The prominence of peer support suggests that students rely primarily on informal networks rather than formal institutional resources. This reliance indicates a gap in institutional mental health provision and approachability. Integrating structured mental health programs (e.g., workshops, counseling services, resilience-building curricula) could address unmet needs and buffer against stress-related declines in academic performance.

Limitations:

1. **Sample Size and Sampling Method:** The small convenience sample (N = 42) limits generalizability.
2. **Self-Report Measures:** Reliance on self-rated performance and retrospective symptom recall can introduce social desirability and recall biases.
3. **Cross-Sectional Design:** The design precludes causal conclusions about the directionality of relationships.
4. **Instrumentation:** Standardized psychometric instruments (e.g., validated stress or mental health scales) were not used, which limits psychometric certainty.

Recommendations & Future Research:

- **Longitudinal studies** to assess causal relations between stress, mental health, and academic outcomes over time.
- **Larger, multi-institutional samples** to improve external validity.
- **Intervention trials** (e.g., mindfulness, resilience training) to evaluate efficacy in reducing stress and improving achievement.
- **Use of validated measures** (e.g., DASS-21, Perceived Stress Scale, standardized academic performance indicators) for robust measurement.
- **Institutional policy development:** implement accessible counseling, faculty training for mental health awareness, and curricular space for wellbeing workshops.

Conclusion:

This study reveals a clear connection between elevated stress and reduced academic functioning among pre-service teachers, while positive mental health and effective coping are linked to better academic outcomes. Although most participants reported satisfactory academic performance, internal pressures and insufficient institutional support represent significant challenges. Implementing structured mental health services and resilience-building programs within teacher education can enhance academic achievement and prepare emotionally resilient future educators.

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FUTURE OF TRADITIONAL BUSINESS OF READY-MADE GARMENT IN THE AGE OF E-COMMERCE IN ULHASNAGAR

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Abstract:

As readymade garment industries are those industries which satisfy our basic wants of life such as clothing and it has been observed that since past few years that ready-made garments industry in India has major contributing in our economy. With the rapid growth of E-commerce business which has transformed India into digital nation, shifting traditional buying patterns to online platforms. But it was the time when there was rush in the markets of Ulhasnagar to purchase ready-made garment offline with trial room and bargaining facility. But with changes in time and advancement in the technology consumer's perception has also changed. Since Sindhi peoples are the one who initially took initiative to start business when they migrated from Pakistan. After migration they started small cottage industries and slowly and gradually they develop their business in Ulhasnagar and now it is famous for wholesale market of jeans and gown, electronic, retail readymade garment market and supply it to not only national and but also international markets. Aim of the study is to find out the changes in behaviour of consumer in buying pattern and impact of E-commerce on the sale of traditional businessman of readymade garment in Ulhasnagar. Data is collected from 50 consumers buying ready-made garments and 50 traditional businessman of readymade garments businessman from Ulhasnagar town in thane district in Maharashtra state and Samples for survey were randomly selected by convenience sampling method and questionnaire method is adopted to collect the data. Findings will help to comprehend the problems faced by traditional businessman in Ulhasnagar and changes in the behaviour of consumer after E-commerce while purchasing ready-made garments. It can be concluded while analysis the data collected for this research that e-commerce has badly impacted the traditional businessman of readymade garment in Ulhasnagar but in order to face competition from e-commerce sites traditional business man in Ulhasnagar should adopt hybrid models to attract more customers and increase their sale.

Key words: *E-Commerce, Perception, Traditional Business.*

Introduction:

A) Role of traditional business:

Traditional business refers to face to face process of buying and selling goods in brick- and mortar store, by exchanging goods for money. It relies on conventional¹ techniques and technology. These include manufacturers, distributors, retailers, and wholesalers.

B) What is traditional readymade garment business?

It is a kind of sale of readymade garment such as shirt, Kurtis, jeans, pants, salwar suits, and etc. By sellers to buyers face to face in exchange of money.

C) Importance of ready-made garments industry :(Data taken from an overview of the Readymade Garments Industry in India, R.S. Balkumar Associate Professor, Dept. Of Fashion Design & Arts, Hindustan University, Chennai, India, 10/01/2021)

Today, India is the world's 6th largest exporter of readymade garment products, registering over US\$17 billion in readymade garment export value annually. India is known for its high quality garments for men and most of the garment manufacturers are in the Small and Medium large scale industry. Indian sub-continent is the second largest manufacturer of garments after China being the global leader in garment production.

D) Meaning of E-commerce

E-commerce refers to buying and selling of goods online through computers, tablets², smartphones, and some other smart devices. E-commerce encompasses a wide range of products such as music, plane tickets, and financial services and etc.

E) Types of E-commerce business models: There are seven types of E-commerce business models.

- 1) Business to consumer (B2C)
- 2) Business to Business (B2B)
- 3) Business to business to consumers (B2B2C)
- 4) Business to Government (B2G)
- 5) Consumer to Business (C2B)
- 6) Consumer to Consumer (C2C)
- 7) Direct to end-consumer (D2C)

¹ conventional

² Tablets computer is a portable, wireless device that is typically larger than smartphone but smaller than a laptop

F) How E-commerce works in readymade garment business

E-commerce helps the customer to browse and buy the apparel online with the help of internet through websites or online platforms where they can see readymade garment details, size, and colour, fabric from 360 degree angle and then order while making payment online or cash on delivery when delivered to their address.

G) Problems faced by customers while shopping readymade garments online.

Some of the issues that customers face while shopping readymade garment online are size, colour shade, quality of fabric and etc.

H) Impact of E-commerce on traditional businessman of Ulhasnagar:

- 1) Local traders have resorted to unethical practice such as bombarding³ E-commerce sites with fake orders and then rejecting delivery of goods. This has resulted in online companies blocking their town, and such strategy was used in other cities as well because traditional business suffer not only huge losses due to profitable deals given by online stores but also posing threat to the jobs of their staff which also creates loss of the revenue for government as online companies pay less tax. (Times of India, 30 Oct, 2018 by Pradeep Gupta)
- 2) Ulhasnagar, key manufacturing hub of Maharashtra, has lost nearly Rs.500 crores in business due to second round of lockdown that starts from the first week of April. The manufacturing units, retail and wholesale outlets were closed for two months which was the second wave of coronavirus pandemic which give rise to E-commerce business in Ulhasnagar. (By Vinay Dalvi, Mumbai Mirror: updated 30 may, 2021)

I) Importance of the study

While observing these above mentioned examples of negative impacts of E-commerce on the sale of traditional business man in Ulhasnagar so I feel the need to do research on this topic "Future of traditional business of readymade garment in the age of E-commerce in Ulhasnagar" to find out the impact of E-commerce on the sales performance of traditional businessman of readymade garment business in Ulhasnagar while competing with E-commerce business and also to find out changes in the consumers behaviour in Ulhasnagar after E-commerce.

³ Bombarding in e-commerce means a type of cyber-attack called email bombing, which involves sending a large number of emails to an address or server

This study will also help to suggest some strategies to the traditional businessmen of readymade garment business to increase their sale and profit which will also increase the revenues of local government (UMC) and also shift to hybrid model- both online and offline as the future of ecommerce.

(J) Limitations of the study

The study is very much subjected to one small town i.e. Ulhasnagar of thane district.

- 1) Most of the research is based on primary data.
- 2) Very limited information is available on this topic in the published form.

Research Methodology:

This research study is an empirical study based on a convenience sample survey method. The sample of 50 customers and 50 traditional businessman doing offline business of readymade garment business were randomly selected from Ulhasnagar which is small town in Thane district of Maharashtra state. Shops of readymade garments were contacted by using questionnaire to collect primary data from traditional businessman and consumers .Ulhasnagar is divided in to five camps i.e., camp no-1 to camp no-5 but most of the traditional retail businessman of readymade garments are in camp no-2, 4 & 5. To achieve the objectives of the research primary data and secondary data are collected from the sources such as Google scholars, local newspapers, websites and Google& etc.

Objectives of the Study:

- 1) To find out the impact on sales performance of traditional businessman of readymade garments business in Ulhasnagar after e-commerce.
- 2) To find out the changes in behaviour of consumer while buying readymade garment in Ulhasnagar.

Review of Literature:

- 1) Shahjee, R. (2016).⁴ It explains about the effect of e-commerce on business. It focusses on the Management Information Systems, Finance and Accounting, Marketing and Computer Sciences of E-Commerce on Business. E-commerce plays a crucial role in the economic growth and economic development of our nation. The data is collected from secondary sources such as books related to e-commerce, marketing research, internet marketing and etc. It concludes that due

⁴ Shahjee, R. (2016). *The impact of electronic commerce on business organization. Scholarly Research Journal for interdisciplinary studies*, 4(27), 3130-3140.m
(https://www.academia.edu/download/51477570/10._rajneesh_shahjee.pdf, accessed on 27/6/2023 at 22:02 p.m.)

lack of proper infrastructural facility and knowledge about basic computers, e-commerce may face some difficulties in web marketing. If good website is developed by our Indian marketers, then they can

- 2) Nakhate, S. B., & Kohade, G. (2022)⁵, this study emphasis on how to convert problems faced by retailer into opportunities in the retail readymade garment business in India. The sample of 200 customers from thane city of Maharashtra state was collected by primary and secondary data. As today retail business of ready-made garment plays a very crucial⁶ role in the fashion world. To collect the primary data in this study questionnaire method is used and further it is analysing that 73% of customers were comfortable with online purchase and 27% were not comfortable with online purchase. It concludes that young generation are more comfortable to shop online and the main factors that impress the young generation are reasonable price and time saving.
- 3) Maiti, B. (2021)⁷, It analyses to find out the different factors and their impact on the purchasing pattern of a consumer in the traditional and online modes of shopping in relation to readymade garments. The study is qualitative in nature. It is based on secondary sources and it shows that for the readymade garment sector there are four principal factors affecting the consumer behaviour such as Economic factor, Personal factor, psychological factor, and Social & Cultural factor. Secondary data sources include books and articles published in peer-reviewed journals. Online shopping offers a wide product line, product review facilities, huge discounts and everything that a consumer can enjoy from his comfort zone. However, the chances of bargaining and physical trial are not available in online. In the future both offline and online shopping strategies to satisfy the customer satisfaction are needed.

⁵ Nakhate, S. B., & Kohade, G. (2022). A STUDY ON CHALLENGES TO THE RETAIL READYMADE GARMENT BUSINESS BY THE ONLINE PURCHASING. *Journal of Positive School Psychology*, 6(2), 2505-2512
(<https://journalppw.com/index.php/jpsp/article/download/1829/1045> accessed on 21/7/2023 at 16:28 p.m.)

⁶ Extremely important

⁷ Maiti, B. (2021). Factors influencing Consumer Buying Behaviour towards Traditional and Online Shopping of Readymade Garments. *KINDLER-The Journal of AIMK*, 9.(1660660344_Kindler Volume XXI_Jan-Dec 2021_print.pdf (kindler-aim.ac.in) accessed on 21/7/2023 at 16:50 p.m.)

- 4) Khare, A., Sehgal, V., Dhal, D., Agarwal, S., & Singh, V. (2011)⁸, It try to analyse and making efforts to use technology in order to make supply chain more competitive in nature. Globalisation, technology, outsourcing, supplier collaborations and customer relationships are the factors that supports and give drive to adopt the technology while applying various business strategies. It investigates the adoption of Information Technology (IT) in Indian clothing retail supply chains and the information prevalent in the Indian supply chains. Research was conducted and data was collected by using primary sources on the various ready-made garment retailers and the role of IT which plays a crucial role in the management of supply chain.
- 5) Panigrahi, C. M. A., & Joshi, V. (2016)⁹, It Investigates that many of the current physical stores both traditional and corporatized has gain the succeed in applying E-commerce not only expand their business but to growth the business and increase the sale. E-commerce is the future of textile and apparel industry. Many e-commerce applications are implemented by the textile and apparel supply chain. Information and communication technologies (ICTs) helps to provide extravagant¹⁰ amounts of information available to consumers located in different parts of the world. ICT also facilitate on the spot communication between retailers and consumers. Textile sector represent nearly 30 per cent of the country's total exports. It has a high weightage of about 20% in the National production. It provides direct employment to over 15 million persons in the mill, power loom and handloom sectors. After China India is the world's second largest producer of textiles. It is the world's third largest producer of cotton-after China and the USA-and the second largest cotton consumer after China.

⁸ Khare, A., Sehgal, V., Dhal, D., Agarwal, S., & Singh, V. (2011). *Technology as a driver for competitiveness to Indian ready-made garments' supply chains. International Journal of Logistics Systems and Management*, 8(1), 47-65 (khare,A,SHGAL"TECHNOLOGY AS A DRIVER - Google Scholar accessed on 28/7/2023 at 7:00 a.m.)

⁹ Panigrahi, C. M. A., & Joshi, V. (2016). *Application of e-commerce in Indian textile industry. International journal on textile engineering and processes*, 2(2). (Application of ecommerce in ecommerce in Indian textile... - Google Scholar accessed on 28/7/2023 at 7:19 a.m.)

¹⁰ Excessive

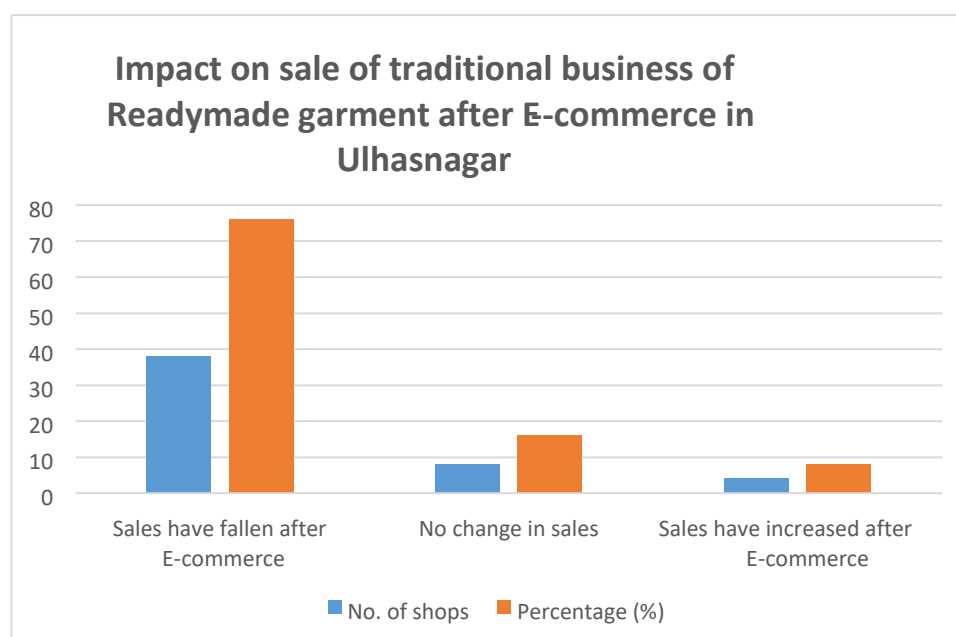
- 6) Chandra, A. (2021)¹¹, It tries to explain that how business today has advanced in the development of technology by explaining the present challenges of the systems, their structure, modernization, and by bringing innovation of cyber systems in E-commerce. It further explains that by adoption of Omni channel systems in communication sector through the 5G network, in a transaction through block chain, and in composition through the Social Internet. It concludes that systems in e-commerce will surely bring future software development. The e-commerce industry in India has been directly impacting MSME¹² in India such as by providing them means of technology, training, and financing has a favourable rippling effect on the other industries also. It concludes that the Indian e-commerce industry shows upward trend and is expected to overtake the US market to become the second-largest e-commerce market in the world by 2030.

Analysis of Data:**Responses of traditional business men of readymade garments in Ulhasnagar after Ecommerce.**

Response of traditional businessman in Ulhasnagar	No. of respondents	Percentage (%)
Sales had fallen after ecommerce	38	76
No change in sale after ecommerce	8	16
Sales had increase after ecommerce	4	8
Total	50	100

¹¹ Chandra, A. (2021). The Future of e-Commerce in India. *International Journal of Accounting*. (Chandra, A(2021) "The future of ecommerce - Google Scholar accessed on 14/7/2023 at 17:56p.m)

¹² Micro, small & Medium Enterprises

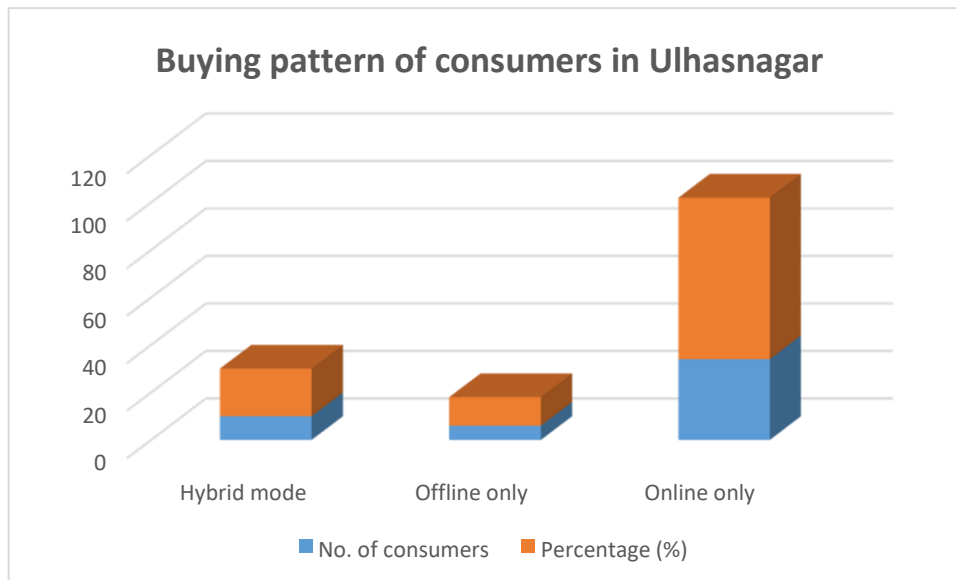


From the above Table and bar graph it can be observed that majority of shops of traditional business of readymade garment i.e. 38 out of 50 reported fall in sales due to emerging ecommerce platforms. A smaller number i.e. 8 traditional business responded that there is no impact on their sales and some 8% of shops (traditional) replied an increase in the sale. Which shows that traditional business man of readymade garments are badly impacted after ecommerce in Ulhasnagar because of online platforms which help the consumer to buy at their comfort zone, with return facility, watching reviews of garment with one click?

As the data is also collected by selecting the sample of 50 consumers in Ulhasnagar of different age to observe the changes in their buying behaviour after e-commerce.

Consumer behaviour in buying readymade garment from traditional businessman in Ulhasnagar

Mode of purchase with age of consumer	No. of consumers	Percentage (%)
Hybrid mode (35-50)	10	20
Offline only (5065)	6	12
Online only (2035)	34	68
Total	50	100



A majority of consumers i.e. 68% of consumers prefer buying readymade garments online between age 20 to 35 years which is observed from the above mention table and sub-divided bar graph. This shows a significant inclination towards e-commerce platforms in Ulhasnagar. Some 20 % of the respondents use both combine modes of buying because they are aware of using technology such as smart phones or buying from online platforms between age 35 to 50. A very little but still some small group of consumers relies on offline buying from physical stores between age group of 50 to 65 years. Which shows that majority of consumers between ages 20 to 35 years in Ulhasnagar are habitual of buying ready- made garments online.

Reasons for change in the buying pattern of consumers of readymade garments in after E-commerce:

- 1) Discounts and special offers on online purchase of readymade garments
- 2) Free shipping
- 3) Reviews of the products
- 4) Attractive photos of product 5) Security of personal data assurance 6) Return policy.
- 7) Shopping as the social activity
- 8) Easily price comparison
- 9) Easy payment method

Some strategy that traditional businessman of readymade garment business in Ulhasnagar should adopt in the age of E-commerce.

- 1) By creating a well-designed website, offering personalized services and customization.

- 2) Partnering with e-commerce platforms, focusing on building strong reputation and winning trust of customers also by using social media and software to enhance their operation.

Suggestion and Recommendations:

It is observed that in near future globally the retail E-commerce sale will increase in Ulhasnagar. There will be rise of mobile shopping, multichannel personalisation, and voice shopping, increased AI use in E-commerce etc. So, the traditional business of readymade garment in Ulhasnagar must update their skills and adopt a hybrid model of offline and online selling of readymade garments to reach a wider audience. The government should provide support to those who want to learn new skills or bring innovation. Emphasizing the use of social media platforms and e-commerce websites to promote and sell their products can be an effective strategy. Providing a personalized shopping experience, loyalty programs, or discounts may help retain customers and combat online competition.

Conclusion:

E-commerce has become more important in today's world. Government can regulate it, but it cannot put restriction on it as it is the demand of today's generation so traditional business of readymade garments which is originally created by sindhi people in Ulhasnagar should have to come to online platforms in the long run to save themselves from extinction. The data clearly indicates that e-commerce has negatively impacted most traditional businesses of ready-made garments in Ulhasnagar. To remain competitive, traditional retailers should embrace digital platforms and adopt hybrid models to retain customers who still value physical stores for certain needs while appealing to online shoppers.

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5. Maiti, B. (2021). *Factors influencing Consumer Buying Behaviour towards Traditional and Online Shopping of Readymade Garments. KINDLER–The Journal of AIMK*, 9
6. Khare, A., Sehgal, V., Dhal, D., Agarwal, S., & Singh, V. (2011). *Technology as a driver for competitiveness to Indian ready-made garments' supply chains. International Journal of Logistics Systems and Management*, 8(1), 47-65
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BLOOM'S TAXONOMY AND STEPWISE INTEGRATION OF AI TOOLS IN EDUCATION: ALIGNMENT WITH NEP 2020

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Abstract:

Bloom's Taxonomy continues to be one of the most significant frameworks for classifying educational learning objectives. With the rapid emergence of Artificial Intelligence (AI) tools in the teaching and learning landscape, educators now have the opportunity to enhance each cognitive level of Bloom's model through intelligent systems, adaptive platforms, and generative technologies. This research paper critically examines the systematic integration of AI tools across the six levels of Bloom's Revised Taxonomy, highlighting the pedagogical potential at each stage, and aligning these advancements with the objectives of India's National Education Policy (NEP) 2020. Additionally, the paper presents a stepwise model for AI integration, discusses associated challenges and implications, and offers recommendations for educators, policymakers, and institutions to adopt responsible and effective AI-enabled educational practices.

Key words: *Taxonomy, Integration, Artificial Intelligence, NEP*

Introduction:

The educational landscape is undergoing rapid transformation driven by digital technologies. Among these, Artificial Intelligence (AI) stands out for its potential to personalize learning, automate administrative tasks, enhance learner engagement, and support higher-order cognitive skills. At the same time, classical pedagogical frameworks such as Bloom's Taxonomy continue to guide curriculum development, instructional design, and assessment strategies.

Integrating AI tools within the structured levels of Bloom's Taxonomy provides a strong, research-backed approach to leveraging technology without compromising pedagogical rigor. The National Education Policy (NEP) 2020 emphasizes competency-based learning, experiential pedagogy, digital literacy, and innovative teaching, making AI a powerful enabler of these reforms.

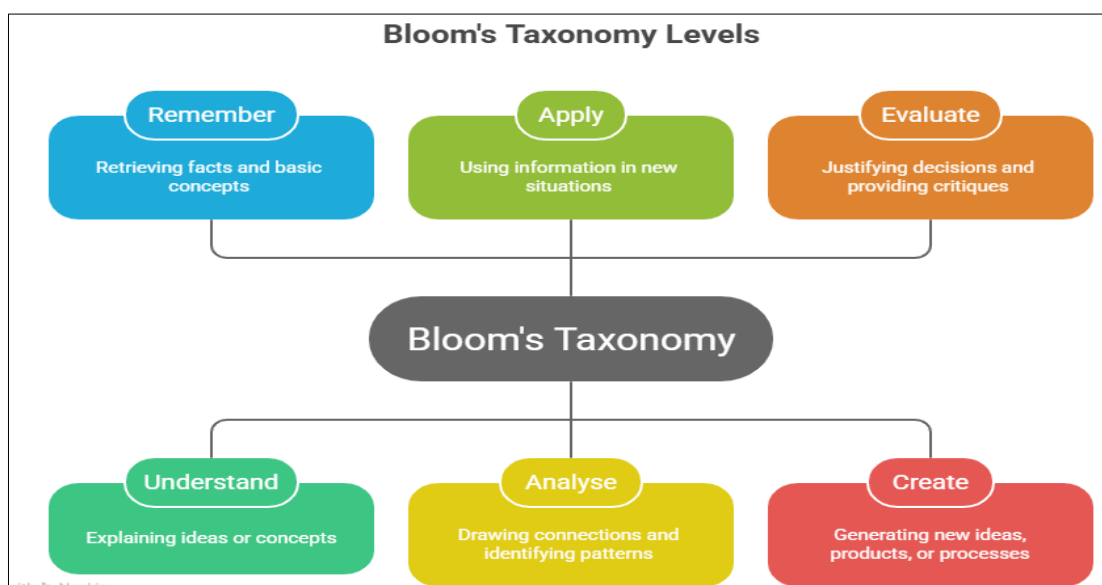
Objectives:

1. To elaborate on Bloom's Revised Taxonomy and its relevance to contemporary teaching and learning practices.
2. To categorize suitable AI tools corresponding to each level of Bloom's Taxonomy in a systematic manner.
3. To analyze the alignment of these AI tool integrations with the guidelines outlined in NEP 2020.
4. To provide a structured model for educators to effectively incorporate AI into curriculum development, teaching methods, and assessment processes.

Bloom's Revised Taxonomy: An Overview

Bloom's Taxonomy, revised in 2001 by Anderson and Krathwohl, reorganizes cognitive skills into six hierarchical levels:

1. **Remember** – retrieving facts and basic concepts
2. **Understand**– explaining ideas or concepts
3. **Apply**– using information in new situations
4. **Analyse** – drawing connections, identifying patterns, and differentiating
5. **Evaluate** – justifying decisions and providing critiques
6. **Create** – generating new ideas, products, or processes



This taxonomy progresses from lower-order thinking skills (LOTS) to higher-order thinking skills (HOTS). Contemporary pedagogy emphasises the importance of learning experiences that cultivate critical, creative, and reflective thinking—areas where AI can play a significant role.

Stepwise AI Tools Across Bloom's Taxonomy:

Below is an analytical mapping of AI tools aligned with the cognitive levels of Bloom's hierarchy. The tools selected are widely used, reliable, and aligned with contemporary AI trends.

1. Level 1: Remember

Learning Focus

Level 1: Recall

At this foundational level, the emphasis is on recall and recognition. Students engage in activities that require listing, identifying, and repeating information, focusing on basic factual retrieval.

AI Tools:

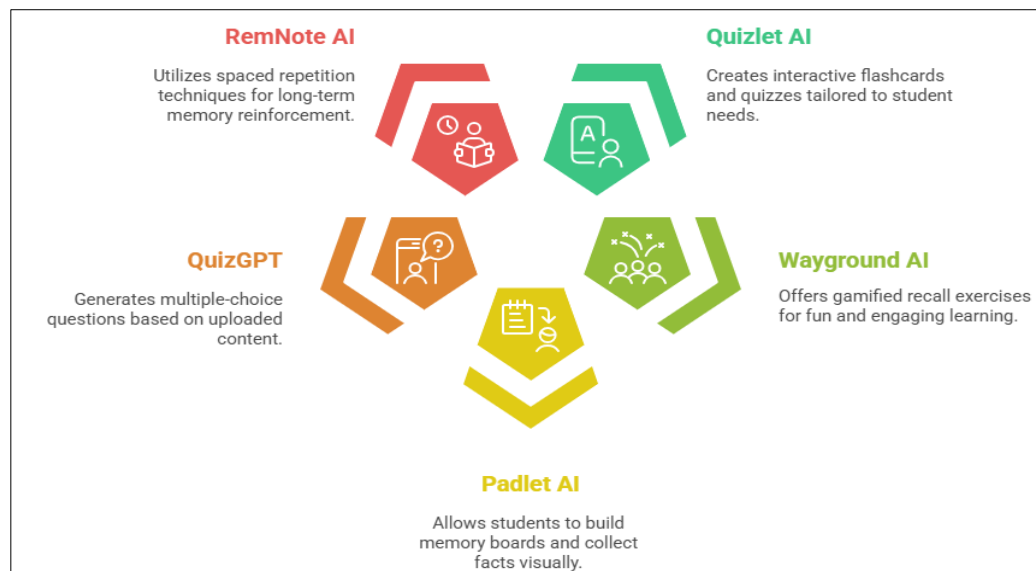
Quizlet AI: This tool helps create interactive flashcards and quizzes tailored to the students' needs.

Wayground AI: Offers gamified recall exercises that make learning fun and engaging through competition and challenges.

Padlet AI: Allows students to build memory boards and collect facts visually, enhancing their retention through organization.

QuizGPT: Automatically generates multiple-choice questions (MCQs) based on uploaded content, enabling structured self-assessment.

RemNote AI: Utilizes spaced repetition techniques, helping students reinforce memory over time with a digital memory system.



AI-enhanced Learning Outcomes:

- This method improves long-term retention by using spaced repetition.
- Instant feedback supports recall, allowing students to correct mistakes in real-time.
- The use of multimodal memory aids (text, audio, images) caters to different learning styles.

Classroom Example:

A teacher uploads a chapter summary into QuizGPT, which then generates 20 recall questions. Student's practice answering these questions using Quizlet for effective retention.

2. Level 2: Understand

At this level, the focus shifts to understanding through summarization, classification, and explanation of concepts.

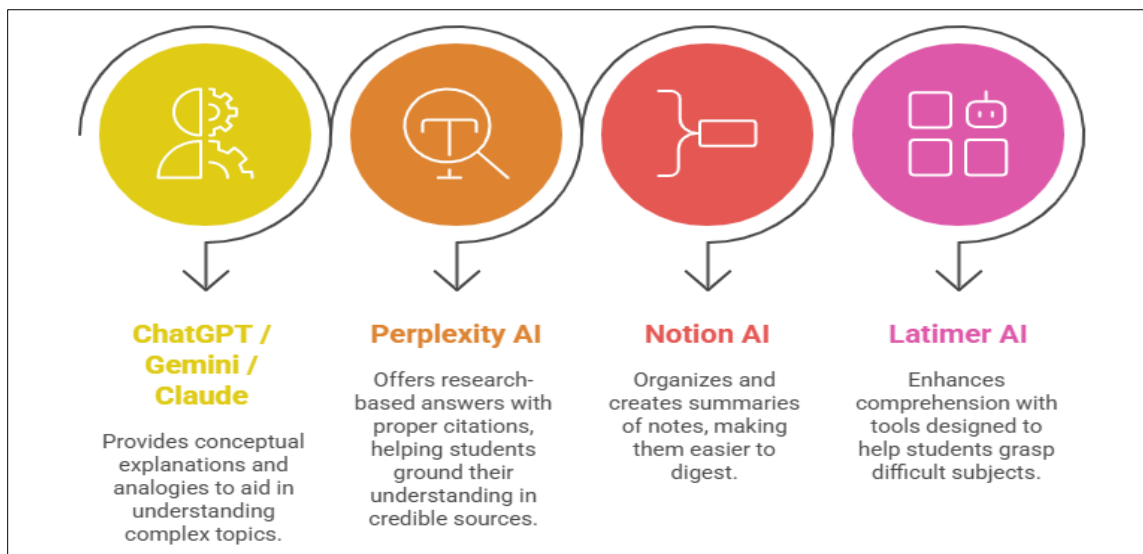
AI Tools:

ChatGPT / Gemini / Claude: These tools provide conceptual explanations and analogies that aid in understanding complex topics.

Perplexity AI: Offers research-based answers with proper citations, helping students ground their understanding in credible sources.

Notion AI: Organizes and creates summaries of notes, making them easier to digest.

Latimer AI: Enhances comprehension with tools designed to help students grasp difficult subjects.



AI-enhanced Learning Outcomes:

- Simplifies complex concepts by breaking them into understandable parts.
- Offers various explanations to suit different learning styles.
- Can translate content into regional languages, making it accessible to a wider audience.

Classroom Example:

Students can ask ChatGPT to summarize a science topic in simple Hindi or Marathi, while Notion AI helps them organize the notes into easily understandable concept maps.

3. Level 3: Apply

In this phase, students start applying their knowledge to real-world situations through problem-solving and performing specific tasks.

AI Tools:

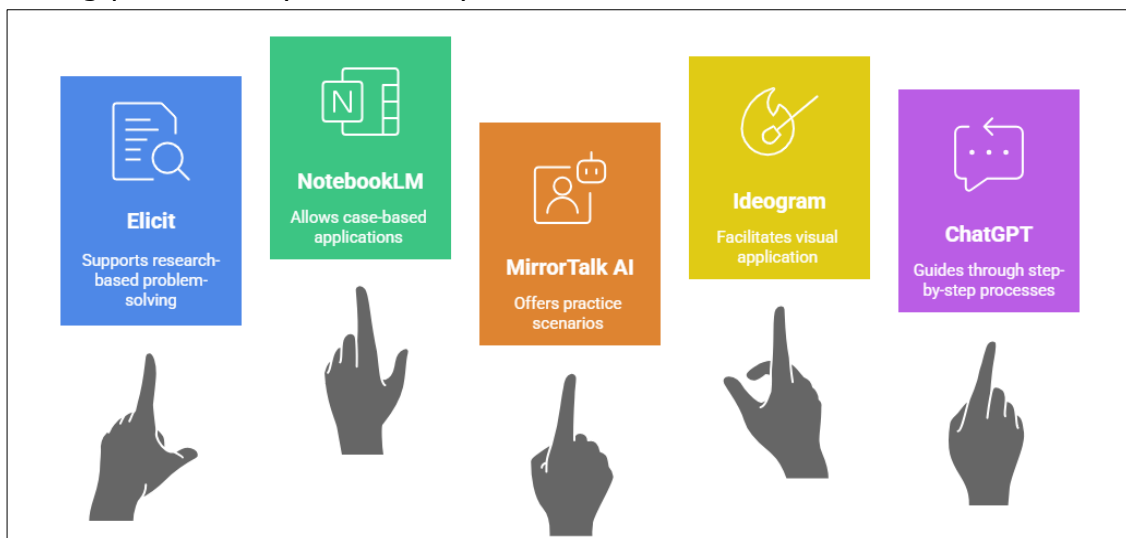
Elicit: Supports research-based problem-solving that applies theoretical concepts to practical situations.

NotebookLM: Allows case-based applications for students to analyze real-life examples.

MirrorTalk AI: Offers practice scenarios or dialogues for students to apply learned strategies.

Ideogram: Facilitates visual application, encouraging creativity in design-oriented tasks.

ChatGPT (step-by-step mode): Guides students through applying formulas or reasoning processes systematically.



AI-enhanced Learning Outcomes:

- Assists in solving mathematical, scientific, or logical problems in complex scenarios.
- Creates simulations for practical tasks, enhancing experiential learning.
- Encourages inquiry-based learning by prompting students to explore and discover solutions.

Classroom Example:

When faced with a challenging physics problem, students input it into ChatGPT, which assists them step-by-step through the solution while they attempt to solve it manually.

4. Level 4: Analyze

At this analytical level, students engage in comparing, contrasting, identifying patterns, and interpreting data critically.

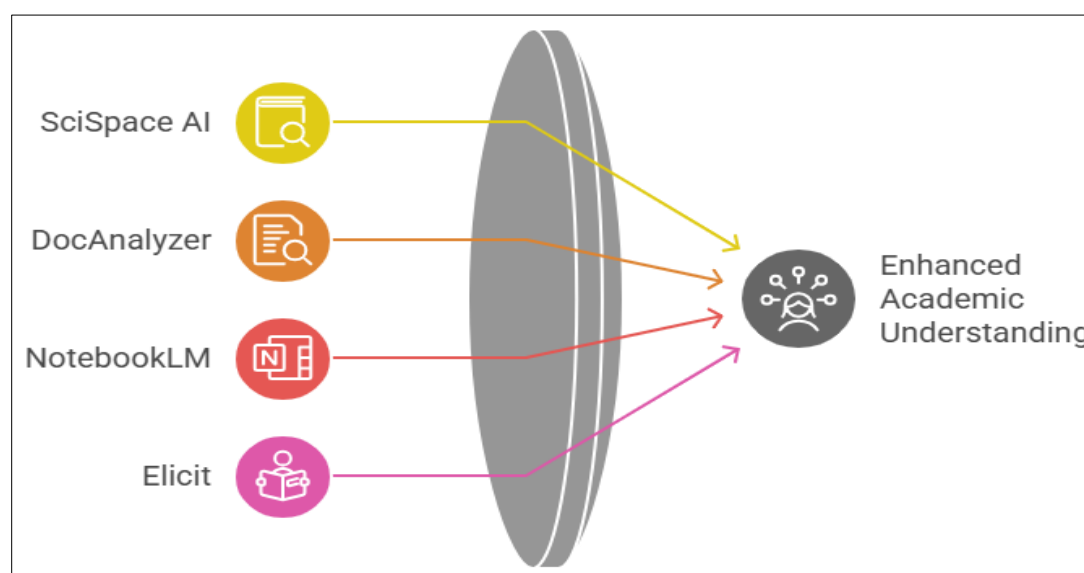
AI Tools:

SciSpace AI: Reads and explains research papers, aiding students in understanding complex academic writing.

DocAnalyzer: Summarizes PDFs and extracts arguments, making it easier for students to digest large amounts of information.

NotebookLM: Assists in cross-document analysis, providing a broader perspective on topics.

Elicit: Supports literature reviews and variable analysis, helping students evaluate existing research.



AI-enhanced Learning Outcomes:

- Strengthens analytical thinking by encouraging students to evaluate different perspectives.
- Improves students' ability to extract, compare, and synthesize data effectively.

Classroom Example:

In a social science project, students upload three different newspaper articles into NotebookLM, which highlights similarities, contradictions, and biases, aiding in their critical analysis.

5. Level 5: Evaluate

This stage focuses on making critical judgments and decisions based on criteria, reviewing evidence, and justifying positions.

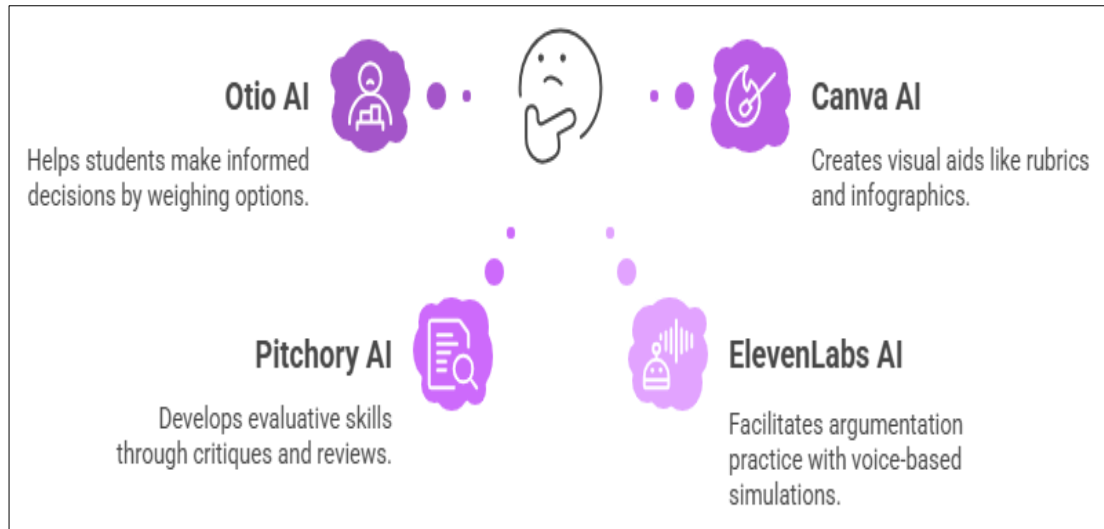
AI Tools:

Otio AI: A decision-support tool that helps students weigh options and make informed choices.

Pitchory AI: Generates critiques and reviews for students to engage with, helping them develop their evaluative skills.

ElevenLabs AI: Facilitates voice-based debate simulations, allowing students to practice argumentation.

Canva AI: Aids in the creation of evaluation rubrics and infographics for visual representation of criteria.



AI-enhanced Learning Outcomes:

- Empowers students to critique essays or arguments constructively.
- Generates structured evaluation rubrics, making assessment clearer and more objective.
- Provides counterarguments and objective assessments to deepen understanding.

Classroom Example:

Students submit their essays to Otio AI, which evaluates them based on clarity, logic, and evidence, helping them enhance their writing.

6. Level 6: Create

At the final level, the focus is on producing original content and designing innovative solutions.

AI Tools:

Gamma AI: Assists in generating presentations, allowing students to express their ideas effectively.

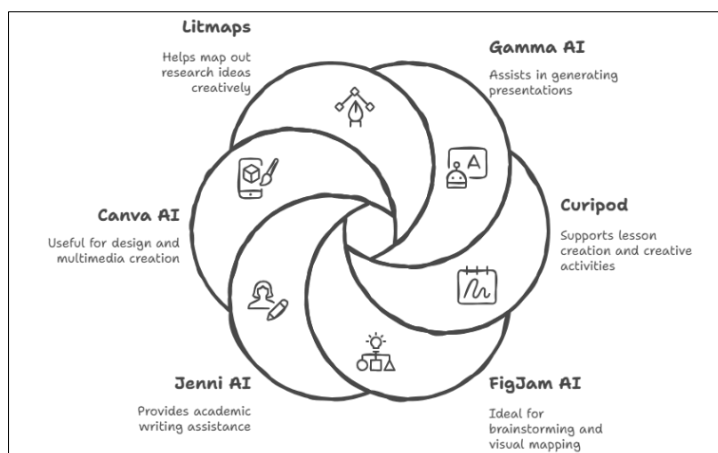
Curipod: Supports lesson creation and promotes creative activities in the classroom.

FigJam AI: Ideal for brainstorming and mapping out ideas visually.

Jenni AI: Provides academic writing assistance, helping students develop research papers and essays.

Canva AI: Useful for design and multimedia creation, promoting a hands-on approach to content generation.

Litmaps: A visualization tool that helps map out research ideas creatively.



AI-enhanced Learning Outcomes:

- Enhances creativity through various visual and narrative tools, encouraging imaginative thinking.
- Supports innovation and design thinking stages, empowering students to invent and construct.
- Aids students in creating prototypes, presentations, and research drafts, bolstering their project skills.

Classroom Example:

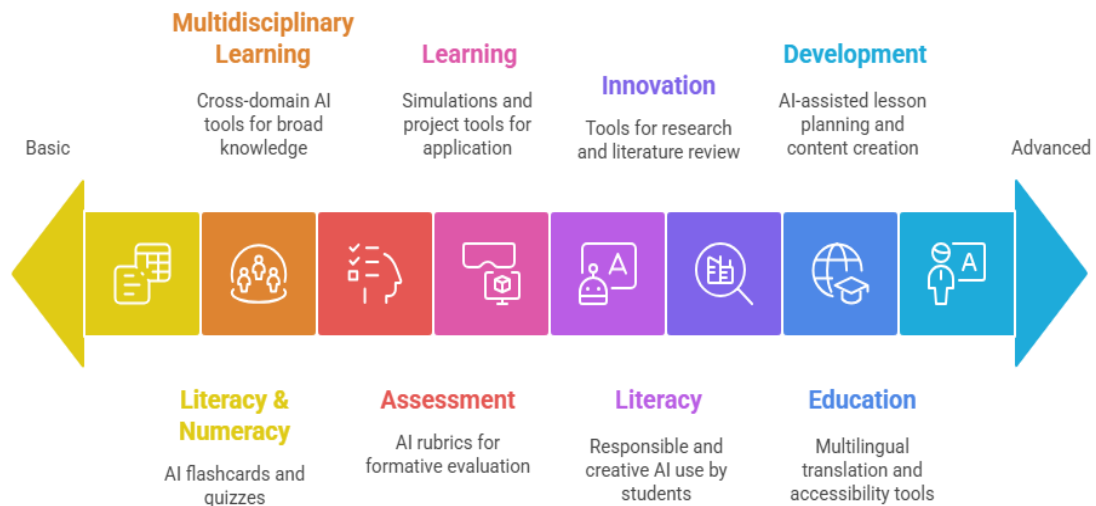
Students use FigJam to brainstorm an idea for a new sustainable product; they then turn to Canva AI to design a prototype poster representing their concept. This structured approach across different learning levels showcases how integrating AI tools in educational environments can significantly enhance the learning experience and outcomes for students.

Alignment of AI Tools with NEP 2020:

NEP 2020 emphasizes holistic development, 21st-century skills, digital empowerment, and competency-based learning. The integration of AI tools across Bloom's levels directly supports the policy's vision.

1. NEP 2020 Key Goals Aligned with AI

NEP 2020 Priority	How AI Integration Supports It
Foundational literacy & numeracy	AI flashcards, quizzes, speech tools
Holistic & multidisciplinary learning	Cross-domain AI tools (NotebookLM, SciSpace)
Competency-based assessment	AI rubrics, formative assessment
Experiential learning	Simulations, project tools, applied AI
Digital literacy	Students use AI responsibly and creatively
Research & innovation	Tools like Elicit, Litmaps, SciSpace
Inclusive education	Multilingual translation, accessibility tools
Teacher development	AI-assisted lesson planning and content creation



2. NEP 2020 + Bloom's Taxonomy + AI Tools: Integrated Framework

1. Remembering (NEP focus: FLN, basic literacy)

- AI helps strengthen foundational knowledge using spaced repetition, gamified quizzes, and audio-visual aids.

2. Understanding (NEP focus: conceptual clarity)

- AI simplifies concepts, translates content, and uses multimodal explanations.

3. Applying (NEP focus: experiential & vocational learning)

- AI helps simulate real-world applications, vocational tasks, and inquiry-based activities.

4. Analyzing (NEP focus: critical & scientific temper)

- AI tools enable multi-document analysis, literature review, and bias detection.

5. Evaluating (NEP focus: competency-based assessment)

- AI can generate rubrics, evaluate arguments, and support peer-review systems.

6. Creating (NEP focus: innovation, entrepreneurship, problem-solving)

- AI enables digital creativity through design tools, presentation generators, idea-mapping platforms, and prototype building.

Benefits of AI Integration in Bloom's Taxonomy

1. Personalized learning pathways
2. Reduced teacher workload
3. Increased student engagement
4. Higher-order thinking development
5. Equitable learning support
6. Alignment with global education standards

Risks and Ethical Challenges

1. AI dependence and reduced critical thinking
2. Bias in AI-generated content
3. Digital divide in rural areas
4. Data privacy and safety concerns
5. Lack of teacher training

NEP 2020 suggests creating guidelines through the National Educational Technology Forum (NETF), addressing many such concerns.

Recommendations:

For Teachers

- **Integrate AI gradually:** Start with basic AI tools that promote recall and understanding, then progress to complex applications as students gain confidence.
- Use AI as an assistant: AI should complement teaching by handling administrative tasks and providing personalized support, allowing teachers to focus on student interaction.
- Teach AI ethics and fact-checking: Educate students on the ethical implications of AI, including bias and the importance of verifying information to promote digital literacy.

For Institutions

- Provide AI training for educators: Develop training programs to equip teachers with skills to effectively use AI in the classroom.
- Enhance digital infrastructure: Ensure reliable access to technology and the internet, enabling AI integration in learning environments.
- Establish responsible AI policies: Create guidelines that protect student data and ensure equitable access to AI resources.

For Policymakers

- Develop a national AI literacy curriculum: Standardize AI education across grade levels to ensure all students acquire essential skills.
- Support low-cost AI tools: Collaborate with tech companies to provide affordable AI solutions for underserved communities.
- Promote AI pedagogy research: Fund studies on the impact of AI in education to inform effective integration practices.
- This concise approach highlights the key actions needed for teaching, institutional support, and policy development related to AI in education.

Conclusion:

The systematic integration of AI tools across Bloom's Taxonomy presents a powerful framework for modernizing education. NEP 2020 strongly advocates the use of technology to enhance conceptual learning, skill development, and holistic growth. By mapping AI tools to Bloom's cognitive levels, educators can design purposeful, competency-based, inclusive, and innovative learning experiences.

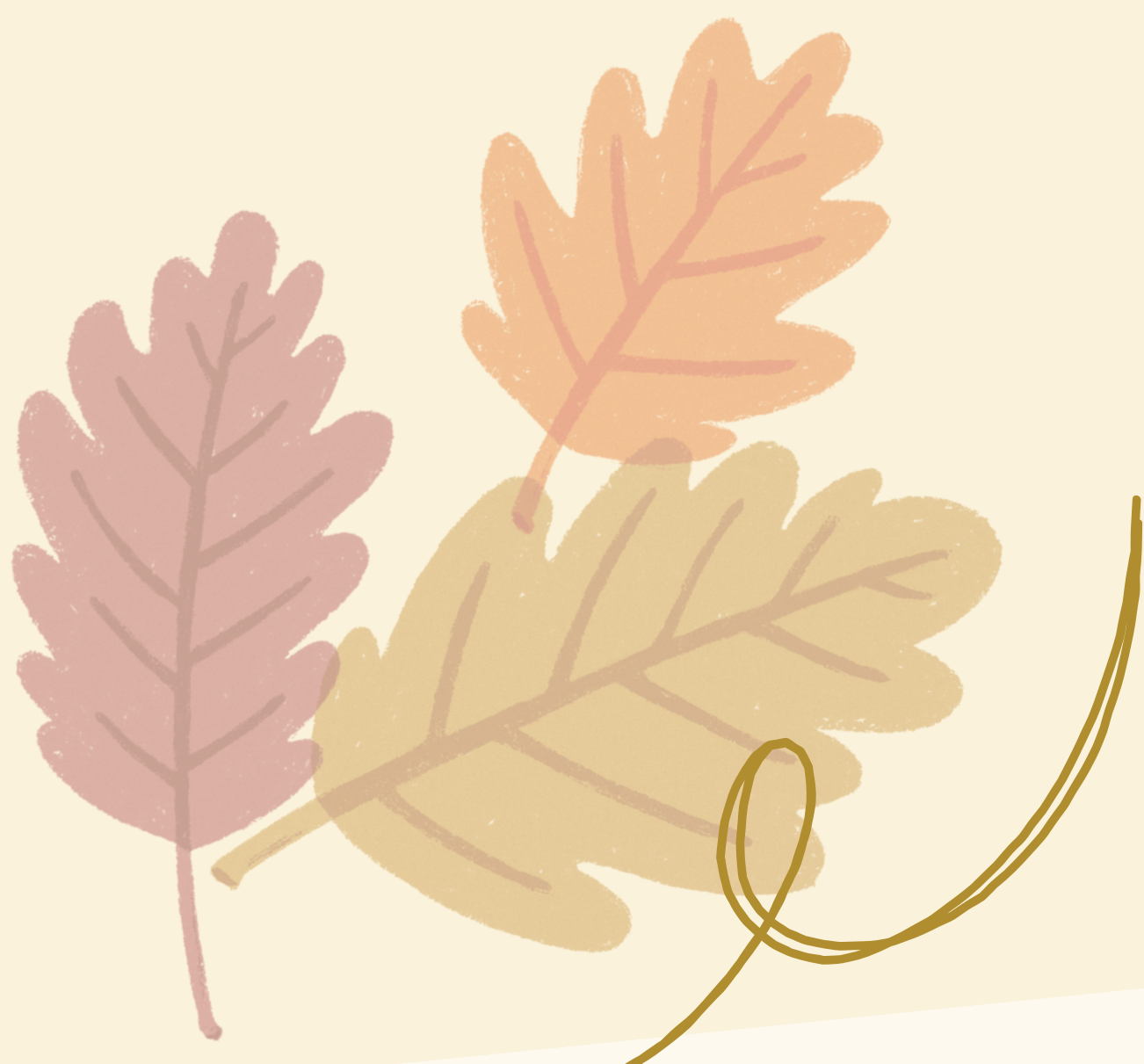
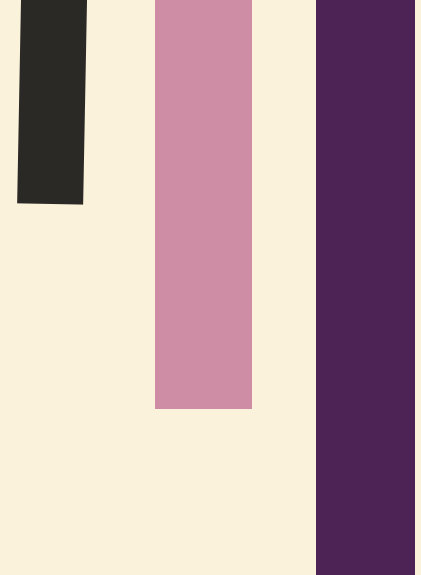
AI, when used responsibly, enables:

- Deeper Understanding
- Creative Expression
- Analytical Reasoning
- Personalized Learning
- 21st-century competence development

This convergence of Bloom's Taxonomy, AI tools, and NEP 2020 marks a significant step toward future-ready education in India.

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