The Eternal Divine Light

**Pujya Shrimad Acharya
Saumyendra Nath Brahmachar**

(October 07, 1946 - June 23, 2012)

Dev Sangha Institute of Professional Studies and Educational Research (DIPSER) was established by Shrimad Acharya Saumyendra Nath Brahmachary (1946 – 2012). A First Class First Mechanical Engineer and a Gold Medalist from the Indian Institute of Technology, Kharagpur, he was awarded the prestigious B C Roy Gold Medal as the best all-rounder graduate of the Institute (batch of 1968).

Pujya Acharya Ji worked in the corporate world for ten years and rose to a senior position with the leading multinational of the day at a young age. Subsequently, inspired by his enlightened Master Shrimad Narendra Nath Brahmachary Ji, he gave up his brilliant management career to become a full-time spiritual aspirant, a brahmachari. He went on to spend five years in intense sadhana (meditation) and two years on pilgrimage across India. The biggest gain from this journey, he used to say, was a secular insight into the country. "It is only when you travel as a common man that you see the real country, come into intimate contact with its people."

Pujya Acharya Ji continued to devote the rest of his life in the quest for eternal truth, combining it with creative institution building for spiritual and material upliftment of youth. In 1988, he was initiated as the Acharya (spiritual head) of Dev Sangha Ashram at Deoghar in Jharkhand. "Our ashram believes in resurrecting the Rishi culture of ancient India where there was no contradiction between—but rather a harmonious blending of—material well-being and spiritual upliftment," he used to maintain.

Later, with the support of his friends and Ashram colleagues, Pujya Acharya Ji founded Dev Sangha Seva Pratisthan (DSSP) as the service wing of Dev Sangha to work primarily in the field of education and set up a (10+2) CBSE school in 1996 and a college of teachers' education for women in 2001 offering D.El.Ed., B.Ed. and M.Ed. courses along with research facilities. DSSP regards women's education in the tribal state of Jharkhand as the most powerful tool for facilitating their economic empowerment and social upliftment. He, the teacher of teachers, was regarded as an extraordinarily gifted speaker bringing in, in simultaneously a most penetrating and entertaining manner, the quiet and brilliant wisdom of the Rishis of ancient India that informed the lives of king and subject alike, into everyday applications of modern life, organization, coordination and governance to help in identifying and resolving issues, while skilfully deconstructing the dichotomy between matter and spirit that had enervated the land over centuries to its great detriment. A highly respected and sought for guest lecturer, he was regularly invited to speak in premier institutes of the country like the IITs, IIMs, BITS Pilani, Universities, National Judicial Academy, Bhopal (NJA), Management Training Institute Ranchi (MTI SAIL), Indian Institute of Coal Management Ranchi (IICM)), Administrative Training Institute Ranchi (ATI) and host of similar institutions both in India and in different countries of the World and spoke eloquently on varied facets of life - contemporary politics to decision-making, self-development, stress management, leadership, motivation and communication and of the joyful and pervasive nature of boundless wisdom.

He left for his eternal abode quietly on June 23, 2012. His golden light shall always guide us all in our journey of life.

FEW THOUGHTS

As we traverse through the VUCA world today, it is time to rethink our education system and reconfigure it to suit the changing needs of the times. "Changing Course - Transforming Education", the theme of this issue of Devaloke, encapsulates a profound and urgent call to action in the contemporary world that seeks to provide a better quality of life to societies around the world. Education, often viewed as the bedrock of societies, is at a crossroad and affected by unprecedented global shifts. From rapid technological advancements and evolving job markets to environmental challenges and the persistent need for social equity, the traditional paradigms of learning are proving increasingly insufficient. This theme invites us to critically examine where education currently stands and, more importantly, to envision and enact the radical changes necessary for it to truly serve the needs of the 21st century and beyond.

One of the most evident areas demanding a change of course is the curriculum itself. For too long, education has been criticized for being overly focused on rote memorization and standardized testing, prioritizing content delivery over the development of essential skills. Transforming education requires a shift towards fostering critical thinking, creativity, collaboration, and communication – often referred to as the "4Cs." This means moving beyond siloed subjects and embracing interdisciplinary approaches that connect learning to real-world problems. Furthermore, the curriculum must become more agile, responsive to emerging knowledge and societal demands, and inclusive of diverse perspectives and cultural contexts. The rise of artificial intelligence, for instance, necessitates a re-evaluation of what human skills will be most valued, emphasizing adaptability, ethical reasoning, and problem-solving over tasks easily automated.

Beyond curriculum, the pedagogical approaches employed in classrooms are ripe for transformation. Traditional teacher-centric models, where information flows primarily from instructor to student, are giving way to more learner-centered methodologies. This includes project-based learning, inquiry-based learning, and personalized learning pathways that cater to individual student needs and learning styles. The role of the educator is evolving from a mere disseminator of knowledge to a facilitator, mentor, and guide, empowering students to take ownership of their learning journey. Technology plays a pivotal role here, offering tools for differentiated instruction, immersive experiences, and access to vast resources, but its integration must be thoughtful and purposeful, enhancing rather than replacing human interaction.

Furthermore, "Changing Course" necessitates a fundamental re-evaluation of the structures and systems that govern education. This includes everything from assessment methods that genuinely measure understanding and skill development, rather than superficial recall, to school governance and funding models that promote innovation and equity. The rigid traditional academic calendar and physical classroom spaces are also being questioned, with blended learning, online learning, and flexible learning environments gaining traction. The COVID-19 pandemic, while disruptive, served as a powerful catalyst, forcing an accelerated adoption of digital tools and highlighting the urgent need for resilient and adaptable educational systems.

Finally, "Transforming Education" is not merely an academic exercise; it has profound societal implications. A truly transformed education system should cultivate global citizens who are not only knowledgeable but also empathetic, ethical, and equipped to address complex global challenges like climate change, inequality, and social injustice. It should foster a sense of lifelong learning, recognizing that education is not a finite process but a continuous journey of growth and adaptation. This transformation requires collaboration among all stakeholders – educators, policymakers, parents, communities, and industry leaders – to co-create an educational ecosystem that empowers every individual to thrive and contribute meaningfully to a rapidly changing world. The task is immense, but the imperative to change course is undeniable; the future of our societies depends on it.

Siddh Nath Singh
Secretary
Dev Sangha Seva Pratisthan and
Dev Sangha Institute of Professional Studies and Educational Research, Deoghar

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"आमायन्तु ब्रह्मचारिणः स्वाहा।

विमायन्तु ब्रह्मचारिणः स्वाहा।

प्रमायन्तु ब्रह्मचारिणः स्वाहा।

दमायन्तु ब्रह्मचारिणः स्वाहा।

शमायन्तु ब्रह्मचारिणः स्वाहा।"

– तैत्तिरीयोपनिषद् 1 / 4 / 2

"Āmāyantu brahmacāriṇaḥ svāhā.

Vimāyantu brahmacāriṇaḥ svāhā.

Pramāyantu brahmacāriṇaḥ svāhā.

Damāyantu brahmacāriṇaḥ svāhā.

Śamāyantu brahmacāriṇaḥ svāhā."

- *Taittirīya Upaniṣad 1/4/2*

"Let pure seekers of wisdom arrive unto us for learning and wisdom from all directions. Let them arrive unto us by diverse paths. Let untainted seekers of knowledge reach unto us in proper form. Be they blessed with mastery over their senses. On them be conferred the strength of controlling their thoughts."

FEATURE ARTICLE

New Education System in the New Era of Artificial Intelligence

Samirranjan Adhikari *

Abstract

The advent of Artificial Intelligence (AI) has revolutionized various sectors, with education undergoing a transformative evolution – traditional pedagogical methods have changed in ☺ to personalized, data-driven learning experiences. The global education landscape is at a crucial crossroads, facing challenges that necessitate significant transformation to meet the emerging demands of the 21st century. This paper explores the impact of AI on education, focusing on adaptive learning, intelligent tutoring systems, and AI-driven assessment methods; examines the imperatives for change in education systems worldwide, exploring innovative strategies to make education more inclusive, sustainable, and aligned with future societal needs; discusses ethical considerations and the future trajectory of AI in education and implications for educators and learners; highlights the opportunities and challenges presented by this technological shift. By analysing current trends and future projections, this study underscores the necessity of adapting traditional education paradigms to harness the potential of AI effectively; and argues for a paradigm shift, emphasising digital inclusion, personalised learning, and cross-disciplinary approaches to foster holistic development and lifelong learning. The findings highlight the urgent need for collaborative efforts among policymakers, educators, and stakeholders to redefine educational objectives and practices for a better future.

Introduction

Education has long been regarded as the cornerstone of societal progress and individual empowerment. However, the rapid pace of technological advancements, globalisation, and socio-economic shifts have exposed the limitations of traditional education systems (UNESCO, 2021). These systems often fail to address the diverse needs of learners and equip them with the skills necessary to navigate an increasingly complex world. As UNESCO's 2021 report on education highlights, there is an urgent need for a "new social contract" for education that reimagines its purpose and delivery (UNESCO, 2021).

Education has always been a dynamic field, evolving with technological advancements. The advent of Artificial Intelligence (AI) has transformed various sectors, and education is no exception. As AI advances, it is recasting traditional learning paradigms, facilitating personalized education, and promoting innovative pedagogical approaches. The new education system in the AI era is characterized by intelligent tutoring systems, automated assessment mechanisms, and adaptive learning platforms that cater to diverse learner needs (Luckin et al., 2016). This transformation signifies a departure from one-size-fits-all educational models towards more customized and interactive learning experiences. So, in the 21st century, Artificial Intelligence (AI) has emerged as a game-changer, restructuring instructional methodologies, content delivery, and assessment techniques (Luckin et al., 2016a). Integrating AI in education enhances personalized learning, automates administrative tasks, and provides data-driven insights for curriculum development (Selwyn, 2019).

AI-driven educational tools have the potential to enhance learning efficiency, improve student engagement, and provide real-time feedback (Selwyn, 2019). Machine learning algorithms analyze students' learning patterns, predict their academic performance, and recommend tailored educational resources (Chen et al., 2020). These advancements contribute to the shift from passive knowledge acquisition to active learning processes, fostering critical thinking and problem-solving skills essential for the 21st century (Schmid et al., 2021). Moreover, AI facilitates inclusive education by addressing learning barriers for students with disabilities. Speech-to-text applications, AI-powered sign language translators, and adaptive learning software help create a more accessible learning environment (Hwang et al., 2020). Additionally, AI enables educators to focus on higher-order teaching tasks by automating administrative responsibilities such as grading and attendance tracking (Holmes et al., 2022). This shift allows teachers to invest more time in mentoring and fostering collaborative learning experiences.

The integration of AI in education, however, raises ethical

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and practical concerns. Issues such as data privacy, algorithmic bias, and the digital divide pose significant challenges (Williamson & Eynon, 2020). Ensuring that AI applications in education adhere to ethical guidelines and are accessible to all learners is crucial for the equitable development of AI-enhanced education systems.

Artificial Intelligence has permeated numerous domains, remodelling traditional workflows and processes. Education, as a cornerstone of societal progress, has embraced AI to foster innovation in teaching and learning methodologies. The traditional "one-size-fits-all" approach is gradually being replaced by personalized and adaptive learning models powered by AI (Luckin et al., 2016). This paper delves into the core components of the new education system in the AI era and its potential to redefine the landscape of education.

This article explores the impact of AI on the new education system in the new era, focusing on its benefits, challenges, and future implications. By analyzing current AI-driven educational practices, this study aims to provide insights into how AI can be effectively leveraged to enhance learning experiences while addressing associated risks. The findings of this study contribute to the broader discourse on the role of AI in shaping the future of education in an increasingly digitalized world.

Challenges in the Current Educational Paradigm

The current educational paradigm faces several challenges in adapting to the rapidly advancing era of artificial intelligence (AI). Traditional teaching methods often fail to incorporate AI-driven tools, which can personalize learning and improve student engagement (Luckin et al., 2016). Moreover, there is a growing concern regarding the digital divide, where unequal access to AI resources further exacerbates educational inequalities (Williamson & Piattoeva, 2020a). It is also perceived that educators need to be equipped with AI literacy and continuous professional development to integrate AI effectively into their curricula (Holmes et al., 2019). Other three significant challenges regarded affect the current Educational Paradigm include the following:

i. *Inequality and Access* – Despite global efforts, disparities in educational access persist, particularly in marginalized communities. According to UNICEF (2022), over 244 million children and youth worldwide remain out of school, with gender, economic status, and geographic location being significant barriers.

ii. *Relevance of Curriculum* – Traditional curricula often prioritize rote memorization over critical thinking,

creativity, and problem-solving skills (Trilling & Fadel, 2009). This approach is increasingly misaligned with the demands of modern economies and societies.

iii. *Digital Divide* – The COVID-19 pandemic underscored the inequities in digital access, leaving millions of students unable to participate in online learning (World Bank, 2020). Bridging this divide is crucial for ensuring equitable educational opportunities.

It is imperative that transforming education is not merely an option but a necessity to ensure a sustainable and equitable future. By addressing existing challenges and embracing innovative solutions, education systems can better prepare learners for the complexities of the 21st century. Collaborative efforts across sectors will be instrumental in driving this transformation, ultimately creating a world where education empowers every individual to thrive.

Strategies for Transforming Education

Strategies for transforming education in the new era of artificial intelligence (AI) involve integrating AI technologies into teaching and learning processes, enhancing personalized education, and fostering critical thinking skills (Luckin et al., 2016). The use of AI can enable adaptive learning systems that cater to individual needs, allowing for more effective learning experiences (Holmes et al., 2019). Additionally, educators must focus on teaching students' skills like digital literacy, creativity, and problem-solving to prepare them for an AI-driven world (Baker et al., 2019). Finally, collaboration between policymakers, educators, and tech developers is crucial to creating curricula that align with the advancements in AI (Brynjolfsson & McAfee, 2014).

Besides the above, strategies for transforming education would involve promoting equity and inclusion, fostering holistic development, strengthening lifelong learning and the need to redefine the role of stakeholders in driving change.

i. *Promoting Equity and Inclusion* – Transforming education requires prioritizing equity and inclusion. Initiatives like India's Digital India program aim to expand internet access and digital literacy in rural areas, addressing the digital divide (Government of India, 2020). Additionally, gender-sensitive policies and community-based interventions can help overcome socio-cultural barriers to education.

ii. *Fostering Holistic Development* – Education should transcend academic achievement to nurture emotional intelligence, ethical reasoning, and global citizenship. Programs like Finland's Phenomenon-Based Learning

emphasize interdisciplinary projects and real-world applications, preparing students for complex, interconnected challenges (Sahlberg, 2015).

iii. *Strengthening Lifelong Learning* – As careers and industries evolve, lifelong learning becomes essential. Governments and institutions must create frameworks that encourage continuous upskilling and reskilling, such as Massive Open Online Courses (MOOCs) and workplace learning programs (OECD, 2019).

iv. *The Role of Stakeholders in Driving Change* Collaboration among governments, educators, private sectors, and international organizations is crucial for implementing transformative strategies. For instance, the Global Partnership for Education (GPE) mobilizes funding and expertise to support education reforms in low-income countries, fostering systemic change (GPE, 2022).

New Aims and Objectives of Education in the Era of Artificial Intelligence

The advent of AI demands a fundamental transformation in the aims and objectives of education. The focus must shift from mere knowledge acquisition to fostering critical thinking, digital literacy, creativity, adaptability, and ethical responsibility. By embracing these new objectives, the education system can prepare learners for a future in which AI complements human intelligence rather than replacing it.

The rapid advancements in Artificial Intelligence (AI) are rebuilding the landscape of education, demanding a shift in its aims and objectives. Traditional education systems, which were predominantly focused on rote learning and standardized assessment, are gradually transitioning to more dynamic, skill-based, and technology-driven models. In the new AI-driven era, education must emphasize critical thinking, creativity, adaptability, and digital literacy to prepare students for an uncertain and technologically rich future (Luckin, 2018).

Redefining Educational Goals

The advent of artificial intelligence (AI) necessitates a redefinition of educational goals, emphasizing critical thinking, adaptability, and digital literacy (Luckin et al., 2018). Traditional rote learning models are being replaced with competency-based approaches that integrate AI-driven personalized learning experiences (Selwyn, 2019). Education systems must foster interdisciplinary knowledge and ethical AI awareness to prepare learners for an AI-augmented workforce (Holmes et al., 2021). Thus, redefining educational goals aligns with cultivating

human-AI collaboration, ensuring that education remains relevant in the rapidly evolving technological landscape.

i. *Fostering Critical Thinking and Problem-Solving Skills* – AI can automate routine tasks, making critical thinking and problem-solving essential competencies for students. According to Anderson and Rainie (2018), AI-driven education should encourage analytical reasoning, ethical decision-making, and the ability to assess the credibility of information.

ii. *Enhancing Digital and AI Literacy* – The digital transformation necessitates AI literacy as a fundamental objective of education. Students must be equipped with an understanding of AI technologies, machine learning, and data science, fostering their ability to interact effectively with intelligent systems (Ng, 2016).

iii. *Encouraging Creativity and Innovation* – In contrast to traditional education, which often stifles creativity, the AI era demands an education system that nurtures innovation. As AI assumes repetitive and computational tasks, human ingenuity will become an invaluable asset (Csikszentmihalyi, 2014).

iv. Promoting Ethical and Responsible AI Usage – As AI becomes ubiquitous, ethical considerations surrounding its application gain prominence. Education must instil ethical AI principles, including fairness, accountability, and transparency, ensuring that students use AI responsibly **(**Boddington, 2017).

v. *Interdisciplinary and Collaborative Learning* – The future workforce will require interdisciplinary knowledge, integrating AI with fields such as humanities, social sciences, and healthcare. Collaborative learning environments should be encouraged to foster teamwork and cross-disciplinary problem-solving (Brynjolfsson & McAfee, 2014).

vi. AI has redefined the virtual classroom experience by integrating chatbots, virtual assistants, and AI-driven discussion forums. AI can facilitate peer-to-peer learning by forming study groups based on students' learning styles and competencies (Chen et al., 2020). Furthermore, AI-powered collaborative tools, such as Google's AI-based Jamboard, enhance group projects and discussions (Popenici & Kerr, 2017).

vii. *Lifelong Learning and Adaptability* – AI-driven automation necessitates continuous upskilling and reskilling. The education system must inculcate a culture of lifelong learning, equipping individuals to adapt to evolving job markets (World Economic Forum, 2020).

New Curricular System in the Era of Artificial Intelligence

The rapid advancement of artificial intelligence (AI) has necessitated a transformative approach to education, leading to the development of new curricular systems that integrate AI and related technologies into the learning process. This integration aims to equip students with the skills required to navigate and contribute to an AI-driven world. The emergence of AI necessitates a reimagined educational framework that integrates technological proficiency with human-centric skills. While the incorporation of AI into curricula offers significant benefits, it is crucial to address associated challenges thoughtfully. By doing so, educational systems can prepare students to thrive in an AI-driven future, balancing technological advancement with the preservation of essential human values.

i. *Integration of AI in School Curricula:* Educational boards worldwide are recognizing the importance of AI literacy. For instance, the Council for the Indian School Certificate Examinations (CISCE) announced plans to introduce robotics and artificial intelligence as formal subjects for Classes XI and XII, starting in the 2025-26 academic year. This initiative aligns with the National Education Policy 2020 and aims to prepare over 3 million students for future careers in a rapidly evolving digital landscape. Similarly, the Central Board of Secondary Education (CBSE) has introduced skill subjects such as Artificial Intelligence, Data Science, and Design Thinking into the curriculum. These subjects are designed to enhance employability and entrepreneurial skills among students.

ii. *Benefits of AI Integration in Education:* AI-driven innovations are reforming the education system by enhancing personalized learning, increasing engagement, automating administrative tasks, and promoting data-driven decision-making. While challenges remain, the responsible integration of AI in education holds the potential to create a more inclusive, efficient, and student-centered learning environment in the new era of artificial intelligence.

AI integration in education enhances personalized learning by adapting to individual student needs, improving engagement and academic outcomes (Zawacki-Richter et al., 2019). It also streamlines administrative tasks, allowing educators to focus more on teaching and mentoring (Holmes et al., 2021). Furthermore, AI-driven analytics provide valuable insights into student performance, enabling timely interventions for at-risk learners (Schmid et al., 2021). Overall, AI fosters an inclusive and efficient education system, preparing students for future digital landscapes (Luckin et al., 2018).

iii. *Personalized Learning Experience:* Artificial Intelligence (AI) enables personalized learning experiences by adapting educational content and pace according to individual student needs. AI-powered adaptive learning platforms, such as those utilizing machine learning algorithms, analyze students' strengths, weaknesses, and learning styles to deliver customized lesson plans (Holmes et al., 2019). This approach fosters a more inclusive education system by catering to diverse learners, including those with special needs (Luckin et al., 2016).

AI also enables personalised education by analyzing individual student data to create tailored learning experiences. Adaptive learning platforms, such as Khan Academy and Coursera, utilize algorithms to recommend content based on learner performance and preferences (Zawacki-Richter et al., 2019). This approach not only enhances learning outcomes but also fosters student engagement.

The personalized learning experience can be actualized mainly by the following approaches.

a) ***Enhanced Student Engagement and Motivation*** which means that AI-powered educational tools, such as chatbots and gamification applications, create interactive and engaging learning environments. Intelligent tutoring systems (ITS) provide immediate feedback and real-time support, boosting student motivation and retention (Van Lehn, 2011). Moreover, AI-driven virtual and augmented reality applications enhance experiential learning, making complex subjects more accessible and immersive (Bacca et al., 2014).

b) ***Automation of Administrative Tasks*** which signifies that AI significantly reduces the administrative burden on educators by automating grading, scheduling, and student assessment processes. Automated grading systems utilize natural language processing (NLP) and pattern recognition to evaluate assignments and essays with high accuracy, allowing teachers to focus on instructional delivery (Jordan, 2020). Additionally, AI-driven chatbots handle routine student queries, improving institutional efficiency (Mollick, 2022).

c) ***Data-Driven Decision Making*** which means that AI provides valuable insights by analyzing vast amounts of educational data, enabling evidence-based decision-making for educators and policymakers. Predictive analytics help identify at-risk students, allowing timely interventions to improve learning outcomes (Zawacki-

Richter et al., 2019). Learning analytics also optimize curriculum design and instructional strategies, ensuring a more effective education system (Siemens, 2013).

d) ***Bridging Educational Gaps*** that is bridging geographical and socio-economic educational disparities by offering access to high-quality AI learning resources. AI-powered platforms provide remote learning opportunities, making education accessible to students in rural or underserved areas (Selwyn, 2019). AI-driven language translation tools facilitate cross-cultural education and support non-native speakers in overcoming language barriers (Ong & Croteau, 2020).

e) ***Enhancing Teacher Support and Professional Development*** which means that AI assists educators by offering real-time professional development resources and instructional support. AI-powered recommendation systems suggest relevant teaching materials, methodologies, and assessment techniques tailored to individual educators' needs (Baker & Inventado, 2014). AI also aids in collaborative learning environments, fostering knowledge-sharing among educators (Chen et al., 2020).

f) ***Ethical Considerations and Challenges*** which states that while AI integration in education offers numerous benefits, ethical concerns such as data privacy, bias in AI algorithms, and dependency on technology must be addressed. Ensuring transparency in AI decision-making processes and implementing robust data protection measures are critical to fostering a fair and equitable education system (Williamson et al., 2020).

i. ***Challenges and Considerations:*** While the integration of AI into education presents numerous benefits, it also poses challenges. Concerns have been raised about the potential for overexposure to digital devices among students and the risk of misinformation. For example, South Korea's plan to introduce AI-powered digital textbooks faced backlash from parents and academics worried about children's screen time and the accuracy of AI-generated content.

Moreover, educators emphasize the need to balance AI integration with the development of human-centric skills. Anthony Seldon warns of the subtle erosion of human values by digital technology, particularly in education and cognitive development. He stresses the importance of shaping AI tools to enhance learning without diminishing essential human interactions and critical thinking skills.

ii. ***Global Initiatives and Future Directions:*** Globally, educational institutions are adapting to the AI era by revising curricula and teaching methodologies. For instance, the Campus d'Alcoi of the Universitat Politècnica de València (UPV) in Spain will offer a Bachelor's degree in Artificial Intelligence starting in the 2025-26 academic year, reflecting the growing demand for AI expertise.

Educators like Andrej Karpathy are also contributing to AI education by developing accessible courses and resources. Karpathy co-designed Stanford's first deep-learning course and has reached millions through online lectures and tutorials, simplifying complex AI topics for broader understanding.

New Techniques of Content Delivery in the New Education System

New instructional methodologies in the AI-driven education system are remaking the way students learn, interact, and engage with knowledge. Personalized learning, ITS, adaptive assessments, and immersive technologies demonstrate the transformative potential of AI in education. However, ensuring ethical AI deployment and addressing digital divide challenges remain critical to harnessing AI's full potential in education.

The integration of artificial intelligence (AI) into education has revolutionized content delivery methods, making learning more personalized, efficient, and accessible. The traditional classroom-based pedagogical approach is rapidly evolving into a technologically enriched environment that fosters adaptability and creativity among learners. AI-driven innovations, including adaptive learning platforms, immersive virtual experiences, and intelligent tutoring systems, are shaping the new education system. This article discusses the latest techniques in content delivery facilitated by AI and other emerging technologies, highlighting their advantages, challenges, and future implications.

The new education system, driven by AI and emerging technologies, is redefining content delivery through personalized learning, immersive experiences, and efficient assessment mechanisms. While these innovations offer numerous benefits, challenges such as data privacy, ethical considerations, and technological accessibility must be addressed. Future research should focus on optimizing AI-driven education models to create inclusive, equitable, and effective learning environments.

Augmented Reality (AR) and Virtual Reality (VR) technologies, driven by AI, offer immersive learning experiences that enhance conceptual understanding. AI-powered simulations and virtual labs enable students to engage with real-world scenarios in disciplines such as

medicine, engineering, and science (Dede et al., 2017). Companies like Labster provide AI-driven VR lab simulations that make complex experiments accessible (Makransky et al., 2019).

i. *Adaptive Learning Systems*: Adaptive learning systems leverage AI algorithms to analyze students' learning patterns and customize content accordingly (Kumar et al., 2022). These systems assess learners' strengths and weaknesses in real-time, providing personalized recommendations to enhance their understanding. Platforms such as Knewton and Smart Sparrow utilize AI to tailor educational content based on individual performance, ensuring that students receive an optimized learning experience (Johnson et al., 2021).

ii. *AI-Powered Intelligent Tutoring Systems (ITS):* Intelligent Tutoring Systems (ITS) employ machine learning and natural language processing (NLP) to simulate one-on-one tutoring experiences (VanLehn, 2020). These systems provide instant feedback, detect misconceptions, and guide learners through problem-solving tasks. AI-based tutors like Carnegie Learning and Squirrel AI offer personalized instruction, making quality education accessible to students across diverse backgrounds (Baker & Smith, 2021).

Intelligent Tutoring Systems use AI to provide immediate and personalized instruction without human intervention. These systems employ natural language processing (NLP) and machine learning to guide students through complex topics with adaptive feedback (VanLehn, 2011). Examples include Carnegie Learning's MATHia and IBM's Watson Tutor, which enhance student learning through interactive problem-solving (Pane et al., 2014).

iii. *Gamification and Game-Based Learning:* Gamification involves integrating game elements into educational activities to enhance motivation and engagement (Deterding et al., 2018). AI enhances this approach by dynamically adjusting challenges and rewards based on learners' progress. Game-based learning platforms, such as Kahoot! and Duolingo, incorporate AI-driven analytics to track student engagement and learning outcomes, fostering interactive and immersive education (Landers, 2019).

iv. *Virtual and Augmented Reality (VR/AR) in Education:* Virtual Reality (VR) and Augmented Reality (AR) offer immersive learning experiences by simulating real-world scenarios (Merchant et al., 2021). AI enhances VR/AR applications by personalizing simulations and adapting virtual environments based on student interactions. Tools like Google Expeditions and Microsoft HoloLens provide hands-on experiences in subjects such as science, medicine, and engineering, improving conceptual understanding and retention (Liu et al., 2022).

v. *Personalized and AI-Powered Content Generation:* AI-driven content generation tools, such as GPT-4 and DeepMind's Alpha Code, create customized learning materials based on students' preferences and curricular requirements (Brown et al., 2020). These systems generate summaries, quizzes, and explanations, enabling learners to grasp complex concepts more efficiently. AI-powered chatbots also assist students in resolving queries, promoting self-directed learning (Mollick & Reich, 2021).

vi. *Blockchain for Secure Content Delivery and Credentialing: Blockchain* technology ensures the secure delivery of educational content and transparent credential verification (Sharples & Domingue, 2016). Decentralized learning platforms use blockchain to track and authenticate students' progress and achievements, reducing fraudulent certification issues. Applications like IBM's Learning Credential Network enhance credibility and accountability in education (Chen et al., 2022).

New Assessment Techniques in the New Education System

The advent of Artificial Intelligence (AI) and advanced digital technologies has transformed traditional education paradigms, leading to the evolution of new assessment techniques. The integration of AI in education has revolutionized assessment techniques, shifting from traditional exams to more dynamic, personalized, and competency-based evaluations. AI-driven adaptive assessments, gamified learning experiences, and automated feedback systems contribute to an inclusive and effective learning environment. As AI continues to advance, future assessment techniques will likely become more immersive, providing even deeper insights into student learning processes.

The new education system emphasizes personalized learning, competency-based evaluations, and real-time feedback mechanisms, requiring assessment techniques that go beyond conventional standardized testing (Luckin et al., 2018). This paper explores various modern assessment strategies that align with the AI-driven educational framework.

i. **Adaptive Assessments**

Adaptive assessments leverage AI and machine learning to modify the difficulty level of questions

based on students' responses **(Shute & Rahimi, 2021)**. These assessments provide a more personalized evaluation by identifying students' strengths and weaknesses in real-time. Platforms such as intelligent tutoring systems (ITS) use adaptive assessments to create individualized learning pathways, ensuring that students receive challenges suited to their learning capabilities (VanLehn, 2019).

ii. Formative and Continuous Assessments

Traditional summative assessments are increasingly being supplemented or replaced by formative and continuous assessments. These assessments focus on ongoing evaluation rather than one-time exams. AI-powered analytics track students' progress through digital platforms, providing teachers with insights into learning gaps (Black & Wiliam, 2018). Real-time assessments, including digital quizzes, peer reviews, and self-reflection exercises, foster continuous learning and immediate feedback (Nicol & Macfarlane-Dick, 2006).

iii. Gamified and Interactive Assessments

Game-based learning integrates AI-powered educational games that foster engagement and motivation (Hamari et al., 2016). AI-driven assessments provide personalized evaluations, identifying strengths and weaknesses through analytics rather than standardized testing methods (Shute & Rahimi, 2021).

Gamification in education has led to the development of assessment techniques that integrate elements of game design to enhance student engagement. AI-powered gamified assessments, such as interactive simulations and virtual reality-based evaluations, provide experiential learning opportunities (Hamari et al., 2016). These methods are particularly effective in STEM education, where students can apply theoretical knowledge in simulated real-world scenarios (Deterding et al., 2011).

iv. AI-Based Automated Assessment and Feedback

AI has revolutionized assessment methodologies by enabling real-time, adaptive testing and instant feedback. AI-powered assessment tools analyze responses to adjust question difficulty dynamically, ensuring a more accurate evaluation of student proficiency (Shute & Rahimi, 2021). Automated grading systems, such as Gradescope and Turnitin's AI-driven feedback, streamline evaluation processes while maintaining fairness and consistency (Jordan, 2020a). AI-driven feedback mechanisms help students identify areas for improvement and refine their learning strategies (Rudolph et al., 2021).

Natural Language Processing (NLP) is used to evaluate written responses, ensuring fairness and reducing grading biases (Zawacki-Richter et al., 2019). Automated assessment systems, such as plagiarism detection tools and AI-generated feedback platforms, enhance academic integrity and provide detailed insights into students' writing proficiency (Baker & Inventado, 2014).

v. Peer and Self-Assessment Techniques

AI facilitates peer and self-assessment by enabling intelligent feedback systems. Platforms like peer grading algorithms assess assignments based on rubrics and predefined criteria, improving collaborative learning experiences (Panadero et al., 2016). AI-driven self-assessment tools analyze students' performance and suggest areas for improvement, fostering metacognitive skills and self-regulated learning (Boud & Falchikov, 2007).

vi. Competency-Based Assessments

The shift towards competency-based education (CBE) necessitates assessments that measure skills rather than rote memorization. AI-enabled assessments evaluate practical competencies through project-based evaluations, digital portfolios, and performance-based tasks (Gervais, 2016). This approach ensures that students acquire the necessary skills for real-world applications, making assessments more aligned with future workforce demands (McClarty & Gaertner, 2015).

vii. Transformative Elements of the New Education System

The transformative elements of the new education system in the era of artificial intelligence (AI) emphasize personalized learning, digital literacy, and adaptive teaching methods, which cater to the diverse needs of learners. AI-driven tools allow for customized educational experiences by analyzing individual learning patterns and providing real-time feedback (Luckin et al., 2016). Moreover, the integration of AI into classrooms enables educators to focus on higher-order skills such as critical thinking and problem-solving, fostering a more holistic approach to education (Brynjolfsson & McAfee, 2014). Ultimately, this paradigm shift aims to equip students with the

skills necessary to thrive in an increasingly digital and automated world (Dede, 2017).

AI as a Teaching Assistant – AI-driven tools, like chatbots and virtual assistants, have become instrumental in addressing student queries, grading assignments, and providing instant feedback (Holmes et al., 2019). These tools allow educators to focus more on creative and critical aspects of teaching.

Automation of Administrative Tasks – AI significantly reduces the administrative burden on educators by automating tasks such as attendance tracking, grading, and report generation. For instance, platforms like Grade Scope streamline the assessment process, saving time and resources (Brynjolfsson & McAfee, 2017).

Enhancing Accessibility and Inclusivity – AI-powered tools have expanded access to education for learners with disabilities and those in remote areas. Technologies like speech-to-text converters and AI-enabled translation services break down language and accessibility barriers (Nguyen et al., 2020).

Challenges and Ethical Considerations

While AI offers numerous benefits, ethical concerns such as data privacy, algorithmic bias, and dependency on technology must be addressed. Ensuring transparency in AI decision-making and protecting students' data is crucial for maintaining trust and fairness (Williamson et al., 2020).

i. Data Privacy and Security – The reliance on student data for AI-driven insights raises concerns about data privacy and security. Robust frameworks are essential to protect sensitive information and ensure ethical usage (Floridi et al., 2018).

ii. Equity in Access – While AI has the potential to democratize education, disparities in access to technology can exacerbate the digital divide. Addressing this issue requires investments in infrastructure and equitable distribution of resources (Selwyn, 2019).

iii. Role of Educators – The integration of AI in education necessitates redefining the role of educators. Continuous professional development and training are crucial to equip teachers with the skills needed to leverage AI effectively (Luckin et al., 2016).

Future Implications

The integration of AI into education heralds a paradigm shift that requires systemic changes. Policymakers must design frameworks that promote innovation while safeguarding ethical standards. Institutions must embrace flexibility and adaptability to meet the demands of an AI-driven education system.

The emergence of Artificial Intelligence (AI) has had profound effects on various domains, and education is no exception. As we look ahead, the implications of integrating AI into the education system are both vast and transformative, influencing curriculum design, pedagogical practices, and the overall learning experience.

The future of education in the AI era holds immense promise but also challenges. The potential of AI to transform education systems around the world offers opportunities for personalized learning, improved teaching practices, and expanded access to knowledge. However, these advancements must be accompanied by careful consideration of ethical issues, such as data privacy, bias, and the need for teacher training. The success of AI integration into education will depend on collaboration between technology developers, educators, policymakers, and students, ensuring that AI is used to enhance, not replace, the human elements of teaching and learning.

i. AI-Driven Educational Tools: The future education system will likely see an increased use of AI-driven educational tools, including virtual tutors, chatbots, and intelligent content creation platforms. These tools will not only assist in knowledge dissemination but also provide immediate, 24/7 support to students, allowing for continuous learning beyond traditional classroom hours. AI can also automate administrative tasks such as grading and scheduling, thereby enabling educators to focus more on interactive teaching and student engagement (Luckin et al., 2016). As these tools become more sophisticated, the role of teachers will shift from content delivery to facilitating critical thinking and problem-solving skills (Brynjolfsson & McAfee, 2014).

ii. AI and Teacher Training: With the rise of AI, teacher training programs will need to evolve. Educators will require skills to integrate AI tools into their teaching practices effectively. This includes understanding how to use AI-driven platforms for assessing students' progress, identifying learning gaps, and providing timely feedback (Holmes et al., 2019). Additionally, teachers will need to be equipped with the knowledge to critically evaluate the ethical implications of AI in education, ensuring that AI applications are used responsibly and in ways that promote equity and inclusion (Williamson & Piattoeva, 2020a).

iii. Ethical Considerations and Data Privacy: As AI becomes more ingrained in the educational system,

there will be growing concerns around the ethical use of AI, particularly in terms of student data privacy and surveillance. AI systems require access to vast amounts of personal data to function effectively, raising questions about how this data is collected, stored, and protected. Policies and regulations will need to be developed to safeguard student privacy and ensure that AI tools are used ethically and transparently (Cummings & Moulton, 2019). Moreover, AI's potential to perpetuate bias in decision-making processes, such as grading and admissions, must be addressed through rigorous accountability (O'Neil, 2016).

iv. Expanding Access to Education: AI can play a critical role in democratizing education by expanding access to learning resources, especially in underserved or remote regions. Intelligent tutoring systems, online courses, and AI-powered language translation tools can break down geographical and linguistic barriers, making high-quality education accessible to a global audience (Zawacki-Richter et al., 2019). In the future, AI could help bridge gaps in educational equity by providing tailored support to learners who might otherwise struggle in traditional education systems, such as those with disabilities or learning differences.

v. The Role of AI in Lifelong Learning: The new education system will also emphasize lifelong learning, a key component of adapting to the rapidly changing job market. AI can facilitate continuous learning opportunities by providing personalized, on-demand learning resources that align with an individual's career goals and evolving skills (OECD, 2019). Moreover, AI's ability to assess learning outcomes in real-time can support the development of micro-credentials and digital badges, which provide learners with formal recognition of their skills and competencies, facilitating career advancement and mobility (Jisc, 2020).

vi. The Need for Human-AI Collaboration: As AI assumes an increasingly prominent role in education, there will be a need for a collaborative approach between human educators and AI technologies. While AI has the potential to automate many tasks and optimize educational experiences, human intuition, empathy, and social interaction remain irreplaceable aspects of teaching and learning (Dede, 2009). Teachers will continue to play a vital role in fostering critical thinking, creativity, and emotional intelligence—skills that are not easily replicated by AI systems. Thus, the future education system will be characterized by a synergy between human educators and AI technologies.

vii. Collaborative and Social Learning through AI: AI-powered collaborative platforms enable students and educators to interact in real-time, fostering peer learning and knowledge exchange. Social learning platforms use AI to recommend study groups, online forums, and relevant educational materials, promoting collective intelligence (Chatti et al., 2012).

viii. Impact on Educational Policy and Governance: Governments and educational institutions will need to adjust their policies to accommodate the integration of AI in education. This includes revising curricula to reflect the importance of AI literacy, updating accreditation standards, and ensuring that AI systems used in schools are subject to appropriate regulatory oversight. The future educational landscape will likely witness the creation of national and international frameworks that guide the ethical development and deployment of AI in educational settings, ensuring that AI tools are used in ways that benefit students and society as a whole (UNESCO, 2021).

Conclusion

The integration of Artificial Intelligence (AI) in education is fundamentally reframing the landscape of teaching and learning, fostering personalized learning environments, automating administrative tasks, and expanding access to quality education (Luckin et al., 2016). As the global education system transitions into an AI-driven era, educators, policymakers, and stakeholders must navigate the challenges and opportunities presented by this paradigm shift. AI-powered adaptive learning platforms have demonstrated significant potential in enhancing student engagement, accommodating diverse learning styles, and providing real-time feedback, thereby revolutionizing traditional pedagogical methods (Zawacki-Richter et al., 2019).

Moreover, AI-driven education systems can bridge educational gaps by providing equitable learning opportunities to marginalized communities through intelligent tutoring systems and multilingual digital resources (Schiff, 2021). The implementation of Natural Language Processing (NLP) and Machine Learning (ML) algorithms has further enabled automated grading, student performance prediction, and learning analytics, reducing teacher workload while improving assessment accuracy (Holmes et al., 2021). However, ethical concerns regarding data privacy, algorithmic biases, and the digital divide remain critical issues that demand careful deliberation and regulatory frameworks (Williamson & Eynon, 2020b).

While AI offers unprecedented advantages, its integration should not undermine the humanistic essence of education. The role of educators remains indispensable in fostering critical thinking, emotional intelligence, and ethical reasoning—qualities that AI cannot replicate (Selwyn, 2019). Future research should focus on developing ethical AI models, enhancing teacher-AI collaboration, and ensuring that AI-powered education remains inclusive and accessible to all learners, regardless of socioeconomic status.

The new education system in the era of Artificial Intelligence presents unparalleled opportunities to enhance learning experiences, improve accessibility, and optimize administrative functions. However, it also necessitates addressing challenges related to equity, ethics, and the evolving role of educators. By fostering collaboration among stakeholders and prioritizing ethical considerations, the education sector can effectively navigate this transformative era.

This article presents both transformative potential and formidable challenges. By adopting a balanced approach that leverages AI's capabilities while addressing ethical considerations, the education sector can harness technological advancements to cultivate a more efficient, inclusive, and learner-centred educational ecosystem. The success of AI in education will ultimately depend on interdisciplinary collaboration among educators, technologists, and policymakers to ensure that innovation aligns with the fundamental principles of equity, accessibility, and lifelong learning.

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FEATURE ARTICLE

Rapidly Growing Landscape of Social Media for Education: Addressing Availability, Accessibility, and Persistent Challenges

Dr. Akhilesh Kumar Gupta*, Sajal Mandal**, Dr. Haripad Kumar Mahato ***

ABSTRACT

Humans' fascination and urbanization towards the scientific and technological progress in the information technology age have greatly transformed human life. Due to the shifting paradigm of modernity and the advent of science, humans have intensive wishes to get material possessions. For these conveniences, they attempt to stay in social communication with one another human beings are bound to one another. Ever since ancient times, man has always been trying to create a communication system that can accelerate communication with near and distant people; social networking sites are the outcome of this effort. Currently, if we look around our surroundings, we can observe that today's youth generation is holding a mobile/smartphone in their hand for various kinds of information communication they engage with their friends virtually on social networking sites through the Internet and communicate with other communities. It is one of the sites that people utilize to share information from one edge of the world to another edge of the world in a jiffy. Social media websites have therefore reached all corners of an individual's social, political, economic, and educational life. The purpose of this paper is to analyze the rapidly growing landscape of social media for education addressing availability, accessibility, and persistent challenges.

Key Words : Education,Information Technology, Intelligence, Social media, Technological revolution.

INTRODUCTION

Technology has revolutionized society, transforming various areas such as communication, medicine, business, transportation, and entertainment. These advancements have altered social systems and reshaped moral perspectives, significantly impacting everyday life (Anderson & Rainie, 2023). Among the most substantial changes brought about by technological progress are those observed in education, where computer-based innovations have made learning more efficient, accessible, and interactive. Traditionally, education was confined to books, documentaries, and physical classrooms; however, the emergence of digital learning tools, smart classrooms, artificial intelligence, and social media platforms has opened up new avenues for education (Selwyn, 2022).

The rapid growth of social media has significantly changed learning experiences, creating new opportunities for interactive learning, collaboration, and participation. YouTube, LinkedIn, Twitter, Facebook, WhatsApp, Telegram, and TikTok have emerged as powerful tools for disseminating knowledge, offering diverse educational content in various formats, including videos, live classes, blogs, and discussion boards (Greenhow & Galvin, 2020). These platforms enable teachers to connect with students in real time, facilitate peer discussions and group assignments, and obtain expert insights from around the world. Social media also promotes a participatory learning environment where students can engage with content, share perspectives, and enhance their critical thinking skills beyond the traditional classroom (Manca & Ranieri, 2016).

Online learning platforms have filled knowledge and skill gaps, enabling students from distant or disadvantaged regions to acquire knowledge and skills that were previously limited to exclusive institutions (Veletsianos & Kimmons, 2021). As the use of social media in education expands further, it is critical to examine its availability, accessibility, and ongoing challenges to ensure an equal and effective digital learning environment.

Availability of Educational Content

Social media has transformed access and sharing of information, with a wide storehouse of educational materials to meet varied learning needs. Social media platforms are in contrast to conventional classroom settings where learning is largely based on textbooks and live lectures. Social media platforms provide a variety of multimedia materials such as short video explainers, online

discussions, and full-fledged online courses (Greenhow & Lewin, 2016). These online platforms allow students and instructors to access information in real time, work collaboratively across the world, and interact with learning content in a more dynamic and customized way (Manca & Ranieri, 2017). Consequently, social media has emerged as a vital tool in contemporary education, promoting interactive and adaptive learning experiences in different subjects and fields.

i. Video-Based Learning

In today's digital era, social media is not just a source of entertainment but has evolved into a significant medium for education, making learning more accessible, engaging, and interactive. The integration of video-based content on platforms such as YouTube, TikTok, Instagram, Facebook, LinkedIn, X (formerly Twitter), and Pinterest has transformed the way students acquire knowledge. These platforms cater to various learning styles, offering a diverse range of educational materials tailored to different interests and subjects (Greenhow & Lewin, 2016).

Among these, YouTube stands out as the most widely used video-learning platform, providing extensive content such as tutorials, lectures, and podcasts, enabling students to learn at their own pace (Krauskopf, Zahn, & Hesse, 2012). TikTok, on the other hand, has gained popularity for its short, engaging videos that simplify complex subjects like science, geography, and programming into easily digestible content (Montag et al., 2021). Similarly, Instagram facilitates education through various formats, including informational videos from institutions like the Indian Institutes of Technology (IIT) and the Massachusetts Institute of Technology (MIT), helping students access high-quality academic content (Manca & Ranieri, 2017).

Facebook also plays a crucial role in online education by hosting educational pages and groups where learners can access videos, discussions, and learning materials from platforms such as BYJU'S, Coursera, and EdX (Veletsianos & Kimmons, 2016). These platforms create an interactive learning environment where students not only consume educational content but also share knowledge and engage in discussions, enhancing the collaborative learning experience (Dabbagh & Kitsantas, 2012). As a result, social media has become an invaluable tool for modern education, offering a wide range of learning opportunities across various subjects and disciplines.

ii. Text-Based Learning and Discussion Forums

In the digital age, the modes of education and discussion are constantly evolving, with social media platforms emerging as transformative tools for text-based learning and knowledge-sharing. These platforms facilitate collaborative learning by enabling students, educators, and experts to exchange ideas, discuss new concepts, and deepen collective understanding (Greenhow & Lewin, 2016). Text-based learning and discussion forums, particularly those found on Facebook Groups, Telegram Channels, and LinkedIn Forums, provide structured environments for individuals to engage in academic discussions and professional networking. These platforms support diverse educational needs, from startup study groups and scientific communities to students preparing for standardized exams, as well as professionals in fields such as technology, medicine, and literature (Manca & Ranieri, 2017).

One of the key advantages of text-based learning forums is their ability to foster continuous knowledge sharing and mentorship. For instance, Telegram Channels serve as repositories for educational content, offering study materials, exam preparation tips, and real-time discussions among learners (Kraut et al., 2013). Similarly, Facebook Groups allow users to engage in interactive discussions, seek guidance from peers and mentors, and access a vast pool of shared resources (Veletsianos & Kimmons, 2016). LinkedIn Forums, on the other hand, create opportunities for professionals and academics to engage in industry-specific discussions, network with experts, and participate in career development initiatives (Dabbagh & Kitsantas, 2012).

Text-based education and discussion forums have introduced a revolutionary shift in modern education, allowing learners to register knowledge, exchange advice, and receive mentorship from subject matter experts (Hrastinski, 2009). However, to maximize the benefits of these platforms, users must ensure that they rely on credible sources and verify the authenticity of shared content. By integrating these forums into mainstream education, social media can play a crucial role in enhancing knowledge acquisition and fostering lifelong learning.

iii. Gamified Learning and Interactive Tools

With the growing influence of digital education, gamified learning, and interactive tools have transformed traditional teaching methods by making them more

engaging, effective, and practical. Social media platforms have evolved beyond communication and entertainment to become essential tools for innovative educational approaches. The incorporation of gamification techniques, such as interactive quizzes, leaderboards, augmented reality (AR) and virtual reality (VR) tools, and mission-based learning, has significantly improved student motivation and engagement (Deterding et al., 2011). These interactive tools align with modern pedagogical strategies that enhance students' learning experiences through dynamic and participatory methods (Hamari et al., 2014).

Gamified learning on social media includes various elements that foster an interactive learning environment:

a) *Quizzes& Polls*: Social media platforms like Instagram Stories, X (formerly Twitter) Polls, and Facebook Groups offer interactive quizzes and polls that help students reinforce their learning while receiving immediate feedback (Wang, 2015). These tools encourage active participation and make learning enjoyable.

b) *Leaderboards & Badges*: Online learning platforms and social media communities use ranking systems and badges to motivate students by rewarding achievements and fostering healthy competition (Domínguez et al., 2013). This approach increases student engagement and promotes long-term retention of knowledge.

c) *Augmented Reality (AR) & Virtual Reality (VR) Tools*: The integration of AR/VR tools, such as 3D modeling and interactive simulations, enhances experiential learning on social media platforms (Bacca et al., 2014). These technologies provide students with hands-on learning experiences in fields such as science, engineering, and medicine.

d) *Challenges & Mission-Based Learning*: Online challenges and mission-based learning activities on platforms like TikTok and YouTube encourage students to apply new concepts in real-world scenarios. This active learning approach fosters critical thinking and problem-solving skills (Sailer et al., 2017).

e) *Discussion Forums & Live Sessions:* Teachers and students can interact through live sessions, Q&A forums, and discussion boards, enabling knowledge exchange and collaborative learning (Manca & Ranieri, 2017). Platforms like LinkedIn Live, Facebook Live, and YouTube Live allow for real-time engagement between educators and learners.

Gamification and interactive tools have revolutionized the teaching system by making education more engaging and accessible. These methods not only enhance students' interest in learning but also improve concentration and retention of information (Seaborn & Fels, 2015). However, to maximize the benefits of gamified learning, it is crucial to implement well-designed strategies and ensure the use of reliable and credible educational content. By integrating these tools into the digital learning ecosystem, social media can serve as a powerful and effective educational platform.

iv. Global Reach And Breaking Geographical Barriers

Social media has revolutionized education by providing a platform that transcends geographical limitations, enabling students and educators worldwide to connect, collaborate, and learn without physical constraints (Greenhow & Lewin, 2016). Traditional education systems often limit learning opportunities to local institutions, but with the advent of digital platforms, students now have access to global perspectives and diverse learning experiences. Social media platforms such as YouTube, LinkedIn, and Facebook facilitate cross-border knowledge exchange, allowing learners to engage with educators, professionals, and peers from different cultural and academic backgrounds (Manca & Ranieri, 2017). This global connectivity fosters a more inclusive educational environment and promotes cultural awareness, equipping students with necessary skills to thrive in a globalized world.

v. Exposure to multicultural learning and 24/7 access to knowledge

The integration of social media in education has also expanded exposure to multicultural learning, providing students with diverse perspectives and cultural insights (Veletsianos & Kimmons, 2016). Platforms such as Twitter, Instagram, and online discussion forums enable students to engage in conversations with individuals from different backgrounds, fostering intercultural competence and a broader worldview (Dabbagh & Kitsantas, 2012). Additionally, social media offers 24/7 access to educational content, breaking the barriers of time zones and rigid class schedules. Online resources such as recorded lectures, e-books, and interactive forums allow learners to access knowledge anytime, ensuring continuous learning at their convenience (Hrastinski, 2009).

vi. International collaboration and virtual classrooms

Social media has further facilitated international collaboration, enabling students and educators to participate in virtual classrooms and global academic projects (Anderson & Dron, 2011). Online courses, MOOCs (Massive Open Online Courses), and live-streamed lectures provide an interactive learning experience where participants from different countries can work together on research projects, case studies, and group discussions (Bonk & Graham, 2012). Platforms such as Zoom, Microsoft Teams, and Google Classroom have become essential tools for virtual education, allowing students to engage with international faculty and peers in real-time. This shift toward digital learning fosters academic networking, enhances research opportunities, and prepares students for a Competitive Global Job Market (Means Et Al., 2014).

Accessibility In Education Through Social Media

Social media has significantly enhanced accessibility in education by providing cost-effective, inclusive, and flexible learning opportunities for students worldwide. Traditional education systems often present barriers such as high tuition fees, geographical limitations, and rigid schedules, making learning inaccessible to many individuals. However, social media platforms have bridged this gap by offering free or affordable educational resources that cater to diverse learning needs (Manca & Ranieri, 2017). Platforms such as YouTube, Facebook, and LinkedIn provide access to online lectures, tutorials, and interactive discussions, enabling learners to acquire knowledge without financial constraints (Greenhow & Lewin, 2016). This shift has democratized education, making high-quality learning experiences available to a broader audience.

i. Cost-effective learning opportunities and inclusive education

One of the key advantages of social media in education is its cost-effectiveness. Unlike traditional education, which often requires expensive textbooks and tuition fees, many social media-based learning resources are available for free or at a significantly lower cost (Means et al., 2014). Online platforms such as Coursera, EdX, and Khan Academy provide affordable courses, while social media groups and discussion forums allow students to share learning materials, reducing the financial burden associated with education (Dabbagh

& Kitsantas, 2012). Furthermore, social media fosters inclusive learning by catering to diverse needs, including individuals with disabilities. Features such as closed captions on YouTube videos, text-to-speech tools, and customizable learning formats help create an accessible and accommodating learning environment (Seale, 2013).

ii. Flexibility and self-paced learning

Social media also offers flexibility and self-paced learning opportunities, making education more adaptable to individual preferences and schedules. Unlike traditional classroom settings with fixed timetables, learners can access educational content anytime and progress at their own pace (Hrastinski, 2009). Platforms like Instagram, Telegram, and podcasts provide micro-learning opportunities, where students can engage with short, focused lessons on various topics (Veletsianos & Kimmons, 2016). This flexibility is particularly beneficial for working professionals, students in remote areas, and individuals with varying learning speeds. Integrating social media into the education system makes learning more personalized and accessible, ultimately empowering learners to take control of their educational journey.

Persistent Challenges In Social Media Or Education

While social media offers numerous benefits for education, several challenges persist that hinder its effective implementation. These challenges include the digital divide, misinformation, privacy concerns, distractions, cyberbullying, and intellectual property issues, all of which can impact the quality and safety of online learning environments (Selwyn, 2016). Addressing these issues is crucial to ensuring that social media remains a valuable and inclusive educational tool.

i. Digital divide and unequal access

One of the major challenges in integrating social media into education is the digital divide, which refers to disparities in access to digital devices and reliable internet connectivity. Socioeconomic differences, geographical constraints, and technological limitations prevent many students from fully participating in online learning (Van Dijk, 2020). While social media has democratized knowledge-sharing, students from low-income backgrounds or rural areas may lack the resources to benefit from these platforms, exacerbating educational inequalities (Hargittai & Dobransky, 2017).

ii. Misinformation and lack of content credibility

The widespread use of social media in education also raises concerns about misinformation and unreliable content. Unlike traditional educational sources that undergo rigorous peer review, social media content is often user-generated, making it susceptible to inaccuracies and bias (Vraga & Bode, 2020). Students who rely on unverified sources may develop misconceptions, which can negatively impact their learning outcomes. Educators and learners must develop critical digital literacy skills to assess the credibility of information before using it for academic purposes (Buckingham, 2015).

iii. Privacy and data security concerns

Another pressing issue is the privacy and security of student data. Social media platforms collect vast amounts of user information, raising concerns about data breaches, surveillance, and unauthorized use of personal information (Lupton & Williamson, 2017). Students and educators using these platforms for learning may unknowingly expose sensitive data, making them vulnerable to cyber threats. Ensuring robust privacy policies and educating users on data security measures are essential to mitigating these risks (Livingstone & Stoilova, 2021).

iv. Distractions and overuse

Social media's highly interactive nature can lead to distractions and excessive use, negatively affecting students' focus and productivity. Studies have shown that multitasking between social media and academic tasks reduces cognitive performance and learning efficiency (Junco, 2012). The addictive design of these platforms, driven by notifications and endless scrolling, can lead to procrastination and time mismanagement, making it essential to establish digital well-being practices among students (Rosen et al., 2013).

v. Cyberbullying and negative social interactions

Cyberbullying is another critical issue associated with social media in education. Online platforms provide opportunities for anonymity, which can lead to harassment, bullying, and negative social interactions among students (Patchin & Hinduja, 2018). Victims of cyberbullying may experience stress, anxiety, and decreased academic performance, making it necessary for schools and online communities to implement strict anti-bullying policies and support systems (Tokunaga, 2010).

vi. Intellectual property and copyright issues

The ease of sharing educational content on social media raises concerns about intellectual property rights and copyright violations. Many educators and students unknowingly use copyrighted materials without proper attribution, which can lead to legal complications (Crews, 2012). Ensuring that social media users understand copyright laws and adhere to fair use guidelines is crucial in maintaining ethical academic practices (Samuelson, 2016).

Conclusion

Social media has influenced educational activities in a great way, offering new methods and means of education. It has proven to be a good medium for offering academic information to students, enabling them to reach various communities and learn at their convenience. Social networking sites also come with challenges like security and privacy issues. Despite these challenges, social media sites such as YouTube, LinkedIn, Twitter, Facebook, and TikTok have revolutionized learning, collaboration, and engagement in the education industry. These sites provide a variety of learning materials, including lectures, videos, and podcasts, which can be accessed via various platforms such as YouTube, TikTok, Instagram, and Facebook. These channels enhance learning capacity and concentration, making learning more interactive and enhancing students' learning capabilities. Social media has become a 24/7 learning space with instant, interactive, and multi-dimensional resources. It can enhance traditional learning systems, supplement educational deficits, and encourage a culture of lifelong learning when utilized optimally. As technology keeps improving, using social media to educate will progressively bridge the digital divide, popularize education, and prepare a future in which students and teachers from across the world collaborate as one seamlessly to bring innovation and intellectual development. Nonetheless, challenges must be addressed carefully, such as preserving digital equity, promoting media literacy, applying cybersecurity measures, and ensuring safe social media use. Generally speaking, social media can transform education and help shape a more inclusive and innovative learning culture.

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FEATURE ARTICLE

Changing Course & Transforming Education in the Field of Fine Arts

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Abstract

The arts have the power to activate knowledge and emotions, making them powerful contributors to transformative learning. When education is transformed, it can profoundly change the way students think which in turn affects their emotions and behaviour. The arts can greatly contribute to transformative learning. Arts education can integrate the mind, hands, and heart. The arts can support transformative learning by connecting students to the deeply human processes of learning and communication. The arts—music, drama, dance, visual arts, literary arts, media arts, and digital arts—have great potential to support transformative learning. For education to be transformative, it must foster deep learning that engages cognitive, social, and emotional processes. It must awaken the inner conflict and discomfort necessary to change your thinking and take action. Archaeological evidence, such as fragments of a Neanderthal flute dating back 43,000 years, suggests that the roots of artistic practice reach deep into the past. In a world of increasing complexity and uncertainty, arts education can foster a humanistic approach to being, contributing, and thriving as transformative citizens of the future. Man is an artistic species by nature. For countless centuries, we have used art to explore our deepest humanity and highest spiritual aspirations. Today, as we address current and emerging challenges, the arts continue to help us imagine and discuss solutions.

Key Words: Effective communication, Artistic resources, Changing Course, Transformative learning, Modern assessments, Intercultural communication etc.

Introduction:

For a child, the world is like a blank canvas ready to be filled with colour. Each brushstroke is a step toward understanding everything around us. Art is not just a hobby for children; it is a way to express themselves. But as children grow older, society's expectations begin to weigh heavily on them. Their parents and teachers believed that success was only achieved through excellence in traditional subjects like math and science, with no room for creativity

to stimulate children's minds. During the 2022 Education Reform Summit, UN Secretary-General António Guterres issued a vision statement on education reform. A truly transformative education must focus on what communities, families, parents and children value most, and respond to local, national and global needs, cultures and capacities, he explained. This will enhance the holistic development of all learners throughout their lives, enabling them to achieve their aspirations and contribute to their families and communities. The concept of transformative education includes educational initiatives that promote peace, support human rights and enhance sustainable development. Transformative education includes global citizenship education, education for sustainable development, traditional education, education for health and well-being and other specific educational priorities. Transformative education recognizes that the issues addressed in these subjects are interconnected and mutually reinforcing. Transformative education must be based on human rights, the principles of non-discrimination, social justice, respect for life, human dignity and cultural diversity. It must embrace the ethics of compassion, reciprocity and solidarity. Transformative education involves teaching and learning in and out of school and throughout life to equip, inspire and empower people of all ages with the knowledge, skills, values and attitudes necessary to develop their full human potential.

Through social and emotional learning, students gain important skills such as problem-solving, effective communication, conflict management, and self-care. These skills help us understand and manage our emotions, create supportive and collaborative communities, and ultimately improve ourselves and others. While older adults often think of stress and pressures as a burden they must bear alone, no one realizes that even young children struggle to take their first steps and that teenagers face enormous pressure to prove their worth to the world. This is where schools come in, focusing not only on academic growth but also on children's social and emotional well-being.

Through participation in the arts, students develop critical thinking skills as well as self-regulation, self-expression,

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and communication skills. The arts can foster experiences, values, and attitudes such as empathy, understanding of diversity, and inclusion. The best part is being able to monitor students over the years. As a result, you will be able to see the progress of your students' skills, whether it is drawing or photography. Overall, Fine arts learning support sustainable development by enabling students to acquire the knowledge, skills, values, and perspectives necessary to understand and address sustainability challenges. For example, arts experiences can increase students' knowledge, awareness, and appreciation of different cultures and peoples.

By considering relationships and issues in ways that foster empathy and open minds to new perspectives and possibilities for change, the arts can foster just, peaceful, and inclusive societies. Because art has the powerful ability to capture and hold our attention, arts education can increase knowledge and raise awareness about sustainability issues. In addition, art offers flexible forms of understanding. Scientific explanations can be complemented by alternative means of conveying meaning. Add to that the fun that the arts allow for. This creates moments of joy and sharing. Over the years, arts and culture programs have provided students with direct exposure to diverse worldviews, traditions, and lifestyles. This experience not only broadens your worldview, but also develops tolerance, understanding of diversity, and intercultural communication skills. It is an enlightening experience that highlights the importance of developing international and global understanding through education and demonstrates that cultural exchange is not just a recreational activity but a vital aspect of a well-rounded education. The concept of transformative education is based on developing students' capabilities and inspiring them to build a more peaceful and sustainable world. Technical education can directly support sustainable development in several ways. For example, research has convincingly shown that participation in the arts improves students' health and well-being. The arts are essential to providing a high-quality educational experience for students because they can improve their social, emotional, and academic outcomes, as well as their engagement in learning.

In specific arts learning contexts, or where the arts are used to support other curricular outcomes, teachers play a key role in maximising learning potential in and through the arts. Curricular pressures push children into a stressful race for grades. Children should be exempt from early childhood exams so they can enjoy a stress-free childhood and focus on developing their creativity and skills. The new education system has brought changes that many of us wished for as

children. This change creates a less stressful environment and allows children to learn at their own pace without worrying about grades and marks. Removing early exams removes anxiety and helps develop a love of learning in a calm and supportive environment. There is much to learn by studying the arts. But to get the most out of it, students need teachers. This guide encourages teachers to design and support learning experiences that unlock potential. Teachers are best placed to identify how to contribute most meaningfully to achieving the SDGs within their changing contexts. This can be achieved by focusing on physical and mental health and well-being, climate action, social justice and reconciliation, responsible consumption, intercultural understanding, social cohesion, democracy and conflict resolution. It is the responsibility of the teacher to select and implement educational curricula that promote deep and lasting personal development. Through teacher-led arts experiences, students develop the social and emotional skills, well-being and creativity they need to meet current and future challenges and opportunities. It is the teacher who activates technical education to promote transformative learning. Teachers should add the fun that the arts allow. This creates moments of joy and sharing.

For learning to be relevant, educators must consider how learning experiences connect to natural, political, economic, and cultural contexts. Although older adults often think of stress and pressures as a burden they must bear alone, no one realizes that even young children struggle to take their first steps and that adolescents face enormous pressure to prove their worth to the world. Through social and emotional learning, students gain important skills such as problem-solving, effective communication, conflict management, and self-care. These skills help us understand and manage our emotions, create supportive and collaborative communities, and ultimately improve ourselves and others.

Learning relevance refers to the importance of learning processes and outcomes in students' lives. Educational relevance creates a balance between students' experiences in school and the world. Learning experiences become meaningful when students make connections to their own stories and actively participate. For example, learning printmaking techniques could be directly relevant to a student who wants to create artwork to sell at a local market or create posters for community events. Students who practice theatre roles can gain insight into how people react and feel emotionally in different situations. This perspective on the situation can be helpful to the young person in processing their emotional reactions, or to their peers, family members, or community members. This is where schools come in,

focusing not only on academic growth but also on the social and emotional well-being of children.

Ideally, teachers create spaces for students to reflect on their learning experiences and help them identify and celebrate their learning outcomes. Learning outcomes are the knowledge, skills, values, and attitudes that students acquire through their educational experiences. Consequences may be intended or unintended, planned or accidental. There is often a link between learning behaviour and outcomes. For example, learning to imagine and create helps develop imagination and creativity. These skills can be applied to all aspects of a student's life. It is often difficult to see the connection between actions and outcomes. Practice and training involve a variety of sub-actions, including experimentation, learning from mistakes, and persistence. The combination of actions and sub-actions can lead to unexpected and important outcomes, such as increased self-control, self-awareness, resilience, or all of the above.

It is important to realize that the outcomes of studying art are not always positive. The experience of learning art can also lead to negative outcomes, such as low self-confidence and disrespectful attitudes towards certain artistic expressions. Traditionally, assessment has focused entirely on memory recall. However, today's educational environment has evolved significantly. Modern assessments go beyond pencil and paper and include hands-on experiments and field tests. These contemporary methods assess students' understanding and skills more holistically, providing a richer and more meaningful approach to learning and assessment. When parents were in school, the focus was primarily on academic matters. In school, students are required to do extracurricular and sports activities alongside their academic studies. But now education has improved. This includes subjects and activities such as yoga, meditation, journaling, and mindful colouring. This change in education has had a huge positive impact on children. It helped them in many ways, including controlling aggression, regulating emotions, making informed decisions, and communicating better in relationships. Artistic experiences can take students to dizzying heights, but they can also plunge them into misery. Teachers have a responsibility to carefully prepare and organize learning experiences and help students negotiate and understand them in ways that ultimately lead to positive learning outcomes.

Those who choose the humanities are often asked about their future career prospects. Our growing enrolment in the humanities demonstrates the importance of creative and critical thinking skills, and fosters an environment that values artistic expression and cultural understanding. The curriculum was synonymous with exams. Schools viewed tests as a means of assessment and were more like photographs. Students must memorize information and reproduce it accurately in their answers. You might be interested in choosing subjects like English, Biology or Art. Unlike some foreign education systems, Indian education did not give us the freedom to choose our subjects. But now, with the emergence of new educational policies, the situation has changed dramatically. It is unrealistic to believe that today students have the freedom to customize their education according to their interests and whims. Imagine a science student who later studies music or art. It is a real breakthrough. In the past, the importance of sports and physical education was often underestimated, especially among 11th and 12th grade students. In the past, this aspect of holistic development in schools was often ignored. When it comes to talking about mental health, the pandemic has affected our minds and changed the way we look at things around us. During the COVID-19 pandemic, educational technology has become the only way we learn.

The introduction of educational technology has enabled students to access a wider range of education that was previously unavailable to them. The online platform provides educational materials such as e-books, videos, and interactive tutorials, making it easier for students to learn different subjects at their own pace. When it comes to mental health, it is heartening to see prestigious universities such as the Indian Institutes of Technology and Indian Institutes of Management actively addressing the issue of suicide among students. Mental health-focused programs and weekly counselling sessions are now the norm, with institutions such as the Indian Institute of Technology leading the way. However, opinions have changed and educational institutions now recognise the importance not only of academic excellence but also of mental and emotional health through sport and physical activity.

Artistic resources exist within and across educational dimensions. The study of the arts promotes transformative education that empowers and motivates students to build a more peaceful and sustainable world. Teaching teachers how to transform learning through the arts offers incredible potential to enrich, energize, and drive transformative learning for individuals and communities. The guide encourages teachers to harness the transformative power of the arts. This teacher reflection tool was developed by analyzing data from over 600 teachers in 39 countries of the UNESCO Schools Network. This model identifies four dimensions of the arts learning experience: context, action, significance, and outcomes. The model also recognizes the

special benefits associated with the arts that can enhance the learning experience. Art has the power to enhance the transfer of richness.

The learning experience description explains how the arts model of transformative learning works in real-world learning. Screenshots of the learning experience provide additional bite-sized examples. Although I had ridden the board a lot before, the board itself felt heavy and oppressive. The pressure of exam results was so intense, it was so stressful that breathing calmly seemed impossible and anxiety was at its peak. Parents often remind us that we faced state exams in fifth and eighth grade, but those of us who were kids in the 2000s were spared that extra stress. It was a horrific incident that occurred during the 10th and 12th grade exams. It was difficult to cover the entire textbook and the pressure to beat the average was intense. However, the upcoming change of splitting the exam into two sessions is promising. This approach distributes the workload more evenly, reducing stress and giving students more time to prepare for the next session. This section provides timely feedback on performance, identifies areas for improvement, and offers support before the next session, ultimately improving student learning and performance. But to reach their full potential, educators need to carefully structure and support learning experiences with what students will learn in mind. Teacher guidelines outlining a step-by-step process for bringing arts education to life and fostering transformative learning.

The educational system is a camp, and it is not the same as the liberated academy. This is an important place in the country that creates the general credentials. When we come to work in the art world, we love it because our artistic professions and creativity are often reconciled. The educational process transforms the learning process and the collaborative learning. That works and learns and the diversity of the students in the educational environment, which brings the needs of the students and the students who explore and work with them. Adopting our education, changes to ensure that the students advise the people and the necessary skills for the most suitable training for our education. The most important factor is the human resources, a cultural of the country and a contribution to a cultural of the global community. The programs of the studio come to the education for the world, the education that is most suitable for the education and teachings of people, that is, and the creation of social activities, inclusive, valuables and hostiles. It is more important that he is present in the educational system in India.

The global intercultural development is a very important development that promotes a comprehensive compression that provides funding and conscience from the different cultivars and the place. This is an integral part of our knowledge of the educational experiences of the students, as well as the support of the social and social backgrounds that are necessary to participate actively and contribute to a multicultural society. We don't see the whole world and the world. In the world's most popular currencies and professional formats in the arts, the design and interior decor, India will convert to a creative and innovative centre.

The future of education in India no longer has a single log of excellent academic results, as many students as possible to learn from the pace, express their freedom and all the way to school. Determine the value of the connection you receive. The best way to get the education outburst from the beginning of a new project with our intelligence and the gentleman who defends a system that does not know how to manage the world with his companions, since he has the talent and talents of each individual. The learning context consists of all the elements that influence learning. The materials, tools, and technology that students have access to include: The physical or digital space in which learning takes place. The teaching methods and approaches selected influence how students feel accepted, recognized, and valued within the learning community. Teachers can influence the learning environment through the resources they provide, the environment they create, and the relationships they foster. In arts learning situations, teachers can ensure that they support access to materials such as paper for drawing and musical instruments for playing. Teachers can strive to create a physical space where students have sufficient light to work and feel comfortable. Teachers can work to reduce hierarchical structures by creating artwork in collaboration with students and recognizing students as experts.

Cultural exchange programs in schools not only offer diverse perspectives, but also highlight diverse perspectives on education around the world. Seeing how children from different international cultures learn and make a big impact opens your eyes to new possibilities in learning. The National Institute for Open Schooling (NIOS) offers flexible learning opportunities to students from diverse cultural backgrounds, including rural areas, tribal communities, and marginalized groups. Through its inclusive curriculum and open learning approach, NIOS responds to the needs and realities of diverse communities across the country and promotes cross-cultural understanding. When the arts are taken seriously, schools become different and better places.

To fully realize the benefits of arts learning, students need teachers. In arts learning environments, or when

the arts are used to support other curricular outcomes, teachers play a key role in maximizing the potential for learning in and through the arts. This guide encourages teachers to design and support learning experiences that unlock potential. Educators are best placed to identify how arts learning can contribute more meaningfully to achieving sustainability goals in a changing context. This can be achieved by focusing on physical and/or mental health and wellbeing, climate action, social justice and reconciliation, responsible consumption and intercultural collaboration. Inspiring School Change recognises the pressures of performance and accountability in schools and shows how an arts approach to education can address the fundamental challenges schools face in terms of student and parent engagement, achievement, improved learning and inclusion, understanding, social cohesion, democracy and conflict resolution.

It is the teacher's responsibility to select and implement educational curricula that promote deep and lasting personal development. Under the guidance of a teacher, students have the opportunity to experience the arts that help them develop social and emotional skills, enhance their sense of wellbeing and the creativity they need to adapt to current and future challenges and opportunities. The teacher is the one who activates technical education to promote transformative learning. Through the arts, they transcend personal projects and become the focus of teaching, learning and school reform. Based on research findings to raise awareness of the power of the arts to drive educational change, the text includes four main themes that run through all chapters. It is a record of inspiring shared experiences and how they were achieved, and inspiring teaching through understanding the reasons and people involved in making them happen. School Reform: The need for schools to better prepare young people for life in the 21st century. To engage young people more effectively, educate them better and recognise that in an unequal society schools can contribute to making things fairer. The school seeks to empower students' creativity and improve their cultural level.

Learning experiences are transformative when they develop students' knowledge, skills, values, and attitudes that inspire and enable change in their lives and communities. Arts learning experiences are a space filled with extraordinary possibilities. However, useful learning and beneficial outcomes are not guaranteed. To maximize the potential of learning through the arts, educators must thoughtfully and intentionally structure and support experiences to determine what students will learn from the

arts. By carefully considering learning behaviours, context, significance, and outcomes, teachers and students can effectively use the arts to create positive and transformative learning. Creating art is putting knowledge into practice. Many students experiment with lines, dots, colours, and other expressive marks. Through arts education experiences, students have the opportunity to develop an understanding and appreciation of the diverse abilities and experiences of people within and outside their community. On a personal level, they coped in different ways with the frustrations of drawing and the positive feelings that come with helping others, which gave them the opportunity to connect with their own feelings.

There are many learning outcomes that can be drawn from this educational experience. Using different collared paints and brushes in new ways will develop students' skills and technical knowledge, including color mixing, paint application, and more. As students created artwork using different senses (sight, touch, hearing, and body parts such as the face and hands), they were encouraged to develop their understanding of different skills, including their own. The children's experience of painting in a group, sharing materials and painting surfaces, is thought to not only enhance their collaborative skills, but also deepen their sense of social connection and understanding of the needs of others. This helps them become more compassionate global citizens.

Conclusion:

Art education is a fundamental path to learning, a journey of discovery of the meaning of education for aesthetic experience. The future of education in India is not just about academic excellence but also about empowering children to pursue their passion and pave their way to success. This journey is certainly worth telling the children of our country. Art and education schools are changing to meet the needs of a rapidly changing world. These changes include an emphasis on teamwork, interdisciplinary learning, and development of 21st century skills. The school develops educational programs that emphasize multidisciplinary learning to prepare students to deal with the complex demands of life. The school is developing an educational curriculum that focuses on 21st century skills and competencies.

An art in education encourages students to think imaginatively, develop fine motor skills, and communicate ideas through aesthetics. It is expected that in art schools, greater emphasis will be placed on group work and other field methods. Previously, it was unimaginable that a

tool like Chat-GPT could manage assignments, develop content, and become an indispensable assistant. Artificial intelligence, virtual reality, and augmented reality technologies have transformed education, especially in the arts, by creating exciting opportunities for creative expression and discovery. AI personalizes learning and provides intelligent creative tools. VR allows students to immerse themselves in a virtual environment to provide a hands-on art experience, while AR integrates digital information into the real world to enhance visualization. The combination of these technologies makes arts education more engaging, interactive, and creative, deepening students' creativity and understanding. By showcasing the creative arts through international research, we show how the arts can enhance learning across the school and address key challenges such as promoting achievement, inclusion and lifelong learning. Transforming Education - Marshall goes beyond individual projects, presenting arguments and evidence in favour of forms of arts-based education that are at the heart of teaching, learning and school reform. By addressing hot topics such as parent and student engagement, standards and accountability in new ways, Inspiring School Change offers perspectives on the educational value and potential of arts-based education and arts-rich curricula for those involved in research and practice aimed at improving teaching and learning.

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FEATURE ARTICLE

Transfiguring Education: Insights from Ancient Mathematics in Indian Knowledge System

Dr. Amar Nath Chatterjee *, Bikash Kumar **

Abstract

Ancient Indian mathematics, deeply embedded within the broader Indian Knowledge System, represents a rich and sophisticated intellectual heritage spanning millennia. This abstract explores the significant contributions of ancient Indian scholars to the field of mathematics, highlighting its integral connection to philosophy, astronomy, and various practical applications. From the ingenious development of the decimal number system and the concept of zero to advancements in algebra, geometry (as seen in the Sulbasutras), trigonometry, and the early understanding of calculus, Indian mathematics laid foundational principles that influenced global mathematical thought. This study aims to provide an insight into the depth and breadth of ancient Indian mathematical knowledge and its enduring relevance within the context of the Indian Knowledge System.

Key Words: Indian Knowledge System, New Education Policy, sutras, Mathematics, Astronomy

Introduction

The classical period Indian mathematics was from 400 CE to 1200 CE. During this period great Indian scholars like Aryabhata, Brahmagupta, Bhaskara II, Varahamihira and Madhava contributed a lot for Mathematics. But Indian mathematics developed in the Indian subcontinent from 1200 BCE [1]. In ancient and medieval period Indian mathematician composed their work in Sanskrit and the rules were mentioned a sutras where rules and problems were stated with great economy in verse in order to aid memorization by a student.

Until 500 BCE, all mathematical works were orally transmitted. After that, the sutras ware transmitted in manuscript form. The oldest extant mathematical document produced on the Indian subcontinent is the birch bark Bakhshali Manuscript, which was discovered in 1881 in the village of Bakhshali, near Peshawar (modern day Pakistan) and is likely from the 7th century CE[2,3].

Modern concept of decimal number was first defined by Indian mathematicians [5]. Also in earlier Indian mathematician contributed to discover zero as a number, negative number, arithmetic, and algebra [6]. Also the trigonometry ratio like sine and cosine concept were developed by Indian mathematician [6]. These mathematical concepts were transmitted to the Middle East, China and Europe later on [6].

In the 15th century CE, Kerala School of mathematician developed the series expansions of trigonometric functions like sine, cosine and arc tangent. Their work related to calculus were completed two centuries before the invention of calculus in Europe. But they did not formulate a systematic theory of differentiation and integration nor their results being transmitted outside Kerala [7, 8].

History of Indian Mathematics

Pre History

In ancient history, practical mathematics was used which was discovered through the excavation at Harappa, Mohenjo-daro and other sites of the Indus -Vally Civilizations. During that period, they manufactured bricks with the dimension proportionate to the ratio 4:2:1. They also used a standardised system of weights based on the ratios: 1/20, 1/10, 1/5, 1/2, 1, 2, 5, 10, 20, 50, 100, 200, and 500, with the unit weight equalling approximately 28 grams (and approximately equal to the English ounce or Greek uncia). As per excavation documents it is observed that they were known about the basic geometrical shapes like hexahedra, barrels, cones and cylinder [9].

The people who lived in the Indus civilization also made an effort to standardize length measurements with a high level of precision. They created a ruler known as the Mohenjo-daro ruler, which had 10 equal pieces and a length unit of around 1.32 inches (3.4 cm). The dimensions of bricks

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made in ancient Mohenjo-daro were frequently integral multiples of this length unit. [10] [11] . It is shown that hollow cylindrical shell items discovered at Lothal (2200 BCE) and Dholavira may measure angles in a plane and establish the location of stars for navigation. [12].

Vedic Period

Samhitas and Brahmanas

The existence of large numbers are as high as 10^{12} during Vedic period during the time of the *Yajurvedasaṃhitā-* (1200–900 BCE) which was included also in the text [2]. The *mantra* (sacred recitation) at the end of the *annahoma* ("food-oblation rite") performed during the *aśvamedha*, and uttered just before-, during-, and just after sunrise, invokes powers of ten from a hundred to a trillion:[2]

Hail to śata ("hundred," 10^2),

hail to *sahasra* ("thousand," 10^3),

hail to *ayuta* ("ten thousand," 10^4),

hail to *niyuta* ("hundred thousand," 10^5),

hail to *prayuta* ("million," 10^6),

hail to *arbuda* ("ten million," 10^7),

hail to *nyarbuda* ("hundred million," 10^8),

hail to *samudra* ("billion," 10^9, literally "ocean"),

hail to *madhya* ("ten billion," 10^{10}, literally "middle"),

hail to *anta* ("hundred billion," 10^{11}, lit., "end"),

hail to *parārdha* ("one trillion," 10^{12} lit., "beyond parts"),

hail to the *uṣas* (dawn) ,

hail to the *vyuṣṭi* (twilight),

hail to *udeṣyat* (the one which is going to rise),

hail to *udyat* (the one which is rising),

hail *udita* (to the one which has just risen),

hail to *svarga* (the heaven),

hail to *martya* (the world),

hail to all (infinite)

Also, the solution to partial fraction was known to the Rigvedic People as states in the *Purush-Sukta* (RV 10.90.4). With three-fourths *Puruṣa* went up: one-fourth of him again was here. The *Satapatha_Brahmana* (c. 7th century BCE) contains rules for ritual geometric constructions that are similar to the Sulba Sutras. [2]

Shulba Sutras

During the period of 700 to 400 BCE the Śulba *Sūtras* (literally, "Aphorisms of the Chords" in Vedic Sanskrit) were constructed. Most of the mathematical problems considered in the Śulba *Sūtras*. During 8 th century BCE, *Baudhayana* composed the *Baudhayana Sulba Sutra*, the best-known *Sulba Sutra*, which contains examples of simple Pythagorean triples, such as: (3, 4, 5), (5, 12, 13), (8, 15, 17), (7, 24, 25), and (12, 35, 37) [1], as well as a statement of the Pythagorean theorem for the sides of a square: "The rope which is stretched across the diagonal of a square produces an area double the size of the original square [1]."

Baudhayana gives an expression for the square root of two:[13]

This expression is similar in structure to the expression found on a Mesopotamian tablet from the Old Babylonian period (1900–1600 BCE):[13]

which expresses √2 in the sexagesimal system, and which is also accurate up to 5 decimal places.

 Even if Pythagorean triples had been widely acknowledged, the *Sulvasutras* might not have addressed the topic because their primary goal was to explain altar architectures and the geometric concepts that underlie them. The triples' presence in the *Sulvasutras* is analogous to mathematics one may come across in an introductory book on architecture or some related practical field; it would not immediately correlate to the general understanding of the subject at the time. There may never be a satisfactory resolution to this problem because, regrettably, no further contemporaneous sources have been discovered. [14]

Three Sulba Sutras were written in all. The *Baudhayana Sulba Sutra's* findings were found in the other two, the *Manava Sulba Sutra* (written by Manava between 750 and 650 BCE) and the *Apastamba Sulba Sutra* (written by Apastamba about 600 BCE).

Vyakarana

The Vedic period saw the work of Sanskrit grammarian *Pāṇini* (c. 520–460 BCE). His grammar includes a precursor of the Backus–Naur form (used in the description programming languages).[37]

Pingala (300 BCE – 200 BCE)

During post Vedic period Pingala's (*piṅgalá*) (fl. 300–200 BCE) contribution to mathematics was remarkable. He was the author of Chhandas Shastra (*chandaḥ-śāstra*, also Chhandas Sutra *chhandaḥ-sūtra*), a Sanskrit treatise on prosody. He also gave a basic ideas of Fibonacci numbers (called *maatraameru*).

Halāyudha's commentary on the *Chandah sutra* from the 10th century has survived, despite the fact that the complete text has not. Using the term Meru-prastāra (meaning "the staircase to Mount Meru"), Halāyudha describes the Pascal triangle as follows:

Sketch a square. Draw two more such squares beneath the first half of the square, then three more squares beneath these two, and so on. Placing 1 in the first square is the appropriate way to begin marking. In both of the second line's squares, enter 1. Put 1 in each of the two squares at the ends of the third line, and the total of the numbers in the two squares above it in the center square. Put 1 in the two squares at the ends of the fourth line. Put the total of the numbers in the two squares above each other in the center ones. Continue in this manner. Of these lines, the second lists one-syllable combinations, while the third lists two-syllable combinations., ...[15]

The text also indicates that Pingala was aware of the combinatorial identity: [16]

$$+$$

Ancient Indian Mathematician and Their Salient Contributions

S. N.	Details of the Work/ Mathematician	Period Location	Sailent Contribution
1	**Vedic Texts**	3000 BCE or earlier	Number systems, Pythagorean type triplets, the decimal system for number names, and the idea of infinity are among the earliest known mathematical concepts.
2	**Sulba-sutras-** Baudhayana, Apasthamba, Katyayana and Manava Sulba-sutras	800-600 BCE	An approximate estimate for the square root of 2 and π can be found in the oldest geometry literature. precise methods for creating and transforming trapezia, squares, rectangles, etc.
3	**Aryabhata-**Aryabhatiyam	476-550 CE; Kusumapura, near Pataliputra, Bihar	Place value system, square root, and cube root algorithms; geometry, quadratic equations, and the sine table equations with linear indeterminacy; sums of integers' cubes and squares; astronomy of planets; spherical and plane trigonometry.
4	**Varah Mihira -** Brhat Samhita, Brhat-jataka, Panca-siddhantika	Ujjain, Madhya Pradesh	Anoverview of the five ancientSiddhantas Trigonometric identities, the sine table, sin2+cos2, combinatorics, and magic squares.
5	Bhaskara I- Commentary on Aryabhatiya, Laghu- bhaskariyam and Maha-bhaskariyam.	600-800 CE; Vallabhi region, Saurashtra, Gujarat	Expanded on Aryabhata's work on planetary astronomy, the approximate formula for the sine function, and integer solution for indeterminate equations.
6	**Brahmagupta-** Brahmasphuta-siddhanta, Khandakhadyaka	598-668 CE; Bhillamala in Rajasthan	Pythagorean triplets, the formula for the diagonals and area of a cyclic quadrilateral, the concept of the arithmetic mean, algebra (Byjaganita). linear and quadratic indeterminate equations, and the rules of arithmetic operations with zero and negative integers.
7	**Sulba-sutras-** Baudhayana, Apasthamba, Katyayana and Manava Sulba-sutras	800-600 BCE	An approximate estimate for the square root of 2 and π can be found in the oldest geometry literature. precise methods for creating and transforming trapezia, squares, rectangles, etc.
8	**Aryabhata-**Aryabhatiyam	476-550 CE; Kusumapura, near Pataliputra, Bihar	Place value system, square root, and cube root algorithms; geometry, quadratic equations, and the sine table equations with linear indeterminacy; sums of integers' cubes and squares; astronomy of planets; spherical and plane trigonometry.
9	**Varaha Mihira-**Brhat Samhita, Brhat-jataka, Panca-siddhantika	482-565 CE; Ujjain, Madhya Pradesh	Summary of five ancient trigonometric identities; sin2+cos2 ; Combinatorics; Magic squares.
10	**Bhaskara I-** Commentary on Aryabhatiya, Laghu bhaskariyam and Maha-bhaskariyam.	600-800 CE; Vallabhi region, Saurashtra, Gujarat	Expanded on Aryabhata's work on planetary astronomy, the approximate formula for the sine function, and integer solution for indeterminate equations.

Contribution of Basic Mathematical Contribution:

a. *Invention of Zero:*

Concept of Zero was developed by an ancient anonymous India mathematician. The concept of zero plays a significant role in the historical development. The basic concept of the numerical value of zero is belongs to a integral part of the decimal system which was developed in ancient India.

During Indus Valley Civilization period, the zero was recorded use of a decimal system which was exited around 2500-1500 BCE. Though the concept of zero as a number was started to evolve later. One of the great ancient Indian mathematicians Brahmagupta (598-668 CE) developed the concept of zero. He defined zero as number and defined various properties of zero. He also introduced the rules for arithmetic involving zero such as addition subtraction and various fundamental concepts of mathematics.

Great Indian astronomer and mathematician Aryabhata (476-550CE) played a significant role in development of zero. He first symbolized the zero and recognized its importance in mathematical calculations. Now zero is considered on of the most fundamental concepts of science and great invention of ancient India. It serves as a placeholder in the decimal system which enables us to represent numbers of varying magnitudes efficiently.

b. *Concept of Pi:*

The concept of Pi () has a long and rich history in India as well as other ancient civilizations. In India was calculated in various was by eminent mathematician and astronomers over the centurie.

Indian mathematician and astronomers made their references the "Shulba" Sutras to define and calculate the . Aryabhata the great mathematician as well as great astronomers approximated the value of as 3.1416 in his work "Aryabhatiya" . He used the geometrical concepts to calculate the approximated value of which was later advanced by other Indian mathematicians.

During 7th century CE, great mathematician Bhaskara I provided an approximation of in his work **"*Mahabhaskariya*"**. He used various methods involving a polygon with 384 sides to estimate more accurately.

Madhava of *Sangamagrama*, was a mathematician who created series expansions for trigonometric functions, such as pi. Madhava's work came centuries before the creation of calculus and infinite series in Europe.

The notion of pi and its precise computation were also sought after in a number of other ancient civilizations, including Babylon, Egypt, and Greece, even though Indian mathematicians made significant contributions to its comprehension and approximation. π is about equal to 227, or 3.14159265359.

c. *Number System:*

Indian had a great contribution in development of number systems. Amogh which application of decimal system plays the most significant role in the number system globally. In Indian Vally Civilization (around 2500-1500 BCE) various numerical system was widely used. There are numerous evidence Archaeological findings in support of counting and recording quantities.

The formation of India's numerical systems was significantly influenced by a physical alteration that occurred in the third century BC. It had numerical symbols, which are regarded as some of India's first written representations of numerical values.

From the third century BCE until the third century CE, the Kharosthi numeric system Like the more popular Indian numeric system, the Kharosthi numeral system was a positional decimal system. Similar to the Indian numeral system, it employed symbols to represent numbers, and the value of a sign was decided by its placement inside a number. To depict distinct numbers, the Kharosthi numeral symbols used a variety of lines and curves. They used a decimal system, with symbols for 1 through 9 and one for zero. Inscriptions, coins, and other ancient objects have been discovered to contain the Kharosthi writing and numbers.

d. *Pythagoras Theorem:*

In India, the Pythagorean theorem was present in ancient times. The concept of Pythagoras Theorem was found in Sulba Sutras (800 BCE to 200 BCE). These texts mainly deal with geometry and provide rules for the construction of altars for religious ceremonies. One of these rules involve right-angled triangles and the application of what we now recognize as the Pythagorean theorem. While they may not state the theorem explicitly, they demonstrate an understanding of the relationship between the sides of right- angled triangles. Baudhayana, an ancient Indian mathematician, and Apastamba, a sage and mathematician provided geometric methods for constructing right angles and calculating diagonal measurements that align with the principles of the

Pythagorean theorem. Aryabhata discussed the relationships between the lengths of chords and the radii of circles, which are related to the Pythagorean theorem in his work "Aryabhatiya".

e. *Vedic Mathematics:*

Vedic mathematics was a great contribution based on the ancient Indian scriptures Vedas. Swami Bharati Krishna Tirtha published a book titled "Vedic Mathematics" in 1965, where he introduced and popularized this system. Key features and claims associated with Vedic Mathematics:

Sutras: There were 16 Sutras (aphorisms) and 13 Upa-sutras (sub-sutras) in Vedas. Theses sutras offers efficient and unconventional methods for various mathematical operations such as addition, subtraction, multiplication square roots and cube roots. Vedic mathematics also emphasizes mental calculation. The rules of Vedic Mathematics helps for accurate and faster calculation in compared to traditional methods. It also covers various fields including arithmetic, algebra, geometry, and calculus.

Conclusion:

Ancient Indian mathematics has a profound legacy within the Indian Knowledge System, contributing to a holistic understanding of the universe. Key innovations include the decimal place-value system, significant strides in algebra, geometry, and trigonometry, and their connection to philosophy and cosmology. The transmission of Indian mathematical knowledge to the Islamic world and Europe played a crucial role in the development of modern mathematics. The Sulbasutras, containing advanced geometric concepts, and the contributions of important mathematicians like Aryabhata, Brahmagupta, and Bhaskara, demonstrate the enduring power of ancient Indian mathematics.

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FEATURE ARTICLE

Attitude of Stakeholders Towards Four Year Integrated Teacher Education Programme (ITEP)

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ABSTRACT

According to National Education Policy 2020 (NEP 2020) students will join the teaching profession not by chance but by choice. NCTE recommended a four-year integrated teacher education program (ITEP) and UGC recommended a four year undergraduate course. Universally, like all other profession, the teaching profession should also have its own professional ethics which is a prerequisite to ensure its dignity and integrity. Teaching profession is the noblest profession. The present study was conducted with the main objectives to know the attitude of stakeholders regarding four years integrated teacher education programme. The data was collected by selecting purposively 34 educators, 43 parents and 112 trainee-teachers and 36 alumni from different training colleges from West Bengal state through using self-made Questionnaire prepared by the researcher. Descriptive Statistical technique e.g. mean, percentage and standard deviation and inferential statistics e.g. 't'-test and 'ANOVA' were used to analyse and interpret the data. All hypotheses were tested at 0.05 level of significance. Results shows that a significant different exists in attitude towards ITEP between male students and female students (t=3.15); between urban students and rural students (t=2.48); between language students, social science students and science students (F=39.26; between urban alumni and rural alumni (t=2.65); between pre-matric parents, post-matric parents and highly educated parents (F=20.22). These finding will be helpful to improve the quality of teaching and teacher for better preparation of learner and the future society. Moreover, it fulfils the goal of better teacher preparation programme. Integrated teacher education programme provide qualified and expert teachers to the teaching-learning arena. Teachers will be expert and skilled in different subjects in multi-disciplinary environment. ITEP will save time and energy to the students as they can continue dual courses in a same time.

KEYWORDS: Teacher Education, Attitude, Stakeholders, Educators, Trainee Teacher

Introduction:

All over the India teacher education profession and institutions are in transitional period and under reformation. The cornerstone of this reform in the Indian education system is the introduction of the Integrated Teacher Education Programme (ITEP). Education is a fundamental force in human life, playing a significant role in shaping both individual destinies and the future of a nation. It is one of the most crucial investments in human development. Teachers, who serve as the cornerstone of any education system not only shape the lives of their students but also influence the development of future citizens, thereby contributing to the nation's progress. Teacher education is a very crucial part of the whole education system of a country. So, the entire education system solely depends upon the existence of teacher education. It is true that educators with adequate capabilities and knowledge can provide effective and meaningful instruction, fostering the holistic development of the young generations. As teachers are the backbone of society and the main architect of the future citizen hence, appropriate training or education is necessary for all trainee-teachers. But when educators possess simultaneously academic and professional competencies and demonstrate commitment, they can facilitate high-quality learning by fostering positive growth in all domains of their learners. It is true that the production of capable and effective teachers solely depends on the quality of teacher education programs. National Education Policy NEP-2020 recommended many major changes from elementary school level to university education system. In teacher education they suggested four years integrated teacher education programme. Teacher education encompasses policies, strategies and procedures aimed at equipping aspiring educators with the necessary knowledge, attitudes, skills, and behaviours to perform their duties effectively not only within classrooms but also in the broader community. NEP-2020 marks a significant shift in the way we view and understand teacher education

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and need for high quality, multidisciplinary and holistic teaching training. This programme has various advantages and can able to fulfill the desire of the existing society.

It is a transformative initiative framed at enhancing the quality of teacher education. The main objective of this program is to integrate academic and professional training into a single comprehensive course. Unlike traditional teachers' training programs, which require separate degrees in education, ITEP offers a streamlined pathway for aspiring teacher educators by combining content knowledge with pedagogical expertise and skill from the outset. The 4-year integrated B.Ed. will be a dual-major holistic Bachelor's degree, in Education as well as a specialized subject such as a language, history, music, mathematics, computer science, chemistry, economics, art, physical education, etc. This program is designed to equip future educators with the necessary competencies, including content mastery, pedagogical skills, classroom management strategies, and a strong ethical foundation. By strengthening the teacher education system, ITEP works as a vital role in improving educational quality and standards which consequently require shaping a future-ready teaching workforce. The 4-year integrated B.Ed. offered by such multidisciplinary HEIs will, by 2030, become the minimal degree qualification for school teachers. It is also important that Stakeholders, including policymakers, teacher educators, students, parents and institutions, have varied attitudes toward this initiative. Understanding these perspectives is important for assessing its effectiveness and long-term impact. This study examines stakeholders' attitudes, highlighting the points of potential improvements/suggestion for quality teacher education.

Statement of the Problem-

In this present study, the problem is stated as- **"Attitude of stakeholders towards four year integrated teacher education programme (ITEP)".**

Objectives of the Study-

1. To study the attitude of teacher educators regarding four year integrated teacher education programme in gender, locality variations and academic discipline variation

2. To study the attitude of trainee teachers regarding four year integrated teacher education programme in gender, locality and academic discipline variations.

3. To study the attitude of alumni regarding four year integrated teacher education programme in gender, locality and academic discipline variations.

4. To study the attitude of parents regarding four year integrated teacher education programme in gender, locality and educational qualification variations.

Hypotheses-

$H_O1:$ There is no significant difference in attitude towards ITEP between male and female educators.

$H_O2:$ There is no significant difference in attitude towards ITEP between urban educators and rural educators.

$H_O3:$ There is no significant difference in attitude towards ITEP between language educators, social science educators and science educators.

$H_O4:$ There is no significant difference in attitude towards ITEP between male and female trainee teachers.

$H_O5:$ There is no significant difference in attitude towards ITEP between urban and rural trainee teachers.

$H_O6:$ There is no significant difference in attitude towards ITEP between language, social science and science trainee teachers.

$H_O7:$ There is no significant difference in attitude towards ITEP between male alumni and female alumni.

$H_O8:$ There is no significant difference in attitude towards ITEP between urban alumni and rural alumni.

$H_O9:$ There is no significant difference in attitude towards ITEP between male parents and female parents.

$H_O10:$ There is no significant difference in attitude towards ITEP between urban parents and rural parents.

$H_O11:$ There is no significant difference in attitude towards ITEP between pre-matric parents, post-matric parents and highly educated parents.

Significance of the Study-

The significance of the study is as follows:

a) The study provides valuable views and insights into the perceptions of various stakeholders regarding the Four-Year Integrated Teacher Education Programme (ITEP).

b) The study highlights differences in opinions among students, teacher educators, parents, and alumni based on gender, location, and academic discipline. These differences will help the importance for policy adjustments and updating to ensure equal acceptance and accessibility of ITEP across diverse groups.

c) The study contributes to the development of strategies and initiatives taken by various stakeholders such

as Teachers, Parents, students and alumni that can contribute to the effectiveness of teacher education programs.

d) The findings of the study will aid policymakers, educational institutions, and curriculum developers

Delimitations-

a) This study was delimited to the stakeholders (students, teachers, parents and alumni) of different training colleges in West Bengal only.

b) This study was delimited to the pre-service B.Ed. trainees and teacher educators of training colleges only.

c) This study was delimited to the stakeholders of private training colleges only.

Review of Literature-

Roy (2025) conducted a research that explores the characteristics, benefits, drawbacks, and challenges of teacher education in India. The study also described the importance of an Integrated Teacher Education Programme (ITEP), discussing its features, advantages, disadvantages, and the problems it faces. The research paper is based completely on secondary data sources, such as: Journals, periodicals, books, official documents, newspapers. It is to be noted that the research follows a descriptive approach study. The findings of this study was that ITEP serves as a gateway for aspiring teachers who wish to bring innovation into the learning-teaching process. Mandal (2024) examined in this research paper the various aspects of teacher education in India including its significant features, drawbacks, and challenges. It also highlights the significance of the Four year Integrated Teacher Education Programme (ITEP) in present circumstances as a policy perspective of India. The paper discusses ITEP and its major features, advantages, disadvantages, and the issues it encounters. The study conducts solely on secondary data sources, such as journals, books, official documents, newspapers etc. It follows a Descriptive research approach. The outcomes indicate that ITEP acts as a significant pathway for aspiring teachers in the present education context.

The study of Meenakshi (2023) comprehends how student teachers perceive the four-year Integrated Teacher Education Programme (ITEP). The objective of this research was to find out challenges and enhance outcomes in the teacher education field. The major aims were to examine the impact of ITEP on the quality of teacher education and to know student teachers' opinions on its implementation or practice. The research work was conducted among 100 M.Ed. students from Bangalore University, using descriptive and inferential analysis through mean and percentage calculations. The findings of the study reveal that most student teachers view ITEP as an innovative initiative in teacher education, serving as a valuable filter for shaping quality teaching professionals. Chakraborty (2022) explain the concept of ITEP, its functioning, and the strategies and initiatives that educational institutions should adopt for its effective implementation.

The study envisions ITEP as an important step in enhancing the teacher education programme in India. This research work follows a qualitative approach, utilizing data gathered from various sources. Srinivasacharlu (2020) conducted a study among Pre-University Course (PUC) students in Bangalore North, who formed the population for the research. A total of 96 PUC learners from Arts and Science backgrounds across various colleges participated in this research. The survey method was used here, and a five-point attitude scale measured students' attitudes towards the four-year Integrated Teacher Education Programme (ITEP). The findings of this study revealed that most PUC students had a moderate outlook on the four-year Integrated Teacher Education Programme, regardless of their academic discipline, gender, or place of residence.

From the above literature study it can be concluded that there are so many studies were done, but no one dealt with the attitude of stakeholders towards ITEP. So, the study is focused on the topic of selecting attitude towards ITEP as the major variable.

Methodology:

A systematic study always needs a better methodology for achieving its expected objectives. Methodology in case of a research study includes various activities like population, sample and sampling technique, tools, data collection procedure and data analysis etc.

Population:

The researcher has decided to collect the data from different stakeholders including trainee teachers, teacher educators, parents and alumni of teacher training colleges in West Bengal.

Sample:

a) Samples were selected purposively from different training colleges in West Bengal state.

b) Samples were collected from private teacher training colleges.

c) The samples were comprised the male and female stakeholders from rural and urban area.

Sample Frame:

A sum of 34 educators, 43 parents and 112 students and 36 alumni from different training colleges constitute the actual sample. Total number of stakeholders is given in the table:

Stakeholders	Number	Gender		Locale		Academic Discipline			Educational Qualification		
		M	F	R	U	L	SS	S	PrM	PoM	HE
Teacher Educators	34	15	19	16	18	11	14	9			
Trainee teachers	112	51	61	54	58	37	45	30			
Alumni	36	20	16	18	18						
Parents	43	20	23	19	24				16	15	12

Note: M=Male, F=Female; R=Rural, U=Urban; L=Language, SS=Social Science, S=Science, PrM=pre-matric, PoM=post-matric, HE=Highly Educated

Variables:

Major Variables (Dependent Variable)

- Attitude towards ITEP

Categorical Variables (Independent Variable)

- Gender (Male and Female).
- Locality (Rural and Urban).
- Academic Discipline (Language, Social Science and Science)
- Educational Qualification (Pre-matric, Post-matric and Highly Educated)

Other intervening and extraneous variables were kept constant for this study.

Tools Used:

1. A self-made attitude scale towards ITEP was constructed and validated by the researcher. This attitude scale was comprised of 22 questions from four dimensions i.e. Financial Dimension, Curricular Dimension, Time frame Dimension, Teaching- Learning Dimension, Job Prospect Dimension. Each items having five options of total marks 110.

2. The content validity was checked by two experts and reliability coefficient was 0.77

Analysis and Interpretation of Data:

The collected data is analyzed and interpreted using various statistical tools and technique, and interpretation of the result. All hypotheses were tested at 0.05 level of significance. Testing of Hypothesis:

All hypotheses were judgement by t-test (Independent sample test, assuming equal variances) using SPSS software.

$H_O1:$ There is no significant difference in attitude towards ITEP between male educators and female educators.

Table No- 2: Attitude towards ITEP of Teacher Educators - Gender variation

Teacher Educators		N	Mean	Std. deviation	S.E. Mean	df	"t"
Gender	Male	15	77.866	10.822	2.794	32	1.13
	Female	19	74.210	7.892	1.810		

The mean value of attitude towards ITEP of male educators (77.866) was greater than female educators (74.210). Here df=32. The critical value of "t" with 32 degrees of freedom at 5% level of significance was 2.03 whereas the computed

values of "t" was 1.13 which does not exceed the critical value of t at 5% level of significance. So, the t-value is taken as not significant (insignificant). Hence it is concluded that there exists no significant difference in attitude towards ITEP between male educators and female educators.

H₀2: There is no significant difference in attitude towards ITEP between urban educators and rural educators

Table No- 3: Attitude towards ITEP of Teacher Educators_ Locale variation

Teacher Educators		N	Mean	Std. deviation	S.E. Mean	df	"t"
Locality	Rural	16	76.875	8.139	2.034	32	0.61
	Urban	18	74.888	10.419	2.456		

The mean value of attitude towards ITEP of rural educators (76.875) was greater than urban educators (74.888). Here df=32. The critical value of "t" with 32 degrees of freedom at 5% level of significance was 2.03 whereas the computed values of "t" was 0.61 which does not exceed the critical value of t at 5% level of significance. So, the t-value is taken as not significant (insignificant). Hence it is concluded that there exists no significant difference in attitude towards ITEP between urban educators and rural educators.

H₀3: There is no significant difference in attitude towards ITEP between language educators, social science educators and science educators.

Table No- 4: Attitude towards ITEP of Teacher Educators_ Academic Discipline variation

Teacher Educators		N	Mean	Std. deviation	S.E.Mean	df	"F"
Academic Discipline	Language	11	72.818	8.975	2.706	Between=2 Within=31 Total=33	1.07
	Social Science	14	76.214	11.355	3.034		
	Science	9	78.888	5.060	1.686		

The mean value of attitude towards ITEP of science educators (78.888) was greater than social science educators (76.214) which was also greater than language educators (72.818). Here total df=33. The critical value of "F" with 33 degrees of freedom at 5% level of significance was

3.30 whereas the computed values of "F" was 1.07 which does not exceed the critical value of t at 5% level of significance. So, the F-value is taken as not significant (insignificant). Hence it is concluded that there exists no significant difference in attitude towards ITEP between language educators, social science educators and science educators.

H₀4: There is no significant difference in attitude towards ITEP between male and female trainee teachers.

Table No- 5: Attitude towards ITEP of Trainee Teachers_ Gender variation

Student		N	Mean	Std. deviation	S.E. Mean	df	"t"
Gender	Male	51	59.666	12.959	1.814	110	3.15*
	Female	61	67.311	12.636	1.617		

The mean value of attitude towards ITEP of female trainee teachers (67.311) was greater than male trainee teachers (59.666). Here df=110. The critical value of "t" with 110 degrees of freedom at 5% level of significance was 1.98 whereas the computed values of "t" was 3.15which exceed the critical value of t at 5% level of significance. So, the t-value is taken as significant.

Hence it is concluded that there exists significant difference in attitude towards ITEP between male and female trainee teachers.

H$_o$5: There is no significant difference in attitude towards ITEP between urban and rural trainee teachers.

Table No- 6: Attitude towards ITEP of Trainee Teachers_ Locale variation

Student		N	Mean	Std. deviation	S.E.Mean	df	"t"
Locality	Rural	54	60.666	13.242	1.802	110	2.48*
	Urban	58	66.775	12.748	1.673		

The mean value of attitude towards ITEP of urban trainee teachers (66.775) was greater than rural trainee teachers (60.666). Here df=110. The critical value of "t" with 110 degrees of freedom at 5% level of significance was 1.98 whereas the computed values of "t" was 2.48 which exceed the critical value of t at 5% level of significance. So, the t-value is taken as significant. Hence it is concluded that there exists significant difference in attitude towards ITEP between urban and rural trainee teachers.

H$_o$6: There is no significant difference in attitude towards ITEP between language, social science and science trainee teachers.

Table No- 7: Attitude towards ITEP of Trainee Teachers_ Academic Discipline variation

Student		N	Mean	Std. deviation	S.E.Mean	df	"F"
Academic Discipline	Language	37	54.621	8.347	1.372	Between=2 Within=109 Total=111	
	Social Science	45	62.777	13.092	1.951		
	Science	30	76.766	6.806	1.242		

The mean value of attitude towards ITEP of science trainee teachers (76.766) was greater than social science trainee teachers (62.777) which was also greater than language trainee teachers (54.621). Here total df=111. The critical value of "F" with 111 degrees of freedom at 5% level of significance was 3.07 whereas the computed values of "F" was 39.26 which exceed the critical value of t at 5% level of significance. So, the F-value is taken as significant. Hence it is concluded that there exists significant difference in attitude towards ITEP between language, social science and science trainee teachers.

HO7: There is no significant difference in attitude towards ITEP between male alumni and female alumni.

Table No- 8: Attitude towards ITEP of Alumni_ Gender variation

Alumni		N	Mean	Std. deviation	S.E.Mean	df	"t"
Gender	Male	20	67.05	10.430	2.332	34	0.55
	Female	16	65.25	8.621	2.155		

The mean value of attitude towards ITEP of female alumni (65.25) was greater than male alumni (67.05). Here df=34. The critical value of "t" with 34 degrees of freedom at 5% level of significance was 2.03 whereas the computed values of "t" was 0.55 which does not exceed the critical value of t at 5% level of significance. So, the t-value is taken as insignificant. Hence it is concluded that there exists no significant difference in attitude towards ITEP between male alumni and female alumni.

H$_o$8: There is no significant difference in attitude towards ITEP between urban alumni and rural alumni.

Table No- 9: Attitude towards ITEP of Alumni_ Locale variation

Alumni		N	Mean	Std. deviation	S.E.Mean	df	"t"
Locality	Rural	18	62.333	7.753	1.827	34	2.65*
	Urban	18	70.166	9.811	2.312		

The mean value of attitude towards ITEP of urban alumni (70.166) was greater than rural alumni (62.333). Here df=34. The critical value of "t" with 34 degrees of freedom at 5% level of significance was 2.03 whereas the computed values of "t" was 2.65 which exceed the critical value of t at 5% level of significance. So, the t-value is taken as significant. Hence it is concluded that there exists significant difference in attitude towards ITEP between urban alumni and rural alumni.

H$_O$9: There is no significant difference in attitude towards ITEP between male parents and female parents.

Table No- 10: Attitude towards ITEP of Parents_ Gender variation

Parent		N	Mean	Std. deviation	S.E.Mean	df	"t"
Gender	Male	20	55.8	8.697	1.944	41	0.47
	Female	23	57.17	9.939	2.072		

The mean value of attitude towards ITEP of female parents (57.17) was greater than male parents (55.80). Here df=41. The critical value of "t" with 41 degrees of freedom at 5% level of significance was 2.01 whereas the computed values of "t" was 0.47 which does not exceed the critical value of t at 5% level of significance. So, the t-value is taken as not significant (insignificant). Hence it is concluded that there exists no significant difference in attitude towards ITEP between male parents and female parents.

H$_O$10: There is no significant difference in attitude towards ITEP between urban parents and rural parents.

Table No- 11: Attitude towards ITEP of Parents_ Locale variation

Parent		N	Mean	Std. deviation	S.E.Mean	df	"t"
Locality	Rural	19	54.263	8.562	1.964	41	1.44
	Urban	24	58.333	9.635	1.966		

The mean value of attitude towards ITEP of urban parents (58.333) was greater than rural parents (54.263). Here df=41. The critical value of "t" with 41 degrees of freedom at 5% level of significance was 2.01 whereas the computed values of "t" was 1.44 which does not exceed the critical value of t at 5% level of significance. So, the t-value is taken as not significant (insignificant). Hence it is concluded that there exists no significant different in attitude towards ITEP between urban parents and rural parents.

H$_O$11: There is no significant difference in attitude towards ITEP between pre-matric parents, post-matric parents and highly educated parents.

Table No- 12: Attitude towards ITEP of Parents_ Educational Qualification variation

Alumni		N	Mean	Std. deviation	S.E.Mean	df	"F"
Educational Qualification	Pre-matric	16	49.437	5.632	1.408	Between=2 Within=40 Total=42	20.22*
	Post- matric	15	56.733	5.725	1.478		
	Highly Educated	12	65.75	8.894	2.567		

The mean value of attitude towards ITEP of highly educated parents (65.75) was greater than post-matric parents (56.733) which was also greater than pre-matric parents (49.437). Here total df=42. The critical value of "F" with 42 degrees of freedom at 5% level of significance was 3.23 whereas the computed values of "F" was 20.22 which exceed the critical value of t at 5% level of significance. So, the F-value is taken as significant. Hence it is concluded that there exists significant difference in attitude towards ITEP between pre-matric parents, post-matric parents and highly educated parents.

Rejected and Accepted Hypotheses:

Rejected Hypotheses	Accepted Hypotheses
H_O4 ; H_O5 ; H_O6 ; H_O8; H_O11	H_O1; H_O2 ; H_O3 ; H_O7; H_O9; H_O10

Major Findings of the Study:

1. There was no significant difference in attitude towards ITEP between male educators and female educators.

2. There was no significant difference in attitude towards ITEP between urban educators and rural educators.

3. There was no significant difference in attitude towards ITEP between language educators, social science educators and science educators.

4. There exists significant difference in attitude towards ITEP between male and female trainee teachers.

5. There exists significant difference in attitude towards ITEP between urban and rural trainee teachers.

6. There exists significant difference in attitude towards ITEP between language, social science and science trainee teachers.

7. There was no significant difference in attitude towards ITEP between male alumni and female alumni.

8. There exists significant difference in attitude towards ITEP between urban alumni and rural alumni.

9. There was no significant difference in attitude towards ITEP between male parents and female parents.

10. There was no significant difference in attitude towards ITEP between urban parents and rural parents.

11. There exists significant difference in attitude towards ITEP between pre-matric parents, post-matric parents and highly educated parents.

Conclusion of the Study-

This study revealed that the mean difference of major variable attitude towards ITEP is due to the gender (Male & Female), locale (rural & urban), academic discipline (language, social science & science) and Educational qualification (Pre-matric, Post-matric & Highly educated). The main reason is that most of the rural trainees and male trainees were engaged in some work for earning money to save their family, so they have not enough time to spend four years with institution, teacher, curriculum and parents. On the other way they hide themselves and they think the training is just for a degree for getting a school teacher job. Moreover Science trainees are more confident about their career and passionate to spend long time with the institution. Educated parents have more attitudes towards four year integrated course. A better society would be waiting for us if our future teacher would be updated during training. All the stakeholders should take initiatives for the better implementation of the four year integrated teacher education programme for better teacher preparation. Urgent implication and application of this course at massive level is a must. Teacher education is an integral and important component of education system of any country. Hence, a well-structured teacher education program ensures that educators become professionally competent, adaptable, and proficient in essential pedagogical techniques and strategies enabling them to address the evolving needs and expectations of the education system. The Government of India has proposed to introduce four year integrated teacher education programme throughout the country from March, 2019 in accordance with the NCTE. Although a few numbers of institutes managed this programme prior to 2019.

Few Suggestions for Improvement of ITEP…..

1. There are lacks of teaching job. So, there must be creating new job opportunities for the students to get job after completion of ITEP. Especially Rural students and Male students are engaged themselves in works other than teaching job to save their family.

2. There should be minimum course fee for the said course as most of the students have poor financial background.

3. Adequate and appropriate infrastructures in the integrated teacher education institution should be needed.

7. There is an urgent necessary to change the mind-set of the people to accept this course.

8. For increase the attitude and awareness among stakeholders, seminars, workshops and sensitization programmes should be organized.

6. Teachers are the backbone in this course. Hence, recruitment of well trained and expert teachers in a good number is very much needed.

7 For science knowledge and pedagogy, best laboratory and other equipment facilities should be needed.

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FEATURE ARTICLE

Effective Teaching Strategy for Transforming Education: Blended Learning

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Abstract

The transformation of education is crucial to meeting the evolving demands of a rapidly changing world where artificial intelligence is emerging as a key facilitator of learning.Blended learning, which integrates traditional face-to-face instruction with digital learning tools, has emerged as an effective strategy to enhance accessibility, engagement, and skill development. This paper focuses on examining the role of blended learning as an effective teaching strategy to transform education by fostering personalized learning, inquiry-based education, and digital literacy. Through a thematic analysis of existing literature, this study explores key themes such as adaptive learning technologies, competency-based education, experiential learning, and the integration of digital skills in curricula. Research findings indicate that blended learning promotes self-directed learning, critical thinking, and flexibility in education while addressing diverse student needs. The paper highlights the importance of continuous teacher development, investment in digital infrastructure, and inclusive educational policies in maximizing the potential of blended learning. By synthesizing research from various educational studies, this study provides insights into the effectiveness of blended learning as a transformative strategy for creating a more inclusive, skill-oriented, and future-ready education system.

Keywords:*Blended Learning, Digital Learning, Experiential Learning, Inclusive Learning*

Introduction

The need to transform education is widely acknowledged, but implementing effective changes requires strategic and well-planned approaches. Traditional education systems, which rely heavily on face-to-face instruction and conventional curricula, often fail to accommodate the diverse learning needs of students (Malone & Lepper, 2021). In an era where technological advancements are reshaping

industries and job markets, education must evolve to equip students with relevant skills and knowledge. A reimagined education system should be inclusive, flexible, and skill-oriented, ensuring that students are prepared for the dynamic challenges of a rapidly changing global landscape (Sesay, 2024).Blended learning has emerged as a powerful strategy for educational transformation, combining traditional classroom instruction with digital learning tools. This approach not only enhances student engagement but also fosters self-directed learning and critical thinking (Pokhrel etal., 2024). By integrating technology with conventional teaching methods, blended learning makes education more accessible and personalized, catering to different learning styles and paces. Additionally, it empowers educators with data-driven insights, allowing them to tailor their teaching strategies to meet individual student needs. As digitalization continues to shape modern society, the education sector must adapt by embracing innovative pedagogical models (Hanna, 1998). Blended learning bridges traditional and modern education, ensuring that students receive a comprehensive and interactive learning experience (Onesi et.al., 2024). Adopting this approach can improve learning outcomes, increase student motivation, and better preparation for future academic and professional endeavors. However, successful implementation requires a supportive infrastructure, trained educators, and policies that promote equitable access to digital resources (Frehywot et al., 2013).

Current Educational Status

The current educational landscape is undergoing a gradual transformation, influenced by technological advancements, policy reforms, and the growing need for skill-based learning (Agarwal & Agarwal, 2021). However, traditional teaching methods continue to dominate in many institutions, particularly in rural and underprivileged areas, where access to modern educational tools remains limited (Ghavifekr & Rosdy, 2015). While there have been efforts to integrate digital learning and student-centered

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pedagogies, the overall education system still struggles with outdated methodologies, infrastructure gaps, and socio-economic disparities (Tangwe & Benyin, 2025).In many schools and colleges, teacher-centered learning remains the primary approach, where educators act as the sole source of knowledge, and students are passive recipients of information (Gulnaz et al., 2015). This method often emphasizes rote memorization and standardized testing over critical thinking, creativity, and problem-solving skills. Despite the need for more interactive and application-based learning models, the rigid curriculum structure and examination-oriented education system leave little room for innovation in teaching methodologies (Dutta, 2023). However, with the introduction of technology-driven education, there is a shift towards blended and online learning models (Istenic, 2024). Government initiatives such as SWAYAM, DIKSHA, and *e-Pathshala* have attempted to bridge the digital divide by providing access to free educational resources. Additionally, smart classrooms, virtual labs, and AI-based personalized learning platforms are being introduced in urban and well-funded institutions (Dogara, NA). These technologies enhance student engagement and offer flexible learning opportunities. Yet, their adoption remains uneven, with rural and economically disadvantaged students still facing challenges in accessing these digital tools due to a lack of infrastructure, internet connectivity, and digital literacy (Devkota, 2021).Another significant shift in education is the emphasis on skill development and vocational training. The demand for job-ready graduates has led to the inclusion of skill-based learning in curricula through programs like the National Skill Development Mission (NSDM) (Sahasrabudhe & Bhagat, 2021). Many institutions are now offering courses in STEM, entrepreneurship, and vocational training, aiming to equip students with practical skills needed in the modern workforce (Hynes et al., 2023). However, implementation challenges, lack of trained faculty, and limited industry collaboration often hinder the effectiveness of these programs (Moshtari & Safarpour, 2024). The role of teachers and educators is also evolving, with a growing emphasis on digital pedagogy and experiential learning. Many educators are being trained in hybrid teaching methods, integrating digital tools with classroom instruction to create a more engaging learning experience (Singh et al., 2021). However, a significant proportion of teachers, particularly in government and rural schools, lack proper training in modern pedagogical techniques, making it difficult to implement student-centered learning approaches effectively (Zenda & Dlamini, 2023).

Despite these advancements, educational inequality remains a major concern. Tribal communities, econom-ically disadvantaged groups, and girls in rural areas continue to face barriers to education due to sociocultural constraints, financial limitations, and inadequate policy implementation (Makai et al.,2024). While initiatives like the National Education Policy (NEP) 2020 advocate for inclusive and multidisciplinary education, achieving these goals requires systemic changes, increased investment in education, and greater collaboration between government bodies, educational institutions, and technology providers.The current status of education reflects a transition phase, where traditional and modern teaching styles coexist, but significant gaps persist (Zhou, 2025). To create a truly inclusive and effective education system, there is a need for stronger policy execution, widespread digital literacy programs, enhanced teacher training, and improved access to technology-driven learning (Das & Singha, 2024). Without addressing these challenges, the benefits of educational transformation will remain limited to privileged sections of society, leaving marginalized communities at a disadvantage (Mossberger et al., 2003).

Challenges in Educational Transformation

Despite the potential for transformation in education, several challenges hinder its effective implementation (Joseph et al., 2024). These challenges range from infrastructural limitations to socio-economic and pedagogical barriers that affect the accessibility, quality, and inclusivity of education. Addressing these issues is crucial for ensuring that educational transformation benefits all learners, particularly those from marginalized and disadvantaged backgrounds.One of the most significant challenges is the digital divide, which creates disparities in access to technology and online learning resources (Islam, NA). In many rural and tribal areas, inadequate internet connectivity, lack of digital devices, and low levels of digital literacy prevent students from benefiting from technology-driven education (Bandyopadhyay et al.,2021). Without addressing these fundamental infrastructural gaps, the integration of blended learning and digital tools remains ineffective for a large segment of the population.

Another major obstacle is resistance to change in traditional educational institutions. Many schools and universities still rely on conventional teaching methods that emphasize rote learning and standardized testing. The transition to student-centered and competency-based education requires a shift in mindset among educators, policymakers, and stakeholders (Chad, 2025). However, resistance from teachers due to a lack of training in digital pedagogy and innovative teaching methodologies often slows down the adoption of transformative practices (Singun, 2025). Socio-cultural

and economic barriers also play a crucial role in limiting educational transformation. Gender biases, economic hardships, and societal expectations often prevent girls, particularly in tribal and rural communities, from accessing quality education (Kumar & Pandey, 2021). Many families prioritize economic survival over education, leading to high dropout rates and low enrolment in higher education, especially among marginalized groups. Additionally, financial constraints make it difficult for students to afford learning materials, digital devices, and internet access, further widening the educational gap.The lack of policy implementation and inadequate funding for educational reforms is another major challenge (Dao, 2015).

While government initiatives such as the National Education Policy (NEP) 2020, SWAYAM, and DIKSHA promote digital learning and skill development, the effectiveness of these programs depends on proper execution and sustained investment. Many educational institutions, particularly in underserved areas, struggle with inadequate funding, teacher shortages, and outdated infrastructure, making it difficult to implement progressive educational strategies effectively (Zarei & Mohammadi, 2022). Assessment and evaluation limitations pose a challenge to educational transformation (Sevnarayan & Potter, 2024).

Traditional assessment models often fail to measure critical thinking, creativity, and problem-solving skills, which are essential in a modern learning environment (Sesay, 2024). The shift to competency-based and outcome-oriented assessment methods requires new frameworks, teacher training, and institutional reforms, which can be challenging to implement at scale (Malhotra et al., 2023). Overcoming these challenges requires a collaborative effort involving governments, educators, technology providers, and communities. By investing in infrastructure, teacher training, financial support for disadvantaged students, and policy-driven educational reforms, it is possible to bridge existing gaps and create an inclusive and effective education system that meets the needs of all learners (Raes et al., 2020).

Effective Strategies for Educational Transformation

Transforming education requires a multi-faceted approach that ensures inclusivity, flexibility, and skill-based learning (Bandyopadhyay et al., 2021). As the global landscape of education evolves, institutions must adopt innovative strategies that enhance learning experiences and improve student outcomes (Castro, 2019). Educational transformation goes beyond traditional classroom settings and embraces a dynamic, student-centered approach that fosters critical thinking, adaptability, and lifelong learning. Schools and universities can create more engaging and effective learning environments by integrating technology, personalized learning methods, and competency-based education.One of the most impactful strategies in educational transformation is integrating technology (Ertmer, 2012).

Digital tools, e-learning platforms, and artificial intelligence-driven education models have revolutionized how students access knowledge. Virtual classrooms, interactive content, and adaptive learning systems enable learners to engage with educational material at their own pace, bridging gaps in access and comprehension. The use of open educational resources (OER) and online courses democratizes education by making high-quality content available to students in remote and underserved areas (Forehand, 2024). A crucial aspect of transformation is student-centered learning, which shifts the focus from passive knowledge acquisition to active participation and critical engagement. Methods such as project-based learning, experiential learning, and collaborative problem-solving encourage students to apply their knowledge in real-world contexts. Personalized learning approaches, supported by data analytics and artificial intelligence, help tailor instruction to individual learning styles, strengths, and needs, fostering a more effective and engaging educational experience.Skill development and competency-based education play a vital role in preparing students for the demands of the modern workforce (Rowe,2019).

Traditional education often emphasizes theoretical knowledge, but a transformative approach incorporates vocational training, digital literacy, and STEM (Science, Technology, Engineering, and Mathematics) education (Barakabitze, 2019). Institutions must work closely with industries to design curriculum frameworks that align with job market needs, ensuring that graduates possess the practical skills required for employability and entrepreneurship.Inclusive and equitable education is essential for creating a more just and progressive society. Education policies must address the needs of marginalized and disadvantaged groups, including tribal communities, economically weaker sections, and female students. By implementing multilingual education, culturally relevant curricula, and financial support programs, institutions can make education more accessible and effective for all.Ultimately, achieving meaningful educational transformation requires a collaborative effort involving policymakers, educators, students, and communities. By embracing technology, fostering student-centered learning, promoting skill development, and ensuring inclusivity, the

education system can evolve to meet the needs of a rapidly changing world. This holistic approach will not only improve learning outcomes but also empower students to become active contributors to society.

a) **Adoption of Blended Learning Models:** Blended learning combines traditional face-to-face instruction with online learning tools, offering a more flexible and engaging learning experience. This approach allows students to learn at their own pace while still benefiting from direct teacher guidance. Digital platforms provide access to diverse resources such as video lectures, interactive simulations, and online discussions, making learning more interactive and personalized (Ulanday, 2021). The integration of technology into education ensures that students develop digital literacy skills, which are essential for their future careers.

b) **Personalized and Adaptive Learning:** Every student has a unique learning style and pace. Adaptive learning technologies can use artificial intelligence (AI) and data analytics to customize lesson plans based on individual learning needs. By analyzing student performance, educators can identify areas of improvement and provide targeted support. Personalized learning fosters self-directed education, empowering students to take control of their learning journey while ensuring that no one is left behind (Netcoh, 2017).

c) **Competency-Based Education (CBE):** Competency-based education shifts the focus from traditional time-based learning to mastery of skills and knowledge. Instead of progressing through a standardized curriculum at a fixed pace, students advance once they demonstrate proficiency in a subject. This approach promotes a deeper understanding of concepts, encourages critical thinking, and ensures that students develop real-world skills that are directly applicable to their careers.

d) **Integration of Experiential and Project-Based Learning:** Experiential learning, including project-based and problem-based learning approaches, encourages students to apply theoretical knowledge in real-world scenarios. Hands-on experiences such as internships, research projects, and community-based learning initiatives help students develop practical skills, creativity, and teamwork. This method fosters deeper engagement, as students actively participate in solving real challenges rather than passively absorbing information.

e) **Use of Open Educational Resources (OERs) and Digital Content:** Open Educational Resources (OERs) provide freely accessible, high-quality learning materials, making education more affordable and inclusive. These resources include e-books, online courses, research articles, and multimedia content that enhance learning experiences. Digital content platforms allow students to access updated and diverse educational materials, reducing dependence on traditional textbooks and encouraging self-learning.

f) **Emphasis on 21st-Century Skills:** To prepare students for the challenges of the modern world, educational systems must emphasize developing 21st-century skills such as critical thinking, creativity, collaboration, and communication. Additionally, digital literacy, emotional intelligence, and problem-solving skills are crucial for future career success. Schools and universities should integrate these skills into their curricula through interdisciplinary teaching, group activities, and real-world case studies.

g) **Teacher Training and Professional Development:** Educators play a pivotal role in transforming education. Teachers need continuous professional development and training to implement innovative teaching methods effectively. Workshops, online courses, and collaborative learning communities help educators stay updated with the latest pedagogical advancements. Additionally, training in technology integration equips teachers with the skills to use digital tools in their classrooms effectively.

h) **Inclusive Education and Bridging the Digital Divide:** Ensuring that education is accessible to all, regardless of socio-economic background, is fundamental to transformation. Governments and institutions must work toward reducing the digital divide by providing necessary infrastructure, internet connectivity, and digital devices to underserved communities. Special education programs and inclusive learning strategies should be implemented to support students with disabilities and learning difficulties.

i) **Strengthening Industry-Academia Collaboration:** Stronger ties between educational institutions and industries can help bridge the gap between academic learning and job market requirements. Partnerships with companies can provide students with internships, mentorship programs, and exposure to industry trends. This collaboration ensures that students graduate with the skills and knowledge necessary to succeed in their chosen fields.

Policy Reforms and Investment in Education Technology: Governments and policymakers must prioritize education reform by implementing policies that support innovative teaching methodologies and digital transformation. Investments in EdTech infrastructure, research, and curriculum design can accelerate the adoption of new learning models. Additionally, education policies should encourage flexibility in learning pathways, allowing students to pursue interdisciplinary education and lifelong learning opportunities.

Conclusion

Educational transformation requires a comprehensive strategy incorporating technology, innovative teaching methods, and inclusivity. Blended learning, competency-based education, and experiential learning models can create a more engaging and effective education system. By focusing on personalized learning, industry collaboration, and professional development for educators, institutions can better prepare students for the future. However, the success of these strategies depends on strong policy support, investment in digital infrastructure, and a commitment to equity in education. By embracing these approaches, education can become more dynamic, accessible, and impactful in addressing the challenges of the 21st century.

A transformative education system must prioritize personalized learning approaches that cater to individual student needs through adaptive learning technologies. By analyzing student performance and learning patterns, these technologies create customized learning pathways that help students grasp concepts at their own pace. Additionally, integrating project-based and experiential learning enhances engagement by allowing students to apply theoretical knowledge in real-world contexts, fostering a deeper understanding of subjects.

Alongside personalization, education must emphasize critical thinking and creativity by encouraging inquiry-based learning, where students actively explore, question, and develop problem-solving skills. Moving away from rigid, standardized assessments, competency-based evaluations should be adopted to assess students based on their mastery of concepts rather than their ability to memorize information. In today's digital era, enhancing digital literacy is crucial, requiring the integration of coding, data analysis, and media literacy into curricula. Expanding online learning opportunities further supports flexible education models, making knowledge accessible to a wider range of learners. However, the success of these approaches depends largely on the capability of educators, necessitating continuous professional development.

Teachers must receive training in modern teaching methodologies and be encouraged to adopt interactive, student-centered learning techniques that foster engagement and innovation. By implementing these strategies collectively, education can evolve into a more dynamic, inclusive, and future-ready system that equips students with essential skills for the 21st century.Blended learning, with its integration of technology and traditional teaching methods, presents a transformative approach to education that enhances accessibility, engagement, and skill development. By incorporating personalized learning, inquiry-based education, and digital literacy into curricula, students can develop critical thinking, creativity, and problem-solving abilities essential for the modern world.

Additionally, competency-based assessments ensure that students are evaluated on their mastery of skills rather than rote memorization, making learning more meaningful. The role of educators remains central to this transformation, necessitating continuous professional development and the adoption of innovative teaching methodologies. However, for blended learning to be truly effective, it must be supported by strong policy initiatives, investment in digital infrastructure, and efforts to bridge the digital divide. When implemented effectively, blended learning has the potential to create an inclusive, flexible, and future-ready education system that empowers students to thrive in an ever-evolving global landscape.

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FEATURE ARTICLE

Transforming Mathematics Learning: The Effectiveness of Art Integration in Competency-Based Assessment

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Abstract

The incorporation of artistic techniques and forms to improve learning across a range of subjects is known as art integration in education. This approach blends in nicely with competency-based assessment, which instead of using traditional testing techniques focuses on student demonstrating their comprehension and skills through real-world applications. Art integration enhances mathematical competency-based assessment by incorporating artistic forms into teaching and evaluation, promoting student engagement and deeper understanding of mathematical principles through creative expression. Artistic activities enhance engagement, deepen understanding, and cater to different learning styles by encouraging creative exploration of mathematical concepts. The objective of the study is to find the practical application of competency-based education in mathematics and to explore the strategies to assess mathematics using art integration. The findings of the study is Art integration and competency-based assessment create a comprehensive learning environment that emphasizes skill mastery, personalized learning, real-world relevance, and continuous feedback, preparing students for academic and practical success.

Key Words: NEP 2020, Competency, Competency-Based Assessment, Holistic Assessment, Mathematics Competency, Art Integration, Critical thinking

Introduction

Art integration and competency-based assessment are two approaches that aim to enhance student learning and engagement by focusing on the application of knowledge and skills in meaningful contexts. They emphasize the demonstration of mastery through artistic projects, personalized learning, real-world relevance, continuous feedback, alignment with educational standards, and the development of personal competencies. Art integration encourages collaboration, creativity, and critical thinking, while competency-based assessment promotes self-regulation and intrinsic motivation. Both approaches provide opportunities for tailored learning experiences, fostering a growth mindset and self-directed learning. They also contribute to the development of personal competencies, such as cognitive, metacognitive, motivational, and social/emotional skills.

These evaluation methods demonstrate how art integration can be an effective instrument for assessing mathematical proficiency in interesting and significant ways. Teachers can encourage creativity while making sure that fundamental mathematics skills are accurately tested by letting students express their understanding through a variety of artistic mediums. Incorporating art into the classroom enhances the educational process and equips students to think across disciplines and solve problems in practical situations.

Literature Review

Gonczi (2007) found that in English speaking countries(Australia, New Zealand) a competency based approach to education and assessment has re -emerged as a key educational policy. Davis (2003) found that a logical and essential aspect of this competence-based approach to education is the assessment of students' achievements of the necessary competences or outcomes. Henri, et.al. (2017) found that though there are gaps in the literature regarding how competency-based learning programs should be structured and assessed, theoretical and applied perspective are offered that address both theoretical basis for the effectiveness of competency based learning and practical aspects of implementing successful competency-based learning instruction in engineering education. Further research directions include the use of Competency based learning for professional skills education and empirical

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quantitative evaluation of competency-based learning pedagogical effectiveness.

Competency-Based Assessment in Mathematics

As stated in NEP 2020, page 12, paragraph 4.6: Experiential learning will be used at every level, including hands-on learning, education that incorporates the arts and sports, and pedagogy based on storytelling, among other things, as standard practice in each topic and with investigations into the connections between various subjects. Classroom interactions will change to competency-based learning and teaching in order to bridge the achievement gap in learning outcomes. The learning outcomes, skills, and attitudes listed for each subject in a particular class will also be in line with the assessment instruments (such as assessments "as," "of," and "for" learning).

According to document *Principles and Standards for School Mathematics* of National Council of Teachers of Mathematics (NCTM,200) reflects that Mathematical competency is defined by both content (i.e., what students should know) and process (i.e., how students should approach and comprehend mathematics). This comprises procedural standards as well as content standards for K–12 math students. The standards have a long history of development and updating, and they are based on research (Curriculum and Evaluation Standards for School Mathematics,1989).

Graf (2007) comes to the conclusion in his document that algebra and the relationships between algebra and numbers and operations should receive the most attention in the middle grades. However, this does not imply that this emphasis would come at the expense of other.

Kayatmanov, et. al. (2016) says that Mathematical competency is defined as the integrated set of skills and abilities that allows students to effectively understand and apply mathematical concepts in diverse contexts. The four key components of mathematical competency are:

1. Cognitive Component: Knowledge and understanding of mathematical concepts and procedures.

2. Practical Component: Ability to apply mathematical knowledge in real-world and professional contexts.

3. Motivational and Value-Based Component: Emotional engagement and recognition of mathematics' relevance to future careers, promoting a positive learning attitude.

4. Reflexive and Assessment-Based Component: Self-analysis and assessment of one's cognitive performance, enabling reflection on learning processes.

It emphasizes the need for diverse teaching approaches to effectively develop these components, underscoring the importance of a competency-based approach in mathematics education.

Art Integration in Education

NEP 2020 stated on page 12(para 4.7) that Art-integration is a cross-curricular approach that integrates art and culture into education, fostering experiential learning and integrating Indian ethos into classrooms. This approach strengthens the linkages between education and culture, creating joyful classrooms. Arts integration is an educational strategy that merges core academic subjects with various art forms, including visual arts, music, dance, and drama. It encourages students to engage in a creative process that links an art form with another subject, enabling them to demonstrate understanding through artistic expression. This approach enhances comprehension of both the art and academic content while fostering personal competencies and collaborative learning. By emphasizing active participation, students utilize their imagination and creativity to explore and create original works that reflect their emotions and beliefs. Arts integration also promotes interdisciplinary connections, enriching the overall learning experience. Ultimately, it aims to make education more engaging and relevant, while developing essential skills such as collaboration, critical thinking, and problem-solving (Biscoe, et. al. (2015)).

Relationship between Art integration and Competency Based Assessment

NEP 2020 emphasizes experiential learning through art integration, fostering critical thinking and deeper understanding. This approach promotes holistic development, promoting emotional intelligence, social skills, and creativity. Art integration also offers a diverse expression of learning, allowing for personalized assessments that cater to different learning styles and intelligences. This aligns with NEP 2020's goal of holistic education, promoting socio-emotional growth and collaborative skills. Art integration offers a diverse learning experience, allowing students to express their understanding through various methods, promoting personalized assessment and critical thinking. This approach enhances problem-solving and creative problem-solving skills, as seen in the creation of scientific concepts. Art integration also fosters collaborative learning, promoting teamwork and communication skills, as outlined in NEP

2020. Assessments can evaluate both the final product and the process of collaboration, providing valuable insights into each student's contributions.

The NEP 2020 encourages continuous assessment through art integrated learning, allowing for informal feedback during art projects. This approach connects learning to cultural contexts, making education more meaningful and engaging. It promotes experiential learning, holistic development, critical thinking, collaboration, continuous assessment practices, and cultural relevance, preparing students for the modern world and enhancing educational outcomes.

Biscoe, et. al. (2015) in his study elaborated that Arts integration significantly enhances students' understanding of academic content while fostering the development of key personal competencies identified by Redding (2014b): cognitive, metacognitive, motivational, and social/emotional competencies.

1. Cognitive Competency: It encourages the application of prior knowledge and critical thinking, improving students' ability to grasp complex concepts.

2. Metacognitive Competency: The creative process allows students to reflect on their learning and adjust their strategies, enhancing self-regulation and awareness.

3. Motivational Competency: Engaging with the arts boosts intrinsic motivation, making learning more enjoyable and relevant, which increases student engagement and persistence.

4. Social/Emotional Competency: Arts integration promotes collaboration and communication, helping students develop social skills, empathy, and emotional intelligence through teamwork on artistic projects.

Overall, arts integration is a powerful approach that enhances these competencies, leading to more engaged and successful learners, and better preparing them for future academic and social challenges. Overall, this assessment method shifts focus from traditional grading to a holistic evaluation of student learning, emphasizing mastery of essential skills for academic and real-world success.

Objective of the Study

The objective of the study is to find the practical application of competency-based education in mathematics and to explore the strategies to assess mathematics using art integration.

Method and Procedure

To obtain pertinent information, thorough literature research was carried out. Wikipedia and the inclusion criteria, which stipulated that peer-reviewed books, journal articles, and conference papers, were included in the selection criteria. Research Gate, J-gate, Semantic Scholar, and Google Scholar were the databases that were utilized for the literature search**.**

Analysis and Findings

1. **Practical applications of the competency-based approach in higher mathematics education**

Ayatmanov et al. (2016) identified several practical applications of the competency-based approach in higher mathematics education, emphasizing its role in making learning more engaging and career-oriented. One key application is contextual learning, which involves integrating real-world problems into the curriculum to enhance students' practical skills and understanding. Additionally, interdisciplinary projects promote collaboration between mathematics and other fields, demonstrating the relevance of mathematical theories across diverse domains. The approach also includes creating simulated professional environments, where students can experience situations that mimic real-world professional settings, allowing them to apply their mathematical knowledge in practical scenarios. Furthermore, reflective practices, such as self-assessment and peer-assessment, are encouraged to deepen students' understanding of their competencies and foster critical thinking. The use of technology plays a significant role as well, with digital tools facilitating interactive learning and problem-solving. Lastly, competency-based assessments are designed to evaluate how effectively students can apply mathematical concepts in practical situations. Collectively, these applications aim to make mathematics education more relevant and engaging, equipping students with the skills needed for their future careers. Competencies encompass the knowledge, skills, and attitudes students are expected to acquire, including cognitive, technical, and soft skills. Key aspects of competency-based assessment include:

The competency-based approach in education is characterized by several key elements that aim to enhance student learning and development. At its core is the *definition of competencies*, which encompasses the knowledge, skills, and attitudes students should

acquire, including cognitive, technical, and soft skills. This approach emphasizes *personalized learning*, allowing students to progress at their own pace and master each competency before moving forward. *Formative assessments* play a crucial role, providing ongoing evaluations that offer feedback on progress and help identify areas where additional support may be needed. Students demonstrate their mastery through *projects and presentations*, offering a comprehensive view of their abilities and understanding. The approach also prioritizes *real-world relevance*, focusing on practical applications that enable students to transfer their skills to real-world situations. Continuous *feedback and reflection* are integral components, encouraging self-reflection, fostering a growth mindset, and promoting self-directed learning. Finally, assessments are carefully *aligned with standards* to ensure that students meet required benchmarks and achieve academic success. These elements collectively create a dynamic learning environment that prepares students for both academic and professional challenges. Art integration enhances critical thinking and creativity in middle stage education, aligning with NEP 2020 objectives and preparing students for future challenges in holistic assessment approaches.

2. Strategies to Assess Mathematics Using Art Integration

Research by Quadri (2023) highlights the potential of art integration in assessing mathematics through innovative methods. One approach is the **STEAM Project**, which combines art with STEM concepts. For instance, students can use various art materials to explore mensuration, fostering creativity and competency. Additionally, **project-based assessments** allow students to apply mathematical concepts in real-world scenarios, while **performance tasks** provide a platform for students to demonstrate their understanding through presentations or performances. **Exhibitions** offer a visual showcase of students' work, allowing them to share their mathematical insights with others. **Art-inspired experiments** can also be used to explore mathematical concepts in a more engaging and interactive manner. Lastly, **culturally relevant assessments** ensure that evaluations are tailored to the diverse backgrounds of students, making learning more inclusive and meaningful. These methods align with broader educational strategies that emphasize experiential learning and interdisciplinary connections, as seen in initiatives like Art Integrated Learning (AIL) promoted by organizations such as CBSE and NCERT

Result and Discussion

Competency-based assessment is an educational approach that evaluates students based on their ability to demonstrate specific competencies or skills, rather than relying on traditional measures like grades or standardized tests(Biscoe, et. al. (2015)). Competency-based education prioritizes actual application above theoretical understanding when teaching skills and knowledge (Laskar, 2020; Chomal et al., 2020). Assessments ought to demonstrate students' capacity to do tasks related to their learning objectives, per the NEP 2020. Based on established competencies, this strategy allows students to advance at their own speed in accordance with the concepts of individualized learning (Chomal & Banerjee, 2020). Competency-based assessment is a comprehensive strategy that emphasizes using a variety of useful techniques to assess students' knowledge of particular skills and abilities. Continuous feedback, student-centered learning, and applicability to the actual world are stressed (Chomal & Banerjee). Competency-based assessment is an approach to assessing a person's knowledge, skills, and abilities based on certain competencies or work needs, according to a roadmap to competency-based assessment (PARAKH) 2023.

Conclusion

Through the promotion of experiential learning, holistic growth, different knowledge manifestations, critical thinking, cooperation, ongoing assessment methods, and cultural relevance, art integration within the NEP 2020 framework greatly aids competency-based assessments. This comprehensive strategy not only improves academic performance but also gets young students ready for the complexity of the modern world.

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FEATURE ARTICLE

Bridging Learning and Technology: A Systematic Review of MOOCs-SWAYAM

Pravat Kumar Behera*, Dr. Sudhir Sudam Kaware**

Abstract:

The Massive Open Online Courses (MOOCs) have revolutionized digital education by offering accessible, flexible, and cost-effective learning opportunities. This systematic review examines the evolution of MOOCs, user attitudes, awareness, effectiveness, perceptions, opportunities, and challenges to comprehensively understand its impact on higher education. Massive Open Online Courses (MOOCs) provide affordable, flexible, and easily available learning opportunities and have entirely transformed digital education. In order to give a thorough grasp of MOOCs' influence on higher education, this systematic review looks at its evolution as well as user attitudes, awareness, effectiveness, perceptions, opportunities, and challenges. This review explores the historical progression of MOOCs and their role in modern educational frameworks. User attitudes and awareness are analysed to assess how different demographics engage with MOOCs and the factors influencing adoption. MOOCs usefulness is assessed regarding skill acquisition, retention rates, and learning outcomes. This review also synthesizes studies on learner perspectives, emphasizing career relevance, usability, and satisfaction. Despite offering a wealth of opportunities for professional growth, lifelong learning, and the worldwide exchange of knowledge, MOOCs encounter obstacles like high dropout rates, a lack of individualized learning, and problems with digital accessibility. By methodically examining the content of existing literature, this study offers insights into optimizing MOOCs for enhanced educational impact and usefulness.

Keywords: MOOCs, SWAYAM, Evolution, Attitudes, Awareness, Effectiveness, Perceptions, Opportunities, and Challenges

Introduction:

The idea of MOOCs was primarily used by George Siemens and Stephen Down in 2008 for connective and connective knowledge. They aimed to shape knowledge and information through online tools among participants (Kumar, 2023). The English abbreviation "MOOC" carries four letters, each conveying separate and essential meanings. The first letter, "M", stands for "Massive," indicating that numerous learners can simultaneously participate in the course without limitations. The second letter, "O", represents "Open," signifying that the course is accessible to all learners irrespective of their caste, creed, gender, or age group. The third letter, "O", indicates "Online," indicating that the entire process, including lectures, interactions, examinations, and certification, takes place through online and virtual means (Jin & Jin, 2018).

The Massive Open Online Courses (MOOCs) have burned a miraculous revaluation in the landscape of contemporary education as a dynamic, democratic, and evolving platform. MOOCs have prevailed over many traditional challenges due to their capacity to democratize access to education irrespective of cast, creed, gender, age and educational qualifications and foster lifelong learning. In the present era of education, MOOCs play a dynamic role in globalization in the field of education and vocational education all over the world. Massive Open Online Courses are the latest phenomenon in education across the world. With the help of MOOC, the learner can enrol himself/herself in various courses with different subjects as per his/her discipline, and there is no geographical limitation to accessing the courses and achieving their dreams (Patwardhan & Yadav, 2022).

As a developing curriculum model, MOOCs remarkably impact traditional educational institutions by providing free, flexible learning resources, developing holistic learning experiences, and teaching through timely interactions with students (Panja et al., 2023). Some researchers and academicians estimate that the number of students applying for higher education will rise by 62.7% by 2025. However, education institutions have not developed their prevailing education systems fast enough to meet the current and future demands of learners. From this point of view, MOOCs are the best weapon to meet our present needs and future demands (Ikinci, 2016).

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Educational institutions play an unique role in providing learning experiences to their learners, bringing them out of the darkness of ignorance and negligence into the light of knowledge and wisdom (Kaur, 2022a). Teachers are the core pillars of institutions, playing a dynamic role in transforming knowledge and intelligence. As NCTE (1998) stated, in the field of quality secondary teacher education, the teacher is the most significant resource in any educational program. MOOCs provide new hope for teachers. Through MOOCs, teachers retain and share their knowledge in different corner of the country and the world , it's also evaluate their professional efficiency and competency (Kaur, 2022a).

On the other hand, a dark side of MOOC implementation is that there have been numerous challenges in MOOC offerings, such as a lack of awareness in the community and colleges, lack of financial support, and unavailability of resources for project funding. All of these are obstacles to the continued sustainability of MOOC offerings (Chan, 2016). Whatever MOOCs provide different opportunities, flexibility, and universal access to all, on the contrary, there are many more limitations inherent in MOOCs like lack of interactive classrooms, serious participation, dropout rate compared to enrolment during the course, long gap between instructor and learner, raise question on getting degree and employment (Nayak, 2022).

There are many more MOOC platforms like edX, Coursera, Future Learn, Udacity, Khan Academy, and SWAYAM. "Study Webs of Active Learning for Young Aspiring Minds" is a joint initiative by the Ministry of Human Resource and Development and the All India Council for Technical Education (AICTE). Through this platform, the Government of India aims to provide integral learning through a virtual medium to all groups of learners

SWAYAM aims to achieve the three primary principles of education policy: access, equity, and quality (Majumder, 2019)Birbhum, West Bengal, India, 2019. All the courses offered by SWAYAM are free, but in some cases, a fee is required to provide examination and certification in the chosen field. The craze for SWAYAM is increasing, and its popularity is also increasing in other countries, including India (Paul, 2018)Information Technology and Computing is useful and applicable and this trend is growing. SWAYAM is the platform which is responsible for the online and advanced self learning initiated and started by the Government of India. This is helpful for those who are studying and also working. The best way and biggest efforts for the self-study by the public sector initiative is SWAYAM. Under this scheme, various organizations and institutions dealing with the academics can interact and do the needful in their online and similar kind of education.

Here in this initiative, initially faculty members from the reputed organizations became participated and delivered the courses and lectures and among these important are IIT Bombay, IIT Madras, IIT Kanpur, IIT Guwahati, University of Delhi, Jawahar Lal Nehru University, IGNOU, IIM Bangalore etc. And gradually other organizations have been added into the catalogues. All the courses under SWAYAM is offered fully free and important to note that in some cases charges are required viz. Offering Award or Certification on the chosen area etc. The craze of SWAYAM is increasing and gaining popularity in India other countries. This paper is on the basics of SWAYAM and including its characteristics and basics. The paper highlighted the traditional and modern concept of e-learning as well. The paper is about the concept and features of SWAYAM as well.","container-title":"International Journal of Applied Science and Engineering","DOI":"10.30954/2322-0465.2.2018.7","ISSN":"23210745, 23220465","issue":"2","journalAbbreviation":"IJASE","language":"en","source":"DOI.org (Crossref. Furthermore, many studies and research have discussed the applications and impacts of MOOCs, the literature still lacks sufficient knowledge and information regarding evolution, attitude, awareness, perceptions, effectiveness, opportunities, and challenges among teachers and learners. Therefore, this review paper is based on the above points

Literature Review Based on MOOCs:

For this review paper, the researcher acknowledges the number of studies already conducted on MOOCs in different countries. The researcher reviews more than 35 papers conducted in the previous ten years on MOOCs in different journals and divides five parameters for this paper according to their content, such as Evolution, Attitude, Awareness, Effectiveness, Perception, Challenges, and Opportunities of MOOCs.
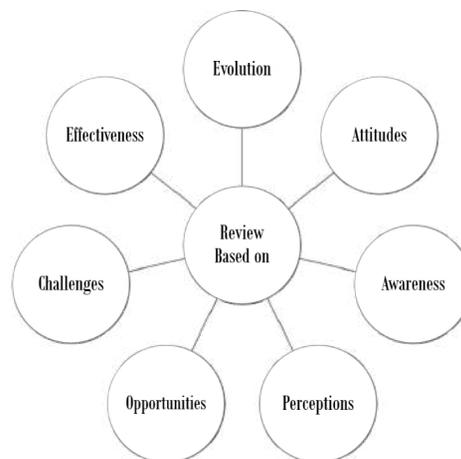

Figure-1: Review

Evolution of MOOCs in the World and India:

The word of MOOCs was first used by George Siemens and Stephen Down in 2008 at the University of Prince Edward Island for connective knowledge. Initially, 25 students attended the course at the University of Manitoba campus in Canada. Further, 2300 students from nearby the world participated. At that time, the key objective of this course was knowledge exchange and connectivity. In 2011, Stanford University, California, US, offered free online courses through MOOCs. In 2011, Sebastian Thrun founded a company called 'Udacity' with Mike Sokolsi to offer MOOCs. In April 2012, Andrew Ng and Dafe Koller, two other Stanford professors, started the company 'Coursera' which collaborates with several universities to offer MOOCs.

Then MIT (Massachusetts Institute of Technology) offered a MOOC platform called edX to offer the courses. It develops over 2500 MOOC courses from over 140 top institutions, and over 20 crore students have enrolled in MOOCs.

Move forward towards the evolution of MOOCs in India. The Government of India has decided to provide free and flexible education to all students. In 2009, the Government launched the National Mission on Education through Information and Communication Technology (NMEICT). This initiative aims to provide an opportunity for all teachers and experts to utilize their experience with expertise and share their knowledge and skills with the learners.

On July 9, 2027, MHRD launched a national platform called SWAYAM (Study Web of Active Learning for Young Aspiring Minds) for MOOCs to offer online courses from 9th to post-graduation class. It is accessible, flexible, and free for all users. This initiative aims to provide free and quality education by expert and experienced professors and teachers across India.

SWAYAM is divided into four dimensions: (1) Video lectures, (2) Reading material that can be easily printed and downloaded, (3) Self-assessment quizzes and tests, and (4) Online discussions for doubt clearance. As per the 2020 data, more than one crore learners have enrolled for this platform across various subjects. Its value and importance have increased across India after the pandemic. It has ten national coordinator appointments by MHRD: AICTE, NPTEL, CEC, UGC, NCERT, NIOS, IGNOU, IIMB, INI and NITTTR. As per UGC guidelines, a student can complete up to 40% of his/her credits through MOOCs (SWAYAM), and each credit is equivalent to 13-15 hours of online activities. NEP 2020 focuses more on implementing SWAYAM in all institutions across India (Sontakke, 2022).

Review on Attitude of Users towards MOOCs:

Factors influencing students' attitude towards MOOC enrolment and use Students tend to pursue a degree from a prestigious university. However, MOOCs do not significantly fill the physical classroom and enjoy face-to-face interaction with each other. Share emotions with others; other factors are poor network, language barrier, and lack of focus on research. In the MOOC learning process, female students are more thorough and serious learners and feel less stressed than male students. Learners who enjoy learning and learning new concepts are strongly committed and serious about MOOCs, while learners who prefer to learn independently are less committed and serious (Yadav, 2023). There are some advantages of MOOCs, including availability and flexibility, and concerns related to the standards of communication, certification, and education provided by MOOCs. Therefore, some learners show some positive and negative attitudes towards MOOCs. However, some challenges and barriers related to MOOCs negatively affect students' attitudes towards MOOCs, such as a lack of personal level interaction and engagement compared to traditional classrooms and a lack of technical skills among the learners (Kumar, 2023).

Demographic factors also influence students' and teachers' attitudes toward MOCCs, and through proper training, we can get a positive attitude from students and teachers towards MOOCs (Panja et al., 2023). Non-traditional students show more positive attitudes than traditional students. MOOCs have higher enrolment rates among undergraduate and graduate degree students than at other levels. Age, education level, and depth of education did not affect students' attitudes toward MOOCs. However, gender had a significant effect on students' attitudes towards MOOCs because girls are more attentive than boys. The student's completion of the MOOC depends on the simplicity and genuineness of the content along with their degree (Jesse, 2019). According to the enrolled learners, MOOCs are valuable, easy to use, highly interesting, and have positive attitudes. However, the main barriers between learners and MOOCs are the lack of ICT skills and aptitude, internet connection, and the unavailability of assets. Teachers have a positive attitude toward MOOCs, but the main barriers between teachers and MOOCs are lack of resources, training, and digital competency; the pandemic brings many alterations in the attitude of teachers and students toward MOOCs. Many of the learners are happy with the service of MOOC and appreciate it.

However, some learners suggest that intensive planning, example- and illustration-based live classrooms, valid supporting strategies, and minimizing technical glitches are required (CEMCA, 2023).

Review on Awareness of Users towards MOOCs:

This part focuses on the awareness of MOOCs among teachers and students. Awareness about MOCCs-SWAYAM among students and teachers is not enough. Students and teachers do not have basic knowledge and ideas about MOOCs and lack a lot of understanding and awareness (Shivkumar,2019). The traditional regular course students have below-average awareness and incomplete ideas about the SWAYAM program, a MOOC initiative. There is a major effect on the higher education and professional degree students' awareness of MOOCs due to the UGC's encouragement of MOOCs at the university level. These students show a highly positive reaction to MOOCs but lack the self-motivation to complete those (Sahoo et al., 2022). SWAYAM functions as a platform for the MOOCs' inventiveness of the Government of India, directing the foster of positive attitudes with ideas and the enhancement of skills in various fields at no cost, except for some certificate fees. It facilitates the emergence of young, talented minds in society. Students willingly acquire knowledge and fulfil their dreams through MOOCs, saving time and money. However, the dark side of MOOCs lies in their challenges during text, assignment, and certification due to inappropriate management. This often leads many students to discontinue their courses before completion (Subaveerapandiyan, 2022). MOOCs have gained enhanced importance wide-reaching after the pandemic. To raise awareness further, institutes should organize orientation workshops.

Additionally, a credit transfer mechanism should be accessible to all institutions to motivate more students to enrol and complete courses through the MOOCs platform. For weaker learners, MOOCs should make extra and remedial lectures available to improve the quality of education. Proctorial examination centres can ensure a more organized and transparent grading and evaluation process. Removing specific time barriers for registration can bridge the distance between MOOCs and learners, and self-motivation plays a dynamic role in the successful completion of courses (Sikriwala, 2022). Inclination and understanding, interest and medium of language, achievement, self-motivation, laziness, and pride in learning play an important role in teachers' awareness of MOOCs. Although school teachers have basic awareness about MOOCs, more education and awareness are required to improve the utility and value of SWAYAM among them. They consider SWAYAM a tool to meet educational needs (Sakarwar et al., 2022).

Review on Effectiveness of MOOCs:

MOOCs are not a new concept in the twenty-first century, but they gained more attention and importance after the pandemic due to their free access, flexibility, openness, and comprehensiveness. They offer virtual courses in various fields of education, saving time and money while reducing physical distance. Another positive aspect of MOOCs is facilitating credit transfer mechanisms across the learners' institutions. They offer a variety of courses suitable for learners of different ages, classes, and interest areas at suitable times. They bring remarkable development to the formal education system (Devaki, 2021). MOOCs significantly and significantly impact higher education rather than school education. It provides opportunities for both students and teachers; through this platform, teachers can teach and share their knowledge, thoughts, and ideas with students; on the other side, learners can interact with different types of expert teachers in the educational field.

There are different types of courses available in MOOCs. The self-directed initiative of UGC has brought a new chapter in the field of Indian education (Sahoo et al., 2017). In today's society, we live in the technology era, where every day starts and ends with technology. Every person depends heavily on technology in various forms, especially in education, where technology plays a significant role in sharing knowledge and ideas among people, making life easier and better. The SWAYAM platform, a MOOC initiative by the Government of India, has brought a notable change in the field of education. It allows anyone to enrol and gain knowledge and information according to their needs.

Through this platform, teachers and professors can share their knowledge and ideas based on their experience and expertise by following specific guidelines and procedures. It not only facilitates the professional development of teachers but also contributes to students' academic development (Paul, 2018)Information Technology and Computing is useful and applicable and this trend is growing. SWAYAM is the platform which is responsible for the online and advanced self learning initiated and started by the Government of India. This is helpful for those who are studying and also working. The best way and biggest efforts for the self-study by the public sector initiative is SWAYAM. Under this scheme, various organizations and institutions dealing with the academics can interact and do

the needful in their online and similar kind of education. Here in this initiative, initially faculty members from the reputed organizations became participated and delivered the courses and lectures and among these important are IIT Bombay, IIT Madras, IIT Kanpur, IIT Guwahati, University of Delhi, Jawahar Lal Nehru University, IGNOU, IIM Bangalore etc. and gradually other organizations have been added into the catalogues. All the courses under SWAYAM is offered fully free and important to note that in some cases charges are required viz. Offering Award or Certification on the chosen area etc. The craze of SWAYAM is increasing and gaining popularity in India other countries. The main focus of MOOCs is to develop education at all levels and build quality capabilities among learners. Effectiveness of MOOCs Accessible structure material, free enrolment, and no pre-registration make MOOCs effective and unique. It also focuses on the professional development of teachers, bringing sustainable development and setting future goals per society's needs. It also facilitates global experience and brings globalization to education (CEMCA, 2023). In teacher education, MOOCs play an important role in developing professional skills and techniques among teachers. It helps in peer assessment, self-motivation, and self-learning.

Through MOOC, teachers update their professional skills and techniques and enhance their educational careers with the help of various experts and experienced professors. It helps to interact with other teachers and share knowledge, ideas, and professional ethics among them. Teachers can choose subjects and interest areas that fit their needs, which helps update their knowledge and skills (Kaur, 2022a). MOOCs provides remedial education and supportive strategies for vulnerable students, helps in face-to-face interaction between students and teachers, reduces the physical distance between learners from rural areas, and connects global students with local students. It Integrates and helps in mainstream education (Chan, 2016). The vital role of SWAYAM in higher education is noteworthy for it provides education free of cost, anywhere, at any time, to anyone using information technology from class nine to post-graduation and offers numerous courses taught by the best teachers in the country (Venkatanarayana, 2020) technology and new techniques in in teaching. Online mode of education is one to correct in the dis advantages or obstacles in existing higher education system. Advancement in Digital technology has become prominent role in higher education at present in the global level. In this context Indian government has given much priority to develop the human resources in India by introducing various novel programmes like SWAYAM, National Digital

Library, SWAYAMPRABHA and National Academic Depositary etc. SWAYAM has designed to achieve the cardinal educational principles of access, equity and quality It is a free online education and tries to provide best teaching learning resources to all. It plays an important role to provide high standard education to the Indian youth learners and strengthening higher education."

Review on Perceptions of MOOCs:

The Perception of MOOCs among the teachers is positive. They understand the importance and impact of MOOCs on teachers' professional development, and teachers view MOOCs as an opportunity rather than a threat. The main factors affecting teachers' perception towards MOOCs are lack of motivation, lack of live interaction between teachers and students, quality of content not as expected, and content behaviour not very effective. All the above factors affect teachers' perception of MOOCs (Patwardhan & Akhilesh K S Yadav,2022).

The teachers and students in higher education have changeable levels of perception toward MOOCs. Some other factors determine the perception of both students and teachers. SWAYAM provides free courses that increase the enrolment rate of students, but proper awareness and seriousness are required among them towards MOOCs. Flexibility, interactive use of technology, and self-pacing create positive perceptions towards MOOCs, while lack of employment creates negative perceptions towards MOOCs; demographic and gender factors play important roles in perception (Sikarwar et al., 2022). The students' perception of SWAYAM was that 17% said that it consumes more internet data while watching videos, 42% said that it provides long and lenient lecturers, 8% found weak assignments and Hated assignment due dates, and 8% suggested that class could be more interactive (Sountharya, 2019).

MOOCs help develop the professional competencies of both pre-service and in-service teachers. Teachers' perception of MOOCs is positive, as they meet teachers' learning needs and promote their personal and professional development. However, lack of self-motivation and feedback affect teachers' perception of MOOCs. Some participants are interested in using MOOCs in their physical and virtual classrooms, so the classrooms should be integrated. Teachers believe that MOOCs play a significant role in education, but the Government needs to improve them, such as conducting fair examinations, providing certificates on time, and doing proper work on credit transfer (Yıldırım, 2020). SWAYAM is an educational tool for self-actualization that provides choices for distance learning and lifelong learning (Dey, 2023).

Indian teachers and students have good positive perceptions about MOOCs and are more aware of them, but still, the perception varies depending on many parameters. Awareness of MOOCs is much higher among postgraduate students than undergraduate students. There is a higher level of awareness among science and law teachers and students rather than humanities and social sciences teachers and students. Demographic and gender factors are vital in students' and teachers' perceptions of MOOCs. However, MOOCs have successfully fulfilled learners' goals and completed the formal learning system (Kundu & Bej, 2020).

Review on Opportunity of MOOCs:

MOOCs provide many opportunities; Its allows you to pursue the curriculum as per the learners' needs, interests, and abilities while removing geographical barriers, saves your time and money, allows you to gain knowledge from experts, and enhances and improves your personality. It provides skills from various fields (JR, 2020). MOOC helps in the democratization of education in India by providing free and open education to all, developing various skills, knowledge, and quality as per the current education demand; it not only offers opportunities for the students but also helps in improving the skills of teachers for improving professional development (Majumder, 2019).

The Government of India recognizes the SWAYAM to enhance the quality of education and provide democratic education for all. As per UGC guidelines, a student can transfer his/ her credit hours to his/her institute from MOOCs in the respective subjects. It focuses on One India, One Nation, improving equitable and flexible education (Ahmed & Baishya, 2019). MOOCs provide opportunities not only for students but also for teachers in the field of teacher professional development. Through these MOOCs, a teacher can conduct classes anytime and anywhere, breaking the boundaries of the physical and synchronous classroom. Taking courses for professional development has presented both opportunities and challenges for women faculty members in terms of organizing teaching-learning materials, providing assessment support services, and other course-related procedures (Ganiger, 2024).

The openness and flexibility of MOOCs bring remarkable changes to the traditional education system. It provides a new platform for teachers to maintain, demonstrate, enhance, and evaluate their professional ethics and career competencies per their subjects (Kaur, 2022b). When university students integrate MOOCs with conventional classroom instruction, they can take advantage of customized opportunities for active learning. Additionally, they thought that online education helped students become more purposeful (Ganiger, 2024). Since the world has expanded beyond geographical boundaries and demands knowledge constantly, MOOCs provide the best alternative to the current educational system, which is based on classroom instruction (R & Prasanna, 2024). A vast array of topics and disciplines are covered in SWAYAM and MOOC courses, providing professors and staff with chances to advance their knowledge, proficiency, and experience in their domains (Narkhede, 2024).

Massive Open Online Courses (MOOCs) are one of the most effective and notable trends in education worldwide. MOOCs in India (SWAYAM) can facilitate effective teaching-learning both on campus and online, and SWAYAM can be used as a flipped class or blended learning. The self-paced nature of this platform brings a great opportunity and change to the working professional learners who are hectic in their working profession and do not have sufficient time for the traditional classroom. All the courses on this platform are designed by experts and experienced professors from different fields. With the help of MOOCs, India is trying to achieve its dreams of providing democratic education to all in higher education. Govt. of India made efforts on SWAYAM to deliver quality content to learners. SWAYAM has ten national coordinators, such as AICTE, NPTEL, UGC, CEC, NCERT, NIOS, IGNOU, IIMB, INI and NITTTR, all of whom work on different areas of education. These coordination centres provide quality lectures by experts and experienced resource persons from IIT and NIT (Patwardhan & Yadav, 2022).

Review on Challenges of Implementing MOOCs:

MOOC implementation in education is a vital and challenging task for the authority. There are some challenges at the ground level that we need to overcome with proper implementation (Ahmed & Baishya, 2019). The challenges are a lack of infrastructure, interest, digital aptitude, literacy, regional languages , and the unavailability of content for different subjects. Some challenges faced while offering MOOCs were the unavailability of weekly and monthly lessons, the unavailability of smartphones and laptops, and some students not being user-friendly towards websites and apps (Mathai, 2019). Common problems encountered during MOOC implementation include credit transfer, high implementation costs, significant time commitments, and a high level of self-motivation (Sakriwala, 2022). Academic libraries may find it difficult to integrate SWAYAM and

MOOC courses with their collections and services. Libraries must guarantee easy access to course content, assist users with using online learning environments, and make it easier to find and use pertinent materials (Narkhede, 2024). Due to several obstacles, the students' enrolment was greater than their SWAYAM course completion. Online education. When compared to traditional learning, the obstacles that students face like time constraints brought on by school schedules are less successful (Deivam et al., 2024). The many elements influencing MOOC learners' satisfaction, establishing a connection between general satisfaction trends and the nuances of individual subjects within the broad field of online learning (R & Prasanna, 2024)

MOOCs do not arouse the traditional classroom environment; they depend on technology, but our students are not adequately trained in information technology, which creates barriers to MOOCs. Lack of motivation, interest, and absence of guidance and mentorship, as seen in physical classrooms, create significant challenges. On the other side, the level of knowledge and competence of the teacher in technology determines the success rate of MOOC implementation (Jin & Jin, 2018). The process of certification, credit transfer, language, lack of training, and awareness among teachers and students creates hurdles in the path of MOOCs (Kaur, 2022b).

Conclusions:

This review paper examines and elucidates the existing research on MOOCs, explicitly focusing on their evolution, awareness, attitudes, effectiveness, opportunities, challenges, and perception. Upon reviewing these areas, this review found different types of awareness, attitude, effectiveness, opportunities, challenges, and perceptions among both students and teachers regarding MOOCs to be evident. This platform raises transformational change and opportunities in education by offering flexible and democratic educational facilities. However, several challenges hinder this progress, such as lack of awareness, self-motivation, digital competency, difficulties conducting fair examinations, credit transfer, and timely certification. I urge the Government to address these challenges to ensure MOOCs meet their social objectives.

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FEATURE ARTICLE

Integration of Yoga and Physical Education in Teacher Education Programs: A Pathway to Emotional Intelligence and Stress Management

Hemant Yadav*, Rajeshwari Garg **

Abstract

Yoga and physical education enhance mindfulness, physical health, and emotional resilience, thereby contributing to the development of emotional intelligence. These practices enable educators to manage stress efficiently, resulting in improved teacher-student relationships and fostering a more positive and productive learning environment. An article is proposed for the integration of these practices into teacher training via workshops and assessments designed to evaluate their effects on emotional intelligence and stress levels. Initial findings suggest that yoga and physical education enhance teachers' emotional well-being, positively impacting both educators and students. Challenges including resistance to curricular changes, time constraints, and inadequately trained staff require attention. Awareness campaigns, collaboration with experts, and the use of digital tools are effective strategies for addressing these barriers. This study highlights that the integration of yoga and physical education into teacher education programs enhances teacher effectiveness and emotional well-being while also decreasing burnout and turnover rates. These interventions enhance the health and sustainability of the teaching profession, positively impacting the entire educational ecosystem.

Keywords: Yoga, Physical Education, Emotional Intelligence, Stress Management

Introduction

Teacher well-being is widely acknowledged as a critical component of good education, affecting both educators and students. Teachers confront numerous obstacles, including increased workloads, mental health issues, and inadequate support systems, emphasizing the importance of prioritizing their well-being. Addressing these difficulties can result in better educational performance and a happier school atmosphere. The well-being of educators directly influences the quality of education delivered. When educators encounter elevated levels of stress or burnout, their capacity to engage and motivate students diminishes (Botha, 2024). Research demonstrates that educators with superior mental health foster constructive student-teacher connections, essential for student achievement (Rahmi, 2024). In education, successful performance and social contribution depend on teacher well-being Cenedesi et., al,2024). It helps teachers' quality of life and creates a better, more sustainable workplace, thereby reducing stress, anxiety, and depression and so helping students and the educational system overall. Emotional Intelligence (EI) and stress management are pivotal in enhancing teaching effectiveness, as high EI enables teachers to foster positive relationships, manage classroom dynamics, and create supportive learning environments, which are essential for student engagement and success (Banga, 2024; Džafić & Ilić, 2024).Furthermore, effective stress management contributes significantly to teacher performance, as it allows educators to maintain focus and resilience in challenging situations (Nurhasanah & Wijaya, 2024).The interplay between EI and stress management not only enhances teachers' productivity but also positively influences students' emotional and academic outcomes (Galang et al., 2024; Anaktototy et al., 2024).Emphasizing not only academic performance but also the general well-being of students by improving mental clarity, physical fitness, emotional resilience, and stress management (Girisha. 2024). Yoga and Physical Education are increasingly acknowledged as complete approaches in education (Smith & Kumar, 2024). By fostering emotional intelligence, educators can better navigate challenges, build stronger relationships, and create a nurturing environment that benefits both themselves and their students.

As teachers negotiate rising professional expectations, emotional problems, and professional stress, the changing terrain of education needs a focus on teacher well-being. Emerging as successful complete strategies to improve

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mindfulness, physical health, and emotional resilience are yoga and physical education (PE). This conceptual research paper explores the integration of yoga and PE in teacher education programs, emphasizing their role in stress management, emotional intelligence enhancement, and overall teacher effectiveness. It provides a framework for incorporating these practices into training programs and discusses the challenges and strategies for effective implementation.

Emotional Intelligence and Teacher Effectiveness

The effectiveness of teachers in the classroom is significantly influenced by emotional intelligence (EI). Effective teaching encompasses more than just subject expertise; it requires strong interpersonal skills, adept classroom management, and the capacity to comprehend and manage emotions. Emotional intelligence, as defined by Goleman (1995), refers to the ability to recognize, understand, and manage one's own emotions while also being able to perceive and influence the emotions of others. Salovey and Mayer (1990) conceptualized EI as comprising four key domains: perceiving emotions, using emotions to facilitate thought, understanding emotions, and managing emotions. Teachers with high EI exhibit better emotional regulation, which enables them to handle classroom stress, communicate effectively, and build positive relationships with students (Brackett, Rivers, & Salovey, 2011).

Teacher effectiveness is generally measured by their ability to engage students, facilitate learning, and manage classroom dynamics. Studies have shown that teachers with high EI are more effective in handling classroom challenges, maintaining discipline, and promoting a positive learning environment (Jennings & Greenberg, 2009). EI enables teachers to manage their emotions in stressful situations, preventing emotional outbursts that may negatively impact students (Brackett & Katulak, 2007). Moreover, emotionally intelligent teachers demonstrate high levels of empathy, allowing them to understand student needs and respond appropriately (Mortiboys, 2012). For example, teachers who can recognize signs of distress in students are better equipped to offer support, thereby fostering student engagement and motivation (Pekrun, Goetz, Titz, & Perry, 2002). Effective classroom management requires teachers to handle diverse student behaviors while maintaining an atmosphere conducive to learning. EI contributes significantly to classroom management by enabling teachers to regulate their emotions and respond calmly to disruptions (Sutton & Wheatley, 2003).

Research suggests that teachers with high EI are less likely to experience burnout and more likely to sustain motivation and enthusiasm in their profession (Chang, 2009). Additionally, teachers with strong emotional intelligence can develop meaningful teacher-student relationships, which are crucial for student learning and well-being (Pianta, Hamre, & Allen, 2012). Positive teacher-student interactions enhance student engagement, reduce behavioral issues, and improve academic achievement (Cornelius-White, 2007). Student success is often linked to the teacher's ability to create a supportive and motivating learning environment.

Studies indicate that emotionally intelligent teachers can enhance student learning by fostering a positive emotional climate in the classroom (Reyes et al., 2012). When teachers demonstrate emotional intelligence, students feel more comfortable expressing themselves, asking questions, and engaging in discussions (Mayer, Caruso, & Salovey, 2016). Furthermore, emotionally intelligent teachers serve as role models for students, helping them develop their own emotional regulation and interpersonal skills (Zeidner, Matthews, & Roberts, 2004). This is particularly important in secondary education, where students are navigating complex social and emotional challenges. Emotional intelligence is a fundamental component of teacher effectiveness. Teachers who possess high EI can manage classroom dynamics effectively, foster strong student relationships, and enhance academic achievement. As research continues to highlight the significance of EI in education, teacher training programs should incorporate EI development to equip educators with the necessary skills to create a positive and productive learning environment.

Stress and Burnout in the Teaching Profession

Stress and burnout represent critical issues within the teaching profession, impacting educators' well-being, job satisfaction, and overall effectiveness. Teaching is a profession characterized by significant emotional demands, necessitating ongoing interaction with students, meticulous lesson planning, effective classroom management, and various administrative responsibilities. Chronic stress may result in burnout, which is defined by emotional exhaustion, depersonalization, and diminished personal accomplishment (Maslach & Leiter, 2016). Teacher stress is influenced by several factors, including excessive workload, challenges in managing student behavior, insufficient administrative support, and the pressure to achieve academic performance standards (Kyriacou, 2001). Research indicates that extended exposure to these stressors may lead to diminished job performance, reduced

motivation, and increased attrition rates (Skaalvik & Skaalvik, 2017). Burnout among teachers can hinder their ability to foster positive relationships with students and colleagues, thereby impacting the learning environment (Jennings & Greenberg, 2009).

Furthermore, stress within the teaching profession is associated with various physical and mental health problems, including anxiety, depression, and chronic fatigue (Chang, 2009). The implementation of coping strategies, including mindfulness, emotional regulation, and social support, can effectively reduce the impacts of stress and burnout (Brackett et al., 2011). Institutions that cultivate a supportive work atmosphere, offer professional growth opportunities, and encourage collaborative culture can improve teacher resilience and job satisfaction (Hakanen, Bakker, & Schaufeli, 2006). Understanding the significance of teacher well-being is essential for maintaining a high-quality education system, as teachers who effectively manage stress are more capable of engaging students and enhancing academic outcomes (Richards, 2012). Implementing institutional policies and providing psychological support to address teacher stress can substantially decrease burnout and enhance the effectiveness and motivation of the teaching workforce.

Yoga and Physical Education as Holistic Approaches

Yoga and physical education function as comprehensive methods for enhancing overall well-being through the integration of physical, mental, and emotional health. Physical education prioritizes motor skills, fitness, and teamwork, whereas yoga concentrates on flexibility, mindfulness, and stress reduction (Jain, 2017). Collectively, these factors enhance overall health benefits, such as increased cardiovascular fitness, muscular strength, and psychological resilience (Telles, Singh, & Balkrishna, 2019). Research indicates that the integration of yoga into physical education curricula improves students' concentration, emotional stability, and stress management abilities, which are critical for academic achievement and personal growth (Bhavanani, 2016). The consistent practice of yoga enhances body awareness and fosters relaxation, thereby diminishing anxiety and improving overall mental health (Field, 2011). The integration of these approaches promotes self-discipline and social interaction, essential for personal and professional growth (Gopichandran & George, 2018). Teacher training institutions that integrate yoga with physical education establish a balanced environment conducive to students' cognitive and emotional growth, while promoting lifelong healthy habits

(Nagle, Sharma, & Kumar, 2020). Implementing these holistic approaches enables teacher educational institutions to facilitate students' attainment of academic success and overall well-being.

Components of the Framework

i. Yoga Practices

Asanas (postures) regulate physiological processes including blood pressure and glucose levels (Rishi, 2024) while also increasing flexibility, strength, and balance. Pranayama (breath control), and meditation are among yoga poses whose increasing importance in improving self-awareness, lowering stress, and promoting emotional stability is known (Acharyya & Mishra, 2024). Pranayama techniques regulate the autonomic nervous system, resulting in reduced stress and enhanced mental clarity (Charan & Kumar, 2024). These techniques not only support physical health but also operate as efficient complementary therapies in mental health treatment, therefore enhancing total well-being. Regular asanas practice has been connected to lower anxiety and improved emotional resilience (Thakar et al., 2024).

ii. Physical Education Activities

The incorporation of aerobic exercises increases mood and cardiovascular health, so supporting general mental health (Shuba et al., 2024), strength training, and team-based sports in physical education markedly improves physical health, teamwork, and cognitive function. Among teenagers, strength training programs have clearly improved body composition and physical fitness (Pérez-Ramírez et al., 2024). Essential for personal growth, team sports help to build cooperation, discipline, and social skills support and belonging-qualities very essential for mental health and well-being (Graça et al., 2024; Neto et al., 2024). This comprehensive approach enhances physical fitness while also developing social skills and promoting mental well-being among participants.

iii. Emotional Intelligence Development

Reflective practices are a cornerstone of emotional intelligence, as they encourage self-awareness and self-regulation. Engaging in self-reflection allows individuals to gain deeper insights into their emotions and reactions, enabling them to respond more thoughtfully in various situations (Shafik, 2024), mindfulness approaches, and social-emotional learning (SEL) modules focus on teaching skills such

as empathy, communication, and decision-making, which are essential for both personal growth and professional success .

Incorporating mindfulness and social emotional learning into educational settings has been shown to enhance students' emotional awareness and coping mechanisms, equipping them with tools to navigate challenges more effectively (Zhylin et al., 2024). Crucially for both personal and professional success, these techniques develop critical abilities including empathy, resilience, and good decision-making. Combining these techniques helps people to better control their emotions, therefore enhancing their interpersonal interactions and general wellbeing. Finally, introspective practices, mindfulness methods, and SEL courses used together provide a complete strategy for raising emotional intelligence. These techniques help to increase emotional control and self-awareness substantially as well as provide the basis for better relationships of teacher- students and more fortitude against the demands of daily life of the latter.

iv. Stress Management Strategies

Essential for arming teachers with flexible coping methods are stress management tools including mindfulness, resilience building, and relaxation techniques. Effective stress reduction among teachers has been shown by mindfulness training, therefore enhancing their mental and emotional well-being (Gojali et al., 2024). By giving instructors a complete toolkit for stress management, relaxation techniques including guided imagery and deep breathing complement mindfulness and resilience training (Theodoratou, 2023). Common stresses in the teaching profession, severe workloads and student behavior problems, can be very effectively reduced by these approaches (Shang & Singh, 2024). Although relaxation methods, resilience training, and mindfulness are quite helpful, it is crucial to understand that not all teachers would react to these treatments exactly.

Different coping mechanisms and personal situations can affect the efficacy of stress management techniques, so customized approaches are necessary for various instructor populations. Schools and teachers institutions may guarantee that stress management initiatives are inclusive and successful for every teacher by tackling these differences. Ultimately, among instructors, a mix of mindfulness techniques, resilience training, and relaxation strategies provides a strong basis for controlling stress.

These techniques not only help to lower stress but also improve general well-being, thereby improving the teaching atmosphere. Customizing these strategies to fit particular demands will help to enhance their effects and guarantee that teachers are ready to succeed personally and professionally in their work and life.

Proposed Approach for Implementation

Following approaches can be sought and practised for reinforcing emotional intelligence and stress management effectively.

- **Integration of Yoga and Modified Physical Education**

  Including yoga and modified physical education courses into pre-service teacher preparation courses will improve teachers' self-efficacy toward inclusive physical education. This integration will also help teachers acquire the tools to create a more inclusive and encouraging learning environment, therefore improving mental and emotional well-being and lowering burnout.

- **Structured Seminars on Mindfulness and Resilience**

  Structured seminars and interactive sessions focusing on mindfulness, relaxation, and emotional resilience have proven effective in strengthening resilience, lowering stress, and boosting well-being across diverse populations, including teachers, students, and professionals. These practices will play a critical role in promoting holistic health and sustainable teaching practices.

- **Role of Digital Technologies and MOOCs**

  Digital technologies will empower educators, improve teaching and learning outcomes, and reshape teacher education. MOOCs (Massive Open Online Courses) will emerge as a vital tool for professional development, offering accessible, self-directed learning and global collaboration. Effective pedagogical strategies in MOOCs will enhance learning experiences, enabling career advancement and lifelong learning. Their flexibility and accessibility will drive professional growth and competence, transforming traditional development methods (Dey & Panda, 2024).

- **Assessment of Teacher Well-being Using Psychological Scales**

  By means of validated psychological scales, evaluating teacher well-being and stress levels would enable the identification of important elements such

emotional intelligence, coping strategies, and work-related stresses. These realizations will direct focused treatments meant to raise teacher support, lower stress, and enhance general psychological well-being and mental health.

Teacher education initiatives can produce a more resilient, effective teaching workforce by tackling these issues, therefore helping teachers as well as students.

Challenges in Implementation of Teacher Education Programs in India

The following aspects are necessary for implementation of Teacher Education Programs in India.

- **Resistance to Curricular Changes**

  When new curricular changes-like including yoga and physical education (PE) into teacher training programs-the strict framework of India's educational system sometimes results in opposition. Adoption of creative ideas might be slowed down or hampered by conventional attitudes and bureaucratic obstacles, therefore making modernization of teacher education challenging.

- **Time restrictions**

  One major difficulty is juggling the current academic schedule with extra yoga and physical education classes. Programs for teacher preparation already abound in both theoretical and practical elements, hence there is little space for including holistic health practices without sacrificing other vital areas of instruction.

- **Lack of Trained Professionals**

  In specialist disciplines like yoga therapy and holistic health, there is a dearth of qualified experts. This disparity inhibits the successful application of these strategies in teacher preparation programs since teachers can lack the knowledge to provide high-quality instruction or significantly include these ideas within the course of study.

- **Limited Awareness**

  Many teachers and policymakers still don't know about the advantages of yoga, physical education, and holistic health practices. This lack of knowledge results in inadequate funding and prioritizing for such projects, therefore impeding their integration into teacher preparation programs. These customs might not get the required tools or care without general appreciation of their worth.

Navigating with these issues calls for structural adjustments including regulations changes, more training professional investment, and awareness campaigns stressing the need of whole health practices in teacher preparation. Developing a more balanced and efficient teacher preparation system in India depends on breaking through these obstacles.

Conclusion

The integration of Yoga, modified physical education, mindfulness practices, and digital technologies all fit the National Education Policy (NEP) 2020 vision, which stresses holistic development, inclusive education, and the use of technology to transform learning. Including these components will help teacher training programs improve educators' self-efficacy, resilience, and well-being, therefore directly supporting the objectives of NEP 2020-that of building a fair and high-quality educational system. While the policy's emphasis on mental health is addressed in structured seminars on mindfulness and emotional resilience, the adoption of digital tools like MOOCs underlines its desire for easily available, lifetime learning possibilities. Furthermore, in line with NEP 2020's demand for evidence-based solutions is the evaluation of teacher well-being using established psychological instruments. These approaches taken together equip teachers with the tools and knowledge they need, hence strengthening the resilience, inclusiveness, and future-ready education system India

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FEATURE ARTICLE

NEP 2020: EMPOWERING YOUTH THROUGH VOCATIONAL EDUCATION TRAINING IN INDIA

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Abstract

Apart from imparting academic and professional competencies to pupils, education has consistently been a crucial factor in the economic progress of nations. Human capital theory holds that education spending has a positive impact on the economy, society, and person (Organization for Economic Co-operation and Development [OECD], 2001). Becker (1994, p. 11) provided an explanation for this phenomenon, stating that improvements in skills, knowledge, or health that result from investments in human capital (schooling, on-the-job training, medical care, immigration, etc.) enhance financial or psychic incomes. Investing in education raises individual production at the microeconomic level, allowing people to earn more money. Macroeconomically speaking, it boosts the nation's overall output and technological innovation potential, hence promoting economic growth in the nation (OECD, 2014; Vichet,2018).

During the COVID-19 epidemic, vocational education and training gain significant prominence. People are becoming more demanding in these areas because they assist close the gap between supply and demand to meet societal needs. VET bolstered the technological sectors of society and met the demands of the education sector, healthcare professions, transportation, R&D studies, etc.

Key Words: Education, Vocational Education, National Education Policy

Vocational Education

Vocational Education, also known as Career and Technical Education (CTE) or Vocational Education and Training (VET), aims to give students a rich environment for jobs that are based on manual or practical activities. These activities are typically non-academic and entirely related to a particular trade, occupation, or vocation—hence the term—in which the student participates. The term "technical education" is occasionally used to describe it since the learner gains direct proficiency in a certain set of methods or technologies.

Covid-19 crisis uncovered many unnoticed areas , loop halls of various sectors of the society. Human beings felts many changes in their life style which were triggered by Covid-19 and its after effect. It raises the demand of fight with the challenges immediately with skilled and competence society. In those years the demand of VET has strengthened sturdily in young generations to overcome the challenge of unemployment, short-term engagement, unskilled professionals etc. Vocational training is not a new term we heard during pandemic although it was one of the most urged training that has thrown light on its own significance through which a young leader can make his/her career bright and shine which ultimate helps in economical development of the country. Having vocational training gives chance to a young mind to get extra marks during selection process for a job. Skill Development Initiative Scheme under Central Govt., DGET trained people for specific trades, crafts and technical career at various levels. For young people it is the opportunity to be trained for general skills, to become more productive in terms of self-employment sectors. It has miscellaneous role in providing practical skills and social competences among students. At international level it provides better professional stages to showcase talent and social competences. In the beginning of early age, teaching measures and training help children to enroll into career opportunities.Vocational training also significantly correlates with employability skills, with career development learning, particularly transition learning, being a key influence (Salape & Cuevas, 2020). Contradictions or interesting facts emerge when considering the role of external support, such as from parents, in the employability of vocational students (Sulistiobudi & Kadiyono, 2023).

Additionally, technical education programs have been shown to positively influence skill learning attitudes, curriculum satisfaction, and vocational self-concept among junior high school students (Wu & Jia-Jen-Hu, 2015).

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Secondary school students can lead their career by getting positive vocational influences during school life with inclusive and qualitative work based learning experiences that leads towards career opportunities of their interest. Vocational education trains a young mind for future work right from the high school by providing practical skills, employability and career readiness. For economy of the country it supports young minds by evolving through quality teaching and practices to meet the demand of the society. Not only they receive global professional skills but also it focuses upon preparing a young mind for both immediate employment and further development in research field.

Need of Vocational Education

India is a country of large workforce and is one of the largest economy of the world. In spite of having huge number of human resources we are lacking of skilled and trained persons in every sector. India has large young population, we are still struggling with young energetic entrepreneurs. Lacking of skilled and trained population leads large workforce and eventually under developed countries. Formal vocational education opportunities are available for very less percentage of young population. Due to unemployment and poverty remarkable rate of school students drop out at different stages before reaching class X has been observed.

The age group of 15-29 has tremendous potential which can be turned into productive workforce. The number of children in the age group 4-17 years was projected at 340.1 million in 2021(Srija A). Many of this young population enter to the labour market and are ready to enter the labour market with potential to contribute in the economic needs of the country. For levelling up the huge population of workforce, government implement various skill developments policies and programmes. Even out of these training programmes, very few are available for skill development courses due to lack of awareness. This signifies that a large number of school drop outs do not have access to skill development for improving their employability. The vocational education training with practical and long duration of courses provides a platform for a person of low education attainment to acquire skills for his/her livelihood. Further, the largest share of new jobs in India is likely to come from the unorganized sector that employs up to 93 per cent of the national workforce, but most of the training programmes cater to the needs of the organized sector.

There is a target by India's 12th Planning Commission to create around 100 million jobs by 2025 and to achieve it tremendous VET courses would need right from the school education. School going children can get exposures towards career orientation with their choices through VET programme. To increase growth of VET, industrial applications must be introduced from the school education and can be carry forward on the form of apprenticeships or skills qualification framework with new occupational standards and competency based education.

NEP 2020

National Education Policy, 2020 is the landmark in Indian education system through its deep routed moral nature which aims to transform India with its exciting knowledge system and by bringing belief on quality universal education. It aims to provide equality educational access to all which will pave the ways for becoming "Vishwa Guru Bharat" with its utmost core cultural ethics and divine knowledge. Covid- 19 has brought numerous challenges in front of people which were unaddressed before it.Challenges of Covid-19 in education lead various ideas to generate for creating basic routine of education stream lined. National Education Policy (NEP 2020) by Government of India was a welcoming change and fresh initiative. The education policy focused untouched areas in education which educationists never saw before. It leads young minds to generate diverse ideas to meet the national and global challenges of the future which will make them a responsible citizen.

For school education, it is important to focus upon all the areas of students life like cognitive, affirmation and psychometric developments. In addition, it is necessary to enhance social and emotional skills. NEP 2020 ensures transform the whole education pattern into qualitative perspective amalgamate wi   th ancient knowledge system. It offers use of ICT in education at all levels, promotion of constructive approach, strengthen the vocational courses, minimizes the curriculum load by focusing on experiential learning. It also proposes the revision and revamping of all aspects of the education structure, including the school regulation and governance, to create a new system which is aligned with the aspirational goals of 21st century education along with India's tradition, culture and value system. Technology will be integrated with education through several existing as well as proposed initiatives, including energized text books, high quality e-content for capacity building of teachers and learners, question banks based on learning outcomes, etc. The policy has emphasized upon Quality Education across all stages of School Education. Quality education is not only a life-changing, but also a mind-crafting and

character-building experience, that positively impacts on citizenship. Empowered learners not only contribute to many growing developmental imperatives of the country but also participate in creating a just and equitable society.

Significance of VET in NEP 2020

The success, quality, equity, affordability, and accountability pillars of the National Education Policy will transform our nation into a thriving center of knowledge. And because of this policy, the focus of the Indian educational system is shifting from teachers to learners, from specific to holistic growth, from marks to skills, from information to knowledge, and from examinations to experiments. It is anticipated that NEP 2020 would accomplish its goals by 2030 through promoting the active engagement of all members of society, students, and faculty from diverse educational sectors, utilizing creative solutions and fostering a happy learning environment. In his work titled "Vocational Education in the light of NEP 2020," Ahmad (2022) discovered that the NEP 2020 has the ability to dramatically increase the country's vocational education sector because it mandates all educational intuitions to integrate vocational education in to their offerings. This will bring in a very large number of schools, colleges and universities in to the fold of potential vocational Education and Training providers during the coming decade and make vocational education available to millions of students.

Raman(2020) in his paper "Vocational Education in the NEP2020:Oppertunities and challenges " has emphasized on vocational Education to develop a skilled workforce in India's educational policy disclosure. The author has found that it is high time for the government for mapping out the linkages between the demands of industries and supply of vocational courses so that skills can align according to the jobs available. So in order to effectively implement the recommendations in the NEP 2020, the government needs to learn from the existing inefficiencies in its skilling programmes

Flexibility in course choices to the students particularly in secondary school education, students will be given more empowerment to choose the subjects for study including the arts, physical education, crafts and vocational education. Therefore, the learners can create their own paths of the study in lifelong process. There will be no hard separation among the curricular, co-curricular, or extracurricular and different academic streams.

NEP- 2020 and Vocational Education:

The National Education Policy (NEP) 2020 has placed significant emphasis on vocational education and teacher capacity development to enhance the employability and vocational skills of learners at all levels. The following are some of the key implications of NEP2020 on vocational education.

- By 2025, at least 50% of students in the school and higher education systems should have access to vocational education.

- All academic institutions should gradually incorporate vocational education programs into their regular curricula.

- Vocational courses should be accessible to students enrolled in all undergraduate programs, including four-year, comprehensive bachelor's degree programs. Ø

- Higher education institutions will also allow to conduct short-term certificate courses in various skills including soft skills. Incubation centers will be set up in higher education institutes in partnership with industries.

- Focus areas to be chosen based on skills gap analysis and mapping of local opportunities and technical and vocational will be part of larger version of holistic education.

- "Lokvidya" knowledge develops in India will be made accessible to students through integration into vocational education courses. The Ministry of Education will constitute a National Committee for the integration of vocational education (NCIVE), along industry participation, to oversee this effort and should embark budget for promotion this integration.

- A General Education Programme (GEP) shall be set up to frame expected learning outcomes for higher education programmes also refer to as graduates attributes.

As per proposal given by NEP 2020, by 2025, at least 50% of learners shall get exposures to vocational education through the school and higher education system with the aim of one child should learn minimum one vocation and many more training for different sectors. Eventually it will instil students with respect and dignity of labour and importance of various vocation.

Vocational Education Training programme offered by Government

The Indian government has initiated several courses and programs aimed at vocational training for high school students.Skill development programs in India include initiatives like Skill India, Pradhan Mantri Kaushal Vikas Yojana, National Skill Development Mission, and National Policy for Skill Development

and Entrepreneurship, focusing on vocational training, entrepreneurship, and industry-specific needs. The Skill India program aims to develop multi-skills in India through various institutions like the National Skills Development Corporation (NSDC), Sector Skills Councils (SSCs), and National Skills Development Agency (NSDA). The National Council for Vocational Education and Training (NCVET) was established by the Ministry of Skill Development and Entrepreneurship (MSDE), Government of India, focuses on functions and responsibilities of National Skill Development Agency (NSDA) and National Council for Vocational Training (NCVT). The NCVET became fully operational on 1st August 2020. It functions as an overarching national regulator for setting standards and formulating comprehensive regulations for the vocational education, training, and skilling ecosystem for improving quality and outcomes. It has been entrusted with the development, qualitative improvement and regulation of vocational education entities involved in both long and short-term vocational education and training, while also establishing minimum standards for their operations. The NCVET thus strives to integrate fragmented regulatory system and infuse quality assurance across the entire vocational education, training and skilling value chain, leading to the availability of higher-level skilled manpower for better employability and accelerated growth of the Indian economy.

Issues and Challenges

Vocational education has long been a topic of discussion in India's educational policy debates in order to generate a trained workforce. The NEP reassesses it by examining two major issues it faces, as well as methods to address them. The policy still fails to address the above-mentioned Vocational School Fallacy problem. On paper, it appears to be complete." However, the biggest obstacles to adopting these proposals are budgetary constraints and the capability of vocational institutes and administrators. In the Union Budget for 2020-21, around 3000 crores have been allocated for skill development, a major increase over the previous five years from 1007 crore in 2015-1612. However, considering India's demographic dividend, the allocation could be considered to be insufficient." The key agencies responsible for the implementation of vocational education and training in the country are the Ministry of Human Resource Development, Ministry of Labour, Ministry of Skill Development and Entrepreneurship, and National Skill Development Council. The Pradhan Mantri Kaushal Vikas Yojana (PMKVY) and the Skill India Mission have not had the anticipated impact in the past." The Skill India Mission sought to reach 300 million young people by 2022, but only 25 million had been reached and taught as of the end of 2018. Ineffective capacity building and low enrollment are the causes of this inefficiency in meeting the target13. In fact, only 15% of registered students were able to find work even under PMKVY14." Implementing systemic change as advocated by NEP 2020 will necessitate capacity growth in these ministries, which will necessitate more effective budgeting. It is past time for the government to begin mapping out the connections between industry demands and the supply of vocational courses, so that skills can be aligned with available positions. Along with these difficulties, there is also the issue of digital literacy to consider. With the globe heading toward a digital order with NEP 2020 advocating for it, technology-based skills, particularly among the youth, have never been more important. The government must learn from existing inefficiencies in its skilling programmes in order to effectively execute the suggestions in the NEP 2020."

Conclusion

Higher education affects every nation's economy, social standing, adoption of new technologies, and positive human behavior. Improving GER is the responsibility of the national education department, which aims to provide access to higher education for all citizens of the nation. In order to accomplish these goals, the National Education Policy of India 2020 is implementing creative policies that increase the supply, affordability, appeal, and quality of higher education by making it more accessible to the private sector while upholding stringent quality standards in all higher education establishments. By supporting merit-based admissions with free scholarships, hiring faculty members who continuously perform well on the basis of merit and research, placing merit-based leaders in governing organizations, and enforcing tight quality control through biennial accreditation, NEP-2020 is intended to achieve its goals by 2030.

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Teaching Gen Z: Rethinking Education for a New Generation of Learners

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Abstract

As Generation Z (born 1997–2012) becomes the dominant demographic segment in higher education, conventional methods of teaching that are centered around passive lectures, rigid assessments, and text-heavy content and are proving to be increasingly ineffective. This article looks at how education is going through a radical transformation and is propelling the academia to rethink not only our teaching methods to be effective in terms of the learning styles, values, and thinking patterns of Gen Z students, but also the need to revisit the domain of education and align it with the changing needs of contemporary world. Grounded in a qualitative review of current classroom experiences and supported by secondary research on generational learning behavior, the article identifies the core traits of Gen Z learners and contrasts them with the limitations of conventional teaching approaches.

The paper offers a futuristic perspective by recommending adaptable, inclusive, and technology-integrated strategies such as flipped classrooms, gamification, microlearning, and project-based learning. It also stresses the importance of empathy, mentorship, and mental health support in creating meaningful learning environments. The article also intends to serve as a practical guide for educators, aiming not only to bridge the generational gap in teaching but also to unlock the immense potential of this connected and capable generation. As higher education evolves, understanding and adapting to Gen Z's learning needs is not optional but essential for educational relevance and effectiveness.

Keywords: Gen Z, flipped classroom, microlearning, gamification, experiential learning

Introduction: The New Faces in Our Classrooms

Walk into any college classroom today, and the scene looks very different from what it did just a decade ago. Students are no longer just seated with notebooks and pens, passively listening to a lecture. Instead, many are plugged into their devices, multitasking between PowerPoint slides, WhatsApp notifications, Instagram reels, and YouTube tutorials. These are **Generation Z learners,** born roughly between **1997 and 2012**, and they represent the first generation to grow up entirely in a **digitally connected, fast-paced, and information-rich world.**

Unlike their millennial predecessors, Gen Z students have lifelong exposure to smartphones, artificial intelligence, social media, and streaming content, which has shaped not only how they access information but also how they process, engage with, and expect to learn. Their learning is often visual, interactive, and self-directed. Yet, in most of the educational institutions, the prevailing pedagogical approaches remain rooted in traditional, linear, and instructor-centered models.

The lecture-based, textbook-reliant, and exam-driven system is increasingly misaligned with Gen Z's cognitive preferences and learning behavior. This disconnect raises a critical question: How can educators effectively engage a generation that learns so differently? This article seeks to explore the unique traits of Gen Z learners, the limitations of conventional teaching methods, and actionable strategies to help educators **rethink and redesign** their approach to better understand and respond to the varied and changing needs of these students.

Who is Gen Z? Understanding the Learners of Today

Generation Z, often abbreviated as Gen Z, is the demographic group that succeeds Millennials and precedes Generation Alpha. While the exact birth years may vary slightly depending on the source, most researchers and popular media describe Gen Z as individuals born between the mid-to-late 1990s and the early 2010s, with many sources citing 1997 to 2012 as a common range.

Gen Z students have grown up in a fast-paced, hyper-connected digital environment that has profoundly influenced their thinking, communication, and learning styles. Their worldview is shaped by constant exposure to smartphones, social media platforms, YouTube tutorials, online gaming, instant messaging apps, and artificial intelligence tools, all of which offer instant access to information, personalized content, and global connectivity. As learners, they bring a set of unique characteristics and

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expectations into the classroom that differentiate them markedly from previous generations.

***Digital Fluency*:** Gen Z are true digital natives. While millennials grew up watching the digital world take shape, Gen Z has never known life without it. They were born right into the heart of the digital age. They are adept at navigating multiple devices, apps, and platforms, and they often prefer screen-based interaction over traditional printed materials. Whether it's using Google for instant information or collaborating on cloud-based platforms like Google Docs, technology is their first language and their propensity to assimilate information through digital media is much more than their predecessors. This articulacy enables them to learn fast, individualistically and as per their own convenience. It also means that they may find conventional chalk-and-talk methods uninspiring or outdated.

Visual Orientation: Having grown up surrounded by screens and media, Gen Z naturally connects more with visual ways of learning. They gravitate toward videos, infographics, animations, memes, and interactive dashboards. Platforms like Instagram, TikTok, and YouTube have conditioned them to consume and retain information in short, visually engaging bursts. As a result, they often struggle with dense blocks of text or long lectures unless they are supported by visual aids. Incorporating visual content into teaching, such as mind maps, explainer videos, and interactive slides can significantly enhance comprehension and engagement.

Need for Immediacy: When we say "Gen Z is used to getting instant answers," it refers to their inherent expectation for immediate and readily available information, services, and gratification across virtually all aspects of their lives. This expectation stems directly from growing up as "digital natives" in a world saturated with technology. Gen Z is used to getting instant answers from Google, Siri, or Alexa and immediate validation through likes, comments, and notifications. This expectation extends into the classroom, where they prefer frequent, real-time feedback rather than waiting for midterm or final exam results. Traditional assessment cycles may feel disconnected or demotivating for them. They value quick check-ins, formative assessments, and continuous dialogue with instructors, all of which help them feel more engaged and in control of their learning journey.

Individualism and Diversity: Unlike older generations, Gen Z puts strong emphasis on being authentic, embracing diversity, and fighting for causes they believe in. For Gen Z, authenticity means having the freedom and courage to be their true selves, without feeling the need to conform to societal norms or expectations. This includes expressing their unique personality, interests, gender identity, and

beliefs. They are more likely to challenge authority, question norms, and expect their learning environment to respect diverse voices and perspectives. They appreciate opportunities to express their opinions, collaborate on socially meaningful projects, and learn in spaces that acknowledge mental health, gender identity, neurodiversity, and cultural backgrounds. In such a situation, the one-size-fits-all teaching approaches are unlikely to succeed with them; on the contrary, Gen Z finds differentiated instruction and student choice far more effective. Gen Z embody a paradox where a strong sense of individual identity coexists with an equally strong embrace of diverse communities and collective action for social good.

Shorter Attention Spans: It primarily refers to their preference for concise, engaging content and their ability to quickly filter and process information. With constant access to fast-moving content and multiple sources of information, Gen Z students are often more easily distracted and less inclined to focus for long periods without stimulation or variation. This doesn't mean they lack discipline or intelligence; it means their brains are wired to switch rapidly between tasks and scan for relevance. To maintain their attention, educators must adopt dynamic teaching methods that incorporate interactivity, storytelling, real-world relevance, and periodic mental breaks.

Understanding these traits is essential for today's educators to restructure teaching approaches in ways that resonate with Gen Z's learning preferences. By aligning instruction with their cognitive and emotional profiles, teachers can foster deeper engagement, motivation, and long-term retention of knowledge.

Why Traditional Methods Are still followed

Despite the changing profile of learners, many educators continue to rely on traditional, one-size-fits-all teaching methods. This is because quite often, teachers themselves educated using traditional methods are more comfortable and experienced in delivering content this way. Shifting to modern methods requires significant retraining, a change in mindset, and often a departure from established routines, which they are unable to do because, ejecting from one's comfort zone is a very difficult task. On the other hand, students looking for newer methods of teaching find traditional mode of teaching dreary and are unable to concentrate in the class. The gap between instructional delivery and student needs thus grows, resulting in disengagement, reduced classroom participation, and surface-level learning.

One-Way Lectures vs. Interactive Engagement: Both one-way lectures and interactive engagement have their place

in education, and each offers distinct benefits. However, current research strongly favors interactive engagement for deeper learning and better retention. Traditional lectures assume passive listening as an effective mode of learning. However, Gen Z learners prefer active participation, interaction, and quick feedback. They thrive in classrooms where discussion, questioning, and collaboration are encouraged.

Text-Heavy Learning vs. Multimedia Consumption: Discussion about text-heavy learning and multimedia consumption in education is ongoing indicate a strategic blend of both, tailored to the content, learner, and learning objectives. While previous generations were accustomed to dense texts and rote memorization, Gen Z consumes information through multimedia. Incorporating videos, graphics, and interactive tools not only supports their learning style but also sustains their interest and comprehension.

Delayed Feedback vs. Instant Gratification: The timing of feedback in learning is a critical factor that significantly impacts student performance, retention, and motivation. The deliberation between "delayed feedback" and "instant gratification" (often synonymous with immediate feedback in this context) isn't about one being inherently superior, but rather about understanding their unique benefits and drawbacks for different learning scenarios and learners. Traditional assessments like midterms and finals feel slow for Gen Z, who are used to instant feedback in the form of likes, comments, and scores that show up right away. They stay more engaged when feedback is timely and responsive. They perform better when they receive regular input that helps them track and adjust their learning in real time.

Rigid Structures vs. Personalized Learning: Traditional classrooms rarely account for learning differences. Gen Z favors personalized learning paths, voice and choice, and autonomy in how they demonstrate understanding. Flexibility in pace, format, and evaluation increases their motivation and ownership of learning.

Top-Down Authority vs. Collaborative Learning: Gen Z learners value collaboration over hierarchy. The "I speak, you listen" model doesn't align with their expectations of mutual respect and peer-driven exploration. They respond well to environments where teachers act as facilitators and co-learners rather than authoritative figures.

The Strengths of Gen Z: Not a Problem, But a Potential

While often criticized for their restlessness or reliance on technology, Gen Z learners bring a range of strengths that

educators can harness effectively:

Tech-savviness: Their ability to navigate digital tools makes them quick adopters of online learning, research platforms, and collaborative apps. They can seamlessly integrate technology into their academic work, making virtual learning environments more productive.

Entrepreneurial mindset: Many Gen Z students are driven by purpose, eager to start projects, or take initiative beyond the curriculum. They value creativity, independence, and innovation, often seeking opportunities to solve real-world problems.

Global awareness: With access to global content, they are informed about global challenges and demonstrate sensitivity to social causes. This awareness shapes their desire to engage in meaningful, socially responsible learning and action.

Multitasking ability: When guided properly, their ability to juggle multiple tools and tasks can enhance creative and interdisciplinary learning. They are comfortable working across formats such as text, audio, video and can adapt quickly to new tools and platforms.

Recognizing these strengths is the first step in shifting the narrative from criticism to constructive change, allowing educators to tap into Gen Z's full potential.

Reimagining Teaching for Gen Z

To meet Gen Z learners where they are, educators must shift from traditional models to engaging, flexible, and tech-integrated strategies. Below are some evidence-based practices that work well:

Flipped Classrooms: The flipped classroom as a pedagogical model inverts the traditional teaching approach. Instead of the instructor lecturing during class time and students doing homework at home, the roles are essentially reversed. Instead of delivering content during class time, students are assigned video lectures or readings beforehand. Class time is then used for discussion, application, and clarification. This approach encourages self-paced learning and promotes active, in-depth classroom participation.

Microlearning and Chunking Content: Microlearning and chunking content are two closely related and highly effective strategies in modern instructional design, particularly given the increasingly busy schedules and shorter attention spans of today's learners. They are designed to optimize knowledge acquisition, retention, and application. Breaking down lessons into smaller, focused modules, using bite-sized videos, quizzes, and key-point

summaries, aligns well with Gen Z's learning preferences and cognitive processing patterns. It also helps maintain attention and supports better long-term retention.

Gamification: Gamification is the strategic application of game design elements and game principles in non-game contexts to engage, motivate, and influence behavior. It's not about turning everything into a game, but rather leveraging the inherent psychological drivers that make games so captivating and applying them to other activities, whether in education, business, or personal development. Using game elements like points, leaderboards, levels, or rewards in learning can increase motivation. Gamified learning fosters healthy competition and makes even repetitive tasks engaging and goal-oriented.

Project-Based and Experiential Learning: Project-Based Learning (PBL) and Experiential Learning are two powerful, student-centered pedagogical approaches that move beyond traditional passive learning to engage students in active, hands-on, and real-world experiences. Rather than passively receiving information, here students learn by doing. Hands-on activities deepen conceptual understanding and develop essential life skills like critical thinking, collaboration, and problem-solving.

Technology Integration: Technology integration in education refers to the purposeful and meaningful incorporation of digital tools and resources into the curriculum and pedagogical practices to enhance teaching and learning, foster student engagement, and prepare students for the demands of the 21st century. It's not just about having technology available, but about using it effectively to transform the learning experience. Leveraging EdTech platforms such as Google Classroom, Padlet, Canva, Mentimeter etc. helps make learning more dynamic and personalized. These tools also facilitate blended and hybrid learning environments.

Collaborative and Peer Learning: Collaborative learning and peer learning as two highly effective, student-centered pedagogical approaches harness the power of social interaction to deepen understanding, develop essential skills, and create a more engaging learning environment. Encouraging group projects, discussions, and peer feedback builds community and mirrors the teamwork-oriented environments they'll encounter in workplaces. It also nurtures communication, empathy, and leadership skills.

Frequent, Formative Feedback: Regular check-ins, low-stakes quizzes, and feedback loops keep students informed and engaged. Timely feedback not only supports academic growth but also boosts confidence and accountability in learners.

Conclusion

Teaching Gen Z requires a paradigm shift in educational thinking that must be responsive, reflective, and future-focused. While traditional methods served previous generations well, they are no longer sufficient to address the evolving learning preferences, core values, and motivational drivers of today's students. Gen Z learners are growing up in a world marked by rapid technological advancement, heightened social awareness, and constant information flow. In such a context, rigid, one-directional models of instruction no longer inspire meaningful engagement or sustained learning.

By adopting flexible teaching strategies, integrating technology in purposeful ways, designing personalized learning pathways, and building authentic human connections, we can create classrooms that not only educate but also inspire. Gen Z is not a challenge to be managed, but they are a generation brimming with creativity, purpose, and potential. In order to truly unlock that potential, we must be willing to meet them halfway with openness, empathy, and innovation.

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The Perspectives of National Education Policy -2020 in the Light of Yoga Education

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Abstract

The National Education Policy 2020, the abbreviation of which is commonly known as NEP 2020, substituted the preceding National Policy on Education 1986. It has been welcomed by the academicians, Educationists and researchers with great enthusiasm and is being successfully implemented in many states of our country. However, many academicians, politicians and policy experts have also criticized the National Education Policy 2020 as they are doubtful of the future perspectives of this policy when it will be implemented across India. Many academicians, students and even policy experts were undecided and even doubtful of the capacity and outcome of this policy to bridge the ever-increasing gap between the existing education policy and the new education policy to come. The purpose of this paper is to comprehensively examine and analyse the anticipated perspectives and challenges of the National Education Policy of 2020 for the fulfilment of its objectives in the light of Yoga Education. It will be highlighted in this research paper as to how the National Education Policy 2020 will resolve the crises and challenges of education in contributing attributes towards the personality development of students implementing Yoga education in every sphere of education at all stages and all levels. This research paper will also present some important details about the development of various Yogic traditions in ancient India, and contemplates on the modern-day utility of Yoga for the Holistic development of personality giving emphasis on the development of inclusiveness, integrity and self-sufficiency in a human being's personality including innovative suggestions regarding this notion.

Key Words: *Kathopanishad, Yajurveda, Atharvaveda, Rigveda Dharana, Dhyana, Samadhi, Khipta, Chittya, Vritti*

Introduction:

The National Education Policy (NEP) 2020, a landmark reform in India's education system, envisions a holistic, multidisciplinary, and inclusive learning experience for all. A significant aspect of this policy is its emphasis on the overall well-being of students, transcending mere academic achievement to encompass physical, mental, emotional, and even spiritual development. In this comprehensive approach, Yoga, an ancient Indian practice, emerges as a potent tool that aligns seamlessly with the core tenets of NEP 2020.

NEP 2020 advocates for a shift from rote learning to experiential, competency-based education, fostering critical thinking, creativity, and problem-solving skills. It recognizes that for students to thrive in the 21st century, they need to be well-rounded individuals with a strong ethical grounding and psychosocial well-being. The policy explicitly includes provisions for physical education and health, elevating them from co-curricular activities to integral components of the curriculum. It aims to develop a "physical literacy" as important as reading and numerical literacy.

Yoga, with its emphasis on *asanas* (physical postures), *pranayama* (breathing techniques), and *dhyana* (meditation), directly contributes to these objectives. Physically, regular yoga practice enhances strength, flexibility, balance, and overall fitness, which are crucial for a healthy lifestyle. This aligns with NEP 2020's goal of creating a healthier and fitter generation. Beyond the physical, yoga profoundly impacts mental and emotional well-being. It serves as an effective stress management tool, helping students cope with academic pressure and daily challenges. By promoting mindfulness and self-awareness, yoga cultivates emotional balance, resilience, and improved concentration, all of which are vital for enhanced academic performance and overall personal growth.

The policy also stresses the importance of integrating traditional Indian knowledge systems into modern education. Yoga, being a profound part of India's cultural heritage, fits this perfectly. Its inclusion in the curriculum,

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from primary to higher education, not only honors this heritage but also provides students with practical tools for self-development. NEP 2020 encourages the training of qualified yoga teachers to effectively integrate yoga into classrooms and even offers yoga as an elective or credit course in universities and colleges. This signifies a move towards professionalizing yoga education and making it accessible to a wider student population.

Furthermore, the NEP 2020 emphasizes value education, aiming to instil humanistic, ethical, and constitutional values in students. Yoga, with its inherent principles of discipline, self-control, empathy, and non-violence, naturally complements this aspect of the policy. Practicing yoga can foster a sense of responsibility, respect for others, and a deeper connection with oneself and the environment, contributing to the development of socially engaged and morally upright citizens.

The National Education Policy 2020's vision of holistic education finds a powerful ally in the ancient practice of Yoga. By integrating physical, mental, emotional, and spiritual development, Yoga not only supports the policy's goals of creating well-rounded, resilient, and responsible individuals but also enriches the educational experience with timeless wisdom. The synergy between NEP 2020 and Yoga promises to nurture a generation that is not only academically proficient but also physically healthy, mentally strong, and emotionally balanced, truly embodying the spirit of a vibrant knowledge society. The goal of the policy could be fulfilled with the implementation of ancient Yoga culture in every sphere of life in this age of science and knowledge explosion. The process of yoga is essential to all human beings whose inherent nature is to seek happiness and become free from miseries and suffering. It makes a balance (equanimity) between body, mind and soul. The secret of all round development-physical, mental, social, moral, economic, aesthetic etc. which is the main objective of education lies in the root of Yoga. The important tools of a human being namely mind, breath, speech, and body are used in the process of yoga to achieve the highest goal of human life namely Self-Realization, the ultimate aim of education in ancient times resulting in Pure Bliss. Thus, it is evident that yoga is not merely restricted to poses and acrobatic postures with impressive demonstrations, the sole purpose of yoga is the realization of self and making welfare of all.

The National Education Policy (NEP) 2020 places a significant emphasis on holistic development, moving beyond traditional academic silos to foster physical, mental, and emotional well-being. Within this transformative framework, yoga education emerges as a crucial component, deeply aligned with the policy's objectives.

Key Provisions and Alignment:

- **Holistic Development and Well-being:** NEP 2020 advocates for a comprehensive approach to education, recognizing that a student's overall well-being is as vital as academic performance. It promotes physical literacy as being as important as reading and numerical literacy. Yoga, through its *asanas* (physical postures), *pranayama* (breathing techniques), and *dhyana* (meditation), directly contributes to this by enhancing physical fitness, flexibility, strength, and endurance. Moreover, it is a powerful tool for mental and emotional well-being, helping students manage stress, anxiety, and improve concentration.

- **Integration of Traditional Indian Knowledge Systems (IKS):** A cornerstone of NEP 2020 is the valorization and integration of India's rich cultural heritage and traditional knowledge systems into the mainstream curriculum. Yoga, as a profound and ancient Indian practice, is explicitly highlighted for inclusion. This aims to connect students with their roots while providing them with practical tools for self-development and a balanced lifestyle. The policy envisages weaving IKS, including yoga, into various disciplines like science, mathematics, literature, and even engineering, promoting an interdisciplinary approach.

- **Physical Education as an Integral Part:** NEP 2020 elevates physical education from a co-curricular activity to an integral and compulsory part of the curriculum across all stages of schooling. It aims for structured physical activities throughout the academic years, with equal importance given to sports and physical education alongside academic subjects. Yoga is seen as a key element within this physical education framework, contributing to overall physical fitness, motor skills, and a healthy lifestyle.

- **Curriculum Integration and Experiential Learning:** The policy encourages experiential and flexible learning paths. Yoga, being inherently experiential, perfectly fits this pedagogical approach. Students learn by doing through physical postures, breathing exercises, and meditation, directly experiencing the benefits. The NEP also promotes the offering of yoga as an elective or credit course in higher education institutions, allowing for deeper engagement and specialized study.

- **Teacher Training and Professional Development:** To ensure effective integration of yoga, NEP 2020 emphasizes the need for qualified yoga teachers. It recommends professional development courses and specific training programs for educators, equipping them with the necessary skills and knowledge to teach yoga effectively in classrooms. The Yoga Certification Board (YCB) under the Ministry of AYUSH plays a crucial role in professionalizing yoga education and certifying instructors.

- **Focus on Mental Health and Life Skills:** The policy recognizes the increasing academic pressure and digital distractions faced by students, leading to stress and anxiety. Yoga is seen as a vital intervention to address these concerns, promoting mindfulness, emotional regulation, and resilience. It helps students develop crucial life skills such as discipline, self-control, empathy, and improved social interaction, which are essential for navigating modern life.

- **Research and Innovation:** NEP 2020 also encourages research and innovation in yoga education to explore its benefits, applications, and integration with contemporary knowledge systems. This includes studying its impact on cognitive function, memory, and overall well-being.

In essence, NEP 2020 provides a robust framework for embedding yoga education at all levels, from early childhood to higher education. By promoting its inclusion, the policy aims to cultivate not just academically proficient individuals, but also well-rounded, healthy, mindful, and culturally rooted citizens, capable of thriving in a rapidly evolving world. This synergy between modern educational reform and ancient wisdom promises a more balanced and fulfilling learning experience for the coming generations.

The National Education Policy (NEP) 2020 places a significant emphasis on holistic learning and the integration of traditional Indian knowledge systems, with Yoga being a prominent component. The policy aims to cultivate well-rounded individuals who are not only academically proficient but also physically, mentally, and emotionally balanced. Thus, inclusion of studies wellbeing in NEP 2020 of ancient Indian scriptures such as the Bhagavad Gita and the Upanishads that talks much about the physical, mental and emotional wellbeing of students to be aware, besides the wisdom of our Maharishis, about the various characterizations of Yoga and various ancient yogic traditions of India which elucidate the art of self-composure and inner-engineering which can be effectively developed with the help of Yoga. The Art of equability of the cognitive mind both in success and in failure symbolises the most effective tool for realizing the fullest potential of each and every individual student. In other words, it can also be added that it is nothing other than Yoga which can productively suffice and strengthen a student's holistic personality.

Yoga Education and Development of Self

Yoga is the union of Individual self (through mind restraining process) with the Supreme Self. It is the restraint of mental operation (process) and the disconnection with sufferings such as mental agony, stress, anxiety and frustration. The process of yoga is essential to all human beings whose inherent nature is to seek happiness and become free from miseries and suffering. It makes a balance (equanimity) between body, mind and soul. The secret of all-round development -physical, mental, social, moral, aesthetic etc. which is the main objective of education, lies in the roots of Yoga. The important tools of a human being namely mind, breath, speech, and body are used in the process of yoga to achieve the highest goal of human life namely Self- Realization and transcendental Bliss. Thus, it is evident that yoga is not merely restricted to poses and acrobatic postures with impressive demonstrations, the sole purpose of yoga is the realization of self and making welfare of all. The ideal Human civilization is in search of true knowledge-the knowledge of Truth which could be achieved through the adoption of yoga philosophy in education.

The yoga philosophy in education for all round development has been propounded by ancient sages and gurus since ages. Such developmental perspectives of learners is the sole factor in education which could be fulfilled by the implications of yoga education. Hence the total development of personality could be fulfilled through the practice of Yoga and receiving yoga education properly. Therefore, the ancient practice is reflected in our National education policy-2020 though there are tremendous development occurred in the field of science and Technology in this age of Knowledge explosion in 21st century.

The Origin and Concept of Yoga:

The word 'Yoga' is derived from the Sanskrit word 'Yuj' which means union of the 'self' to the 'supreme self' The word "Yoga" means "yoke" or "unity" translated from Sanskrit, the classical language of India. It also means "discipline" or "effort." Yoga requires to make

an effort to unify our body and mind. We do this by concentrating our awareness on our physical body through breathing and postures. It is the aim of yoga to achieve purity and clarity of manas (mind), buddhi (intellect) and Chitta (consciousness). '*Yogaschittyavritti Nirodha' Yoga is restraining the mid-stuff from taking various forms (vrittis)* This removal of impurities allows the individual to realize and remain in original and normal state of uncontaminated joy and bliss.

The roots of yoga can be traced back to over 5000 years ago, but some researchers think that yoga may be even older - up to 10000 years old. Yoga's long and rich history can be divided into five main periods - the Vedic period, Pre-classical period, Classical period, Yoga in Medieval times and Modern times. Yoga may have pre-Vedic elements even during Indus valley civilization. In Indus seal a picture of 'Proto Shiva (Yogi *Murti*) surrounded by animals proved that people in that age used to practise yoga. In Upanishads such as *Shvetashvataropanishad* and *Kathopanishad*, yoga is referred as an essential means to achieve happiness. In *Kathopanishad*, for example, it is advised: **"**Treat the self as the person seated in the body as the chariot. Then, treat the intellect as the driver (charioteer), the mind as the reins and the senses as the horses. The one who has control of mind directed by intellect thereby controlling the senses leads the person to the spiritual goal. Otherwise, a person's life will be as of a chariot driven by uncontrolled horses."

Yoga Education in Ancient Scriptures:

Review of the literature on yoga reveals innumerable treasures of knowledge with regard to yoga. Altekar, A. S. in his book *Education in Ancient India* (II ed.), (1982) stated that the Ariyan period could be regarded as the peaceful, mature and practical age of education. To him, "From the Vedic age downwards the central concept of education of the Indians has been that it is a source of illumination, giving us a correct lead in the various spheres of life"

The Vedas were ancient hymns, chanted in the forests, by *Rishis,* were not put in written form. According to Hindu tradition, the Vedas were composed as far back as 10,000 years. In this Vedic Period, the word "Yoga" was used occasionally, often in reference to *Homas*, fire ceremonies. The "practical aspects" of Yoga were not formalized, but were part and parcel of the Vedic seer's life. To perform *Homa*, the sages had to sit immobile for days, weeks, even months in "*Asanas*", straight, still, sitting positions of the body. The Mantras chanted required tremendous breath control that is called *Pranayama* in Yoga Philosophy. The ritualistic accuracy and purity required intense

concentration or *Dharana* . The senses had to be controlled, as fasting and other physical disciplines through strong practice of Yoga *Sadhana.* So, the word "Yoga" does appear in the Vedas. According to Dr.K.H. Kumar Kaul, author of *YOGA IN THE HINDU SCRIPTURES*, in the prayers of the *RIG VEDA* to Indra, the *Rishis* advise the aspirant to follow the path of Yoga for obtaining energy from the "Divine Person". In the RIGVEDA, (V, 81.1) the Mantra repeats the word "Yoga" and implies different types of Yoga related to all kinds of human existence.

In *Yajurveda*, according to Dr. Kaul, some references directly or indirectly related to Yogic systems are found in the reference "*Yujate* man…" for the sake of putting emphasis on mental Yoga. Dr. Kaul opines that *Atharvaveda* is the most important for the study of Yoga practices. In the *Atharvaveda,* references are found to Prana, the vital energy of the Universe, and also Chakras (eight Chakras in the Pranic body and nine apertures (gates) in the body". "*Astachara navdvara devanam pruayodhya tasyam hiranyayah kosh o kosha svargo jyotisavrth*" *(Atharvaveda* 10.2.31). *Pranavidya* or the Science of *Prana* is referred to in the *Atharvaveda* which explains the meaning and states that *Prana* is the essence of the Universe. According to the *Atharvaveda,* all senses and motor organs can stop their functioning when they are tired, but only *Prana* is always working and active as long as the body lives. *Atharvaveda* gives importance to the practice of Yoga. Dr. Kumar Kaul observes: "All the four Vedic *Samhitas* refer directly or indirectly to the Yoga system and the Yoga traditions. In the first three *Samhitas* there are direct as well as indirect references to Yoga and the *Atharavaveda* gives the clear conception of Yoga describing the eight mystical circles (Chakras) and the nine gates of the human body-the golden sheath and the mystical wheel containing the thousand spokes. Therefore, it may be considered that the Vedic sages were aware of the nature, importance and implication of the practical aspects of Yoga. Their supernatural knowledge discovered the secret of yoga as they were the practical Yogis. The path of Yoga, helped them become successful in revealing divine knowledge within their minds. The Vedas came to be written down, and systematized by *Ved Vyasa*, the author of the *Mahabharata*.

The *Upanishads*, or the *Vedanta* , as old as 3,000 to 5,000 years, also provide ample explanations of the mystic concepts of the yoga in more concrete form. Besides the *Vedas*, the *Upanishads* are also the most important repositories of ancient Hindu mystic yogic thought and represent a body of spiritual realizations based upon individual experience which was transmitted from the Guru to the students. The *Upanishads* contain nuggets of golden

Yogic truth. The Kathopanishad teaches, "The Creator of the Universe opened the gate of the senses outside."

In this *Upanishad*, Lord *Yama* also teaches *Nachiketas* about the one hundred and one nerves in the heart, and among them, and says that one goes upward through the head and if the Yogi raises himself to the head through this particular nerve, he attains immortality (*Kathopanishad* II, 3.16). In *Prasna Upanishad*, the Guru Pippa Lada, in replying to the questions of his disciples, propounds the concept of *Prana* as the "originators of all created things" and promulgates the concept of polarity, or movement between Creator and Created, as a sustenance of the manifested world. He also elucidates in detail the idea of Prana, as the Supreme Moving Force of Creation, in the famous verse, "And when the queen bee rises, all the bees with her arise, and when she comes to rest, again, then all come to rest. Even so it happened to the senses. They realized that Prana was supreme and made obescience to it" (*Prasna Upanishad*). The Guru sketches the intimate relationship of mind and Prana, and teaches the importance of meditation on the sacred *Pranava Aum*. The *Mundaka Upanishad* begins with the importance of meditation on *Aum* and also following the *Yama* and *Niyamas*, or morality and ethics in life. Both the *Mundaka* and the *Prasna Upanishads* belong to the Atharvaveda. The *Chandogya Upanishad* also stresses the importance of chanting and meditating upon the Sanskrit syllable *Aum*, which it describes as *Udgita*, the "sacred word which is chanted". This *Upanishad* also describes the greatness of *Prana*. It also beautifully describes the concept of *Dhyana*, or meditation, and says that "whatever great thing is known to men is known through meditation… the whole earth, middle space, the heaven, waters and even mountains are engaged in *Dhyana*". In the *Brihadaranyaka Upanishad* sage Yajnavalkya, teaches there are three means of liberation, i.e. *Sravana*, or study; *Manana*, rational thinking and *Nididhyasan* Meditation. *The Shvetasvtara Upanishad* is the last among the main *Upanishads*. The second chapter is devoted to an explanation of Yoga philosophy completely. The sage says persons practicing Yoga and *Dhyana* must unite their mind with God. God, then with His Grace, unites their intellect with Him, and they then perceive His Light. Moksha is possible only with purity of heart (*Shvetasvtara Upanishad* (2.1). This Upanishad explains Yoga with the help of the *Vedic Samhita Mantras*.

In short, the concept of *Yoga* in the *Upanishads* is that the spiritual life starts with mental purity, control and devotion to the Divine Spirit. The *Upanishads* brilliantly advocate consummate virtues like devotion, dedication, service, austerity, truthfulness, continence, self-restraint, faith, generosity, etc. though not in proper order, but which are definitely included in the system of Yoga. In *Kathopanishad*, the word "*Yoga*" has been used in its technical sense and has been defined as "controlling and stabilizing the senses". This *Upanishad* further gives stress on *Adhyatma Yoga* which leads to Self-realisation. The motto of *Karmayoga* which is defined in the opening verse of *Isavasyopanisad*. "The actions done with an attitude of renunciation do not become binding". In *Kenopanisad* nature of Self-Realisation has been explained which gives indirect hints to such a Karmayoga. The *Svetasyataropanisad* prepares a long list of Yogic practices. The realization of the mystic power of God through the Yoga of meditation (*Dhyanayoga*) was also recommended. The divine power, known as Kundalini in Yogic culture, is produced by meditation. For the first time, the posture and the place for Pranayama and meditation is described, in detail, in this *Upanishad*. The *Kathopanisad* refers to the metaphor of a charioteer and the Self is said to be the driver of the chariot; the mind; the reins; the senses; the horses; the sense-objects the paths on which chariot goes. The chariot reaches its proper goal if the horses are properly controlled by the Charioteer (Higher Consciousness, Manas) keeping full control over the reins. Yoga is understood as one of the finest examples found in the Upanishads for the Spiritual Living. The *Mundakopanisad* represents further a development of Yoga techniques, narrating 'OM' as the main object of meditation.

Yoga Vashishta is another yogic scripture which is very difficult to date. Many Hindu tradition holds that Lord Rama lived in *Treta Yuga* and thus the *Ramayana*, the story of his life, was written by Sage Valmiki, about 7,000 years ago. The *Ramayana* is also an allegory for the principles of Yogic living. Lord Rama was the supreme Yogi and the role model for all Yogic qualities. The *Ramayana* is a "*Practical Yoga Manual*" showing mankind how to live a spiritual life. Proper attitudes to take towards all the challenges of worldly life are elaborated in detail in the work.

The *Mahabharata* is yet another great "yogic allegory" of Hindu literature, penned by sage Ved Vyasa. It tells the story of the struggle of every human soul to overcome the animalistic passions (symbolized by the Kauravas) and enable the triumph of the divine qualities of the God nature (symbolized by the Pandavas). The *Mahabharata* is also the story of Krishna, who, it is believed, lived in *Dwapara Yuga*, about 5,000 years ago. It is said that when Lord Krishna died, And the date is postulated at about 3125 B.C., Kali Yuga began. Embedded within the *Mahabharata* is the world famous scripture of Hinduism.

The Bhagavad Gita which is the ultimate text book of Yoga, has eighteen chapters of the discourse between Lord Krishna and Arjuna. Here the word **"***Yoga***"** is frequently used during the discourse. In fact, every one of the eighteen chapters is entitled as a **"***Yoga***".** Lord Krishna cautiously leads Arjuna out of *Vishadha*, or depression, into a positive state of mind where he is able to fulfill his duties as a warrior. The famous Yogic concepts of the Gita include: **"***Yoga Karmasu Kaushalam***"** (Yoga is skill in action) and" *Yoga Uchayati Samatva*" (Yoga is equal mindedness in all circumstances). Concepts of Karma Yoga, Bhakthi Yoga, Jnana Yoga, Dhyana Yoga were codified and elaborated in a systematic way for the first time in the Bhagavad Gita. The emphasis was on *Vairayga* or detachment and *Viveka* or discrimination. No practical instruction is given, other than the instruction to "sit straight" with head and neck erect. The word **"***Asana***"** is used, but mainly in reference to the "seat" on which the Yogi is to sit to perfect his "meditation**"**. The concept of "*Yoga*" as an attitude towards living which could embrace the entire spectrum of man's existence was first formulated clearly and boldly by Maharishi Ved Vyasa in his magus opus, THE *Bhagavad Gita* which forms a part of the *Mahabharata*. In these chapters, Lord Krishna instructs his disciple Arjuna that Yoga is cultivating the "proper attitude" of mind in all of life's circumstances. Yoga is not just a "withdrawal from the world and practice of extreme asceticism" but rather *a Yogi is he who is "moderate in both eating and fasting, sleeping and waking".(Chapter Sixteen) (16).* "Yoga is not possible for him who eats too much or for him who abstains too much from eating. It is not for him, who sleeps too much or too little." Even "Dejection and Despair" can be a "Yoga" in the sense that often such despair is the starting point of the spiritual life.

Lord Krishna defines Yoga as "a balanced mind." "The one fixed in equanimity of mind frees oneself in this life from vice and virtue alike. Therefore, devote yourself to Yoga. Work done to perfection is verily Yoga." (Chapter Two. 50). The Yogi is one who has controlled his senses. "The Yogi, having controlled them (the senses) sits focused on Me, as the Supreme Goal. His wisdom is constant whose senses are under subjugation". (Chapter16). A Yogi is a man who rises above the duality of action and non-action "He who sees action in inaction and inaction in action, he is wise among men, he is a Yogi and accomplisher of everything". (Chapter Four 18). The Yogi is not attached to the fruits of action "Abandoning the fruit of action, the Yogi attains peace born of steadfastness; impelled by desire, the non-Yogi is bound, attached to fruit". (Chapter Five 12).

Yoga Sutras of sage Patanjali are still not often recognized to be part of a larger work along with The Yoga Bhashya; the commentary on these sutras. One which is said to be written by Vyasa, yet, most scholars believe was actually written by Patanjali. Therefore, as much as there are varied interpretations of this text due to how sparse it is, the meaning is clearly given in the commentary, as well as two later ones of importance (Vacaspati Misra's and Vijnanabhiksu's)

There are 4 chapters or *padas* in The *Yoga Sutras*. They are, *Samadhi Pada*, laying out the fundamental, metaphysical view. *Sadhana Pada*, that which describes how to practice, *Vibhuti Pada*; strangely, a whole chapter on the special-powers (*Sidhis*) that come from practice, and *Kaivalya Pada*, that delves deeper into the state of liberation and the aspect of meditation that precedes it.

- *Yogacintamani* wherein the thirty-four *asanas* have been described in detail. *Kukkutasana* along with *Mayurasana* are featured amongst what starts to become a more physically dynamic approach to yoga asana. The text borrows extensively and directly from the *hathapradipika,* though its primary orientation is on the science of Ayurveda. The author is *Harthsakirti Suri*, wherein he explains the *Ashtavidha Pariksha*, or, eight types of examination of a patient. Namely; pulse, urine, eyes, oral, tongue, stool, voice and touch.

- *Gherandasamhita, a*uthored by Srisa Chandra Vasu details a sevenfold yoga (in contrast to Patanjali's ashtanga) and explains *Shatkarma, Asana, Mudra, Pranayama, Pratyahara, Dhyana, Samadhi,* the purpose being to use asana once again for the sake of the ultimate aim of meditation, dhyana.

- Yoga Makaranda, This text is authored by Shri Krishnamacharya the text lays out in pictural form and accompanying instruction a practice that groups asanas into sequences very similar to those of the ashtanga yoga we know today. Here, we find the emphasis on the technique of trishana; breath, bandha, Drishti as well as the 'counting method' known now as the vinyasa count.

- Books related to Indian education like *History of Education in India* by Dr. S. N. Mukherji, *Contemporary Problems and Current Trends in Education* by S.K. Murthty, Development of Education in India by S. P Agrawal and A. Biswas, *History of Indian Education* by P. L. Rawat, *Education Ideas and Ideals of Gandhi & Tagore* by David Hardimanm, The Educational Philosophy of Mahatma Gandhi by M. S. Patel, *Value education* by Mohit Chakrabarti, *Thoughts and Theories of Indian educational thinkers* by B. N. Dash

and Nibedita Dash and other books have highlighted the importance of yoga education.

Holistic Development through Yoga Education as Envisioned in NPE-2020

Education is a powerful force in bringing rapid changes in the Society. Education includes all the process that develops human ability and behaviour (UNESCO). Human beings have two important aspects-Biological and Sociological. The Biological aspect is maintained and transmitted by nutrition and reproduction. The Sociological aspect is improved and transmitted through a powerful means of education. So conceptualization and development of education as a product has more importance than the others.

India is a famous country that has the right to take pride in Yoga Philosophy and in ancient age old educational system. India's glorious culture presents to mankind the history of several races invaded India and mixed in the human ocean of India. Dr. F. W. Thomas one of the distinguished Indologists writes, "There is no country where the love of learning so early an origin or has exercised so lasting and powerful an influence." The ideal of Hindu education was based on it's Yoga Philosophy and culture and not in mere literacy. The system of Indian education is the development of 'self' and to realize the supreme 'self' through the practice of Yoga education to liberate mind and to lead the highest possible life. The pivotal sources of ancient education were the Vedas. The Brahmanas, Aranyakas and Upanishads were the granaries of the ancient rich culture and heritage. Dr. R. K. Mukherjee said, 'Since the birth of the oldest Vedic poetry, we find Indian literature for a period of more than a thousand years bearing an exclusively religious impression' A.S. Altekar has rightly remarks, 'the knowledge is a third eye of man which gives him insight into all affairs…' The education of ancient India was exclusively religious in nature influenced by Yoga Philosophy during the early and later Vedic period. Realization of true knowledge was the main aim towards the achievement of absolute or Brahma. Education during the Buddhist period was basically religious in nature and based on practicable principles, high ideals and non-violence. .

But nowadays Students, of all stages whether it may be Primary, secondary or Higher education, are engaged themselves in accumulating bookish knowledge. Learning to them becomes a burden and monotonous. Intrinsic motivation in them is rare for achieving true knowledge or empirical knowledge. Education today does not help them to become self-sufficient and self-dependent in future. Even education of today is not so related to the new changes in the global perspectives and growing socio-economic problems stirring up in our country in the present century. In educational scenario what we notice today is indiscipline, impatience, violence, lawlessness, hatred, decrease of human values, lack of self-confidence, self-sufficiency and self- reliance, mental insecurity, stress, depression, anxiety consumerisation of foreign culture etc. The skills of Problem solving attitude, Decision making capacity, Communication, Interpersonal relation, Empathy, Social awareness, self-awareness, Coping up with emotion and Stress are not inculcated due to lack of active involvement of the learners in the Teaching-learning process. So 'all round drawing out of the best'-the goal of education is not fulfilled. As a result, unemployment, Student's unrest, violation of human rights, violation of rules & regulations, religious fanaticism, inhuman treatment to women, caste conflicts prevailed to greater extent in the present century.

National Education Policy-2020 introduced New Curriculum according to the needs of the learners and society has been introduced in all stages of education. Innovative teaching methods, strategies, tools and techniques have been introduced. Continuous comprehensive evaluation system has been implemented. But man making and character building education is yet to be achieved due to gradual value erosion. The objectives of all round development of the students have not been completely fulfilled. Recently the NCTE has recommended Yoga Education in B.Ed syllabus.

In short, the Principles of Yoga Philosophy which have been recommended in NPE-2020 could be the solution of present day problem of education as once the implications of Yoga Philosophy in ancient Indian Education generated the Human resource to reach the zenith of progress of human civilization based on values and morality. The proposed project will highlight as to how Yoga Education could fulfill the goal of education , development of 3 Hs (Hand, Heart &Head)and generate human resources of our country.

Conclusion:

The philosophy and practices of Yoga are quite relevant in the modern life and they play significant role in the prevention of disease and health promotion through sustainable approach. The principles and practices of Yoga particularly the 'AstangaYoga' have been practised form several thousand years and have been subjected for the investigation in different areas like psychology and allied sciences. They stood the test of all the time and are of great

help in the achievement of best possible holistic health through their regular practice. Yoga revives our heritage and tradition and supports the modern health care system to prevent many of the modern psychosomatic diseases.

Yoga education will be given priority in the school, college and university curriculum which was neglected for the last hundred years. Practice of Eight Limbs Yoga is highly relevant in the 21st century due to its ability to address the prevalent issues of stress, anxiety, and sedentary lifestyles by offering a holistic approach to physical, mental, and emotional well-being through practices like postures (*asanas*), breathing exercises (*pranayama*), and meditation, making it a valuable tool for managing the demands of modern life across various age groups and fitness levels.

Yoga, a millennia-old practice originating from ancient India, has become more relevant than ever in the 21st century. In a world marked by rapid technological advancements and an ever-increasing pace of life, the importance of yoga has transcended its historical roots. The modern era presents unique challenges to physical health, mental well-being, and stress management, and yoga offers a comprehensive solution to these concerns.

In terms of physical health, the sedentary nature of many contemporary lifestyles has led to a rise in health issues such as obesity, cardiovascular problems, and musculoskeletal disorders. Yoga provides a holistic approach to physical fitness, emphasizing not only strength and flexibility but also mindful movement and awareness of one's body. Its postures, or asanas, cater to individuals of all fitness levels and ages, promoting overall health and vitality.

Equally significant is yoga's impact on mental well-being. The 21st century has witnessed a surge in stress-related disorders and mental health challenges. Yoga offers a sanctuary of calmness in the midst of chaos, teaching individuals to quiet the mind, focus on the present moment, and cultivate inner peace. Through techniques like meditation and controlled breathing, practitioners can manage stress, anxiety, and depression more effectively, enhancing their emotional resilience.

Moreover, the digital age has brought about constant connectivity and information overload, often resulting in mental fatigue and low attention spans. Yoga's emphasis on mindfulness and concentration counters these effects, enabling individuals to develop a heightened sense of awareness, concentration, and mental clarity. As a result, productivity and creativity are enhanced, and the ability to manage daily challenges is improved.

Yoga's importance also extends to fostering a sense of community and interconnectedness. The practice brings people from diverse backgrounds together, creating a shared space for personal growth and mutual support. This aspect of yoga is particularly relevant in a world where cultural diversity and global communication intersect.

In conclusion, the 21st century's fast-paced lifestyle and evolving challenges have amplified the significance of yoga. Its multifaceted benefits, spanning physical health, mental well-being, and community building, make it a vital tool for individuals striving to navigate the complexities of modern life. As the world continues to evolve, the timeless wisdom of yoga provides a guiding light towards a balanced, harmonious development and enriched existence which is the goal of Education as well as NPE-2020.

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FEATURE ARTICLE

The Future of Learning: The Transformative Impact of Technology on Education

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Abstract

Technology is revolutionizing education, reshaping traditional teaching methods, and creating new opportunities for learning. This paper explores the transformative impact of digital tools, Artificial Intelligence (AI), Virtual and Augmented Reality (AR), and online learning platforms on education. It highlights how these innovations enhance accessibility, personalization, and engagement while also addressing difficulties such as the digital gap, data privacy, and the essential for teacher adaptation. As education continues to evolve, the integration of technology promises more encompassing and student-centered knowledge acquisition. The study emphasizes the importance of balancing innovation with effective pedagogy to ensure meaningful and equitable learning for future generations.

Key Words: Future of Learning, Transformative, Technology on Education

Introduction

Innovation like technology has turned the world in transforming education, modifying how students learn and educators teach. The integration of digital tools, Artificial Intelligence (AI), Virtual Reality (VR), and Cloud-Based learning stage has revolutionized traditional classrooms, making learning more interactive, personalized, and accessible (Selwyn, 2016). As education moves beyond physical classrooms, online learning platforms, Learning Management System (LMS), and AI powered education have enabled students to study at their own pace and style, enhancing engagement and comprehension (Siemens, 2019). A groundbreaking development in educational technology is rising in power of artificial intelligence, which enables adapting learning (Luckin et al., 2016). Gamification, augmented reality (AR), and virtual simulations provide active learning environment, create ability to simplify complex and chaotic situation. (Wang et al., 2020). Moreover, cloud computing and big data analytics offer real-time feedback, empowering education with data informed practices methodologies (Zawacki-Richter et al., 2019).

The digital revolution has also fostered inclusivity in education, bridging gaps for students with disabilities through assistive technologies such as Automatic speech recording (ASR), screen readers, and AI-powered language translation tools (Burgstahler, 2020). Additionally, technology has facilitated global collaboration, allowing students and educators to connect across borders through virtual classrooms and digital learning communities (Anderson &Dron, 2017). As the world transitions to a knowledge-driven society, the role of technology in education will continue to evolve, equipping students with future-ready skills. However, while technology offers immense benefits, challenges such as the digital divide, data privacy, and the need for effective teacher training must be addressed to maximize its potential (Selwyn, 2021). The future of education lies in harnessing technology to create a more inclusive, adaptive, and efficient learning ecosystem.

Theoretical Background of the Study

This paper applies Constructivism theory of Lev Vygotsky for analyzing the prospect of technology on transforming education. Constructivism is a learning theory that posits that learners actively construct their knowledge and understanding through experiences and interactions with the world. It emphasizes that learning is not a passive process of receiving information but an active process of making meaning. Key Principles of Constructivism: Vygotsky's concept of the "zone of proximal development" (ZPD) highlights the importance of social interaction and collaboration in learning (SCL). SCL encourages group work which is digitally enabled and help in peer discussions, collaborative problem-solving, and enhanced learning through creating a web of network. In this paper Constructivism emphasizes the importance of technology in reflection and metacognition (thinking about one's thinking) and ultimately technology motives students to display on their learning or study processes, set goals, and evaluate their progress, fostering self-directed learning.

The Digital Revolution in Education

The digital revolution has profoundly reshaped the educational landscape, introducing innovative technologies

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that enhance learning experiences and improve accessibility. Traditional classroom-based education has transitioned to hybrid and online models, offering students flexible and personalized learning opportunities (Siemens, 2019). The convergence of artificial intelligence (AI), virtual reality (VR), and adaptive study platforms has enabled teachers to personalize instruction to the needs of individual students, leading to greater engagement and understanding (Luckin et al., 2016). Among the drivers of the digital revolution in education is the universal adoption of online learning platforms, including learning management systems (LMS) like Moodle, Blackboard, and Google Classroom. These platforms capable to remote learning, real-time assessments and interactive course materials, making education more accessible to students worldwide (Zawacki-Richter et al., 2019). Additionally, AI-powered tutoring systems, such as intelligent chat-bots and personalized recommendation engines, provide students with instant feedback and support, bridging gaps in traditional teaching methods (Holmes et al., 2021)

However, despite its advantages, the digital revolution in education comes with challenges. The digital divide remains a significant concern, with disparities in technology access limiting opportunities for marginalized students (Selwyn, 2021). As technology continues to evolve, the digital revolution in education holds immense potential for creating more inclusive, interactive, and efficient learning environments. By leveraging technological advancements responsibly, education can be transformed to take the present essential demand in the changing world.

A New Dimension of Learning:

- **Virtual and Augmented Reality (AR)**

  Virtual Reality (VR) and Augmented Reality (AR) have become revolutionizing technologies in the field of education, providing interactive and immersive learning experiences beyond conventional pedagogies. These technologies create dynamic, engaging environments that help students grasp complex concepts through experiential learning. According to Wang et al. (2020), "VR and AR enable students to interact with digital content in a highly realistic and engaging manner, making abstract subjects more tangible and understandable." For instance, medical students can practice surgeries using VR-based simulation tools, enhancing their skills in a risk-free environment (Radianti et al., 2020). Similarly, in subjects like astronomy, VR can transport learners into space, providing a first-hand experience of planetary systems that would otherwise be impossible to achieve. "Augmented reality provides contextual

learning experiences, helping students interact with content in real time while fostering deeper engagement and understanding" (Chen et al., 2021).

Furthermore, research suggests that these technologies not only improve knowledge retention but also enhance students' motivation and confidence in learning (Dalgarno& Lee, 2010). However, despite their benefits, VR and AR face challenges such as high costs, technological barriers, and the need for specialized hardware. Selwyn (2021) highlights that "the accessibility of VR and AR in education remains a significant concern, particularly in underfunded schools where technological resources are limited." Addressing these challenges through affordable and scalable solutions will be crucial in ensuring that VR and AR reach their full potential in transforming education.

- **Machine Learning**

  Machine learning (ML), being a part of artificial intelligence (AI), is revolutionizing education by facilitating individualized learning, automating clerical work, and enhancing the analysis of student performance. As Luckin et al. (2016) state, "Machine learning algorithms can analyze vast amounts of educational data, identify learning patterns, and adapt instructional content to meet the unique needs of each student." Through the use of ML, teachers can design personalized learning experiences that accommodate various learning speeds and styles so that no student is left behind.

  Furthermore, ML enhances predictive analytics in education by identifying at-risk students early. By analyzing attendance records, quiz performances, and engagement metrics, ML models can predict potential dropouts and recommend interventions (Zawacki-Richter et al., 2019). "Machine learning offers data-driven insights that allow educators to take proactive steps in supporting students before academic challenges escalate" (Siemens, 2019). Additionally, ML-powered chatbots assist students with inquiries, providing 24/7 academic support. Despite its advantages, integrating ML in education comes with ethical and technical challenges. Data privacy concerns, algorithmic biases, and the necessary for teacher training in AI tools are critical issues that should be addressed (Selwyn, 2021). However, as ML continues to evolve, its potential to create more efficient, personalized, and data-driven education systems remains immense.

- **Blended Learning**

  Blended learning, a hybrid approach combining traditional instruction with digital and online or virtual

learning mixed as a transformative model in modern education system. This integration of technology enhances flexibility, engagement, and personalization, making education more accessible and effective. As Garrison and Vaughan (2013) state, "Blended learning combines the best aspects of online and in-person education, allowing students to benefit from both digital resources and human interaction."

One of the major advantages of blended learning is that it can provide personalized learning experiences. Learning Management Systems (LMS) like Moodle, Canvas, and Google Classroom allow students to learn at their own pace, watch recorded lectures, and submit assignments online, promoting self-directed learning (Graham, 2019). Moreover, adaptive study platforms use AI content based on students' progress, ensuring individualized instruction and better academic outcomes (Siemens, 2019). Blended learning also supports active learning strategies, such as the flipped classroom where learners get learning materials before attending in-person sessions for deeper discussions with practical applications (Bishop &Verleger, 2013). "The flipped classroom approach shifts the traditional learning model by using technology to maximize in-class engagement and critical thinking" (Tucker, 2012). This method has been widely adopted in higher education and professional training programs, improving student participation and comprehension. Additionally, blended learning promotes inclusivity by accommodating diverse learning preferences and needs. However, challenges in digital study like lack of trained teacher, and technological infrastructure constraints must be addressed to maximize the potential of blended learning (Selwyn, 2021). As education continues to evolve, blended learning stands as a powerful approach that leverages technology to improve engagement, accessibility and own learning experiences. Its effectiveness depends on the thoughtful mix-up of digital with pedagogical strategies, ensuring that students receive a well-rounded and impactful education.

- **Gamification**

Gamification leverages the motivational affordances of games to increase engagement and foster intrinsic learning. One of most characteristics of gamification is ability to enhance students' motivation in education. Research shows that game-based learning fosters intrinsic motivation by introducing elements of competition, achievement, and instant feedback (Hamari, Koivisto, &Sarsa, 2014). For instance,

platforms like Kahoot!, Duolingo, and Classcraft use gamified approaches to become more interesting and encourage learners to participate actively. "Gamified learning environments provide students with clear goals, immediate feedback, and a sense of achievement, which are crucial for sustaining engagement" (Landers, 2014).

Additionally, gamification promotes experiential learning by allowing students to apply their knowledge in simulated environments. In STEM education, serious games and simulations help students grasp complex concepts through hands-on experience. Furthermore, gamification fosters collaboration and social learning. Multiplayer educational games encourage teamwork, communication, and critical thinking as students work together to solve challenges (Sailer et al., 2017). However, despite its benefits, gamification must be carefully designed to avoid excessive competition, which may demotivate some learners. "The effectiveness of gamification in education depends on balancing extrinsic rewards with intrinsic motivation to sustain long-term engagement" (Nicholson, 2015). As education continues to evolve, gamification remains a key driver of futuristic learning, making lessons more interactive, personalized, and impactful.

- **E-learning**

E-learning has revolutionized education by leveraging digital platforms to deliver interactive, flexible, and accessible learning experiences. Through the integration of online courses, virtual classrooms, and multimedia resources, e-learning provides ability, to study own pace and capacity anytime with anywhere. As Sangrà, Vlachopoulos, and Cabrera (2012) state, "E-learning represents a shift from traditional educational methods to a more student-centered approach that emphasizes digital interactivity and personalized learning." One of the major advantages of e-learning is its accessibility. Online learning platforms like Coursera, edX, and Udemy. Through it enable learners to acquire knowledge and skills beyond the constraints of geography or time (Hodges et al., 2020). Additionally, learning management system (LMS) like as Moodle and Blackboard provide structured environments where educators can organize course materials, assessments, and discussions in a virtual setting (Bozkurt et al., 2020). "E-learning democratizes education by breaking down barriers to knowledge acquisition, particularly for students in remote or underserved areas" (Means et al., 2013). E-learning also supports a variety of multimedia

tools—videos, animations, discussion forums and interactive simulation- that cater to diverse study style. Research has shown that incorporating multimedia elements enhances student engagement and retention of information (Mayer, 2009).

However, despite its benefits, e-learning faces challenges such as digital literacy gaps, lack of student motivation, and technological infrastructure limitations. "While e-learning offers immense potential, its effectiveness depends on learner engagement, institutional support, and equitable access to digital resources" (Selwyn, 2021). Addressing these issues through improved instructional design and blended learning strategies will ensure that e-learning continues to transform education in the digital age.

- **Mobile learning**

  Mobile learning (m-learning) is transforming education by providing students with flexible, on-the-go access to learning resources via smart phones, tablets, and other portable devices. This approach enables a seamless learning experience, allowing learners to engage with learning content at any time. As Crompton (2013) states, "Mobile learning extends beyond the boundaries of traditional classrooms, offering personalized, accessible, and interactive learning experiences tailored to individual needs." One of the major advantages of m-learning is its accessibility and convenience. Mobile learning enhances continuous and self-paced learning, allowing students to revisit lessons and practice skills according to their schedules (Ally & Prieto-Blázquez, 2014). "The portability and ubiquity of mobile devices make learning a fluid experience, bridging formal and informal education" (Sharples et al., 2009).

Additionally, m-learning supports collaborative and social learning through cloud-based platforms and instant messaging tools. Mobile applications such as WhatsApp, Messenger, and Face-book enable students to engage in discussions, share resources, and work on group projects in real-time, fostering peer interaction and knowledge exchange (West, 2013).

However, despite its benefits, mobile learning faces challenges such as digital divide issues, screen size limitations, and distractions from non-educational applications. "For mobile learning to be effective, it requires careful instructional design, digital literacy training, and equitable access to devices and internet connectivity" (Selwyn, 2021). Addressing these concerns will ensure that mobile learning continues to play important role in learning.

Innovating the Learning Experience through Technology

Technology has transformed the learning process by improving accessibility, engagement, and personalized teaching. Contemporary educational software, including artificial intelligence (AI), virtual and augmented reality (VR/AR), and adaptive learning systems, is remodeling students' interaction with material and learning process. As Selwyn (2021) states, "Education technology is not just about digitizing content but about fundamentally rethinking the way learning occurs."

Adaptive learning tailors instruction to students' strengths and weaknesses, ensuring a more effective and engaging learning experience (Holmes et al., 2021). Another transformative technology is virtual and augmented reality, which enhances experiential learning by immersing students in interactive environments. Augmented reality bridges the gap between abstract concepts and tangible experiences, fostering deeper comprehension (Dede, 2009). Furthermore, technology fosters collaboration and global connectivity through online platforms, video conferencing tools, and digital classrooms. Applications such as Zoom, Microsoft Teams, and Padlet enable students to participate in remote learning and engage in cross-cultural exchanges (Means et al., 2013). Social learning theories emphasize that "technology enhances collaborative learning by enabling students to share ideas, receive instant feedback, and develop critical thinking skills" (Vygotsky, 1978). The success of technology-driven learning depends on its thoughtful implementation, ensuring inclusivity and pedagogical effectiveness (Salmon, 2020).

Challenges and Concerns in Technology-Driven Education

Although technology has transformed education, its adoption poses major challenges and issues. Problems like digital equity, data privacy, the digital divide, and teacher training in technology adoption need to be solved to make sure that educational technology is available to all students. According to Selwyn (2016), "The challenge is not just about introducing technology into education but ensuring it is used effectively and equitably."

- **Digital Divide and Equity Concerns**

  One of the most significant pitfalls in technology-focused education is the digital divide—literally the divide between access and lack thereof to modern technologies. Low-income and rural students do not enjoy regular internet accessibility and digital computing equipment, confining them in a limited

form to online classes. "While digital technologies have the potential to democratize education, they can also exacerbate inequalities if access is not universal" (Van Dijk, 2020). Addressing this issue requires government policies, investment in infrastructure, and affordable access to digital resources (Warschauer, 2003).

- **Data Privacy and Cybersecurity Risks**

  The rise of digital learning platforms has increased concerns over student data privacy and cybersecurity. Numerous ed-tech firms gather large volumes of student data, which has triggered concerns over how such data are preserved and safeguarded. "Without strict data protection policies, educational technology can expose students to risks such as data breaches and surveillance" (Livingstone & Third, 2017). Implementing stringent cybersecurity measures and promoting digital literacy can help mitigate these risks.

- **Teacher Training and Resistance to Change**

  Another significant challenge is teacher training in the use of technology in the classroom. Most teachers are not equipped with the technical proficiency or pedagogical methods for full utilization of the potential of online learning tools (Ertmer & Ottenbreit-Leftwich, 2010)."Successful technology integration in education depends not only on infrastructure but also on teachers' confidence and competence in using digital tools" (Mishra & Koehler, 2006). Professional development programs and institutional support are crucial in overcoming this barrier.

- **Screen Time and Student Well-being**

  There is worry over too much screen time affecting the physical and mental well-being of learners. Excessive exposure to screens results in problems like eye strain, diminished attention span, and fewer social interactions (Twenge, 2017). "While digital learning offers flexibility, it is essential to balance screen-based education with interactive and experiential learning methods" (Straker et al., 2018). Encouraging digital well-being strategies, such as structured screen breaks and incorporating offline activities, can help address these concerns.

- **Quality Control and Misinformation**

  The rapid growth of online learning has led to concerns about the quality and credibility of digital educational content. With the rise of self-paced courses and online certifications, ensuring the reliability of learning materials is crucial. "Not all online courses maintain rigorous academic standards, and learners must critically evaluate sources for credibility" (Means et al., 2013). Institutions and policymakers must establish accreditation standards and quality benchmarks to ensure effective learning outcomes.

Importance of Technology in Transforming Education

Technology has a vital role to play in revolutionizing education by increasing accessibility, engagement, and personalization. The use of digital tools has transformed teaching and learning, making education more interactive, inclusive, and responsive to the diverse needs of students. As Selwyn (2021) states, "Technology is not merely a tool for education; it is a transformative force that redefines how knowledge is created, shared, and experienced."

- **Enhancing Accessibility and Inclusivity**

  One of the greatest strengths of technology in education is its capacity to transcend geographical and socioeconomic boundaries. Virtual learning environments, like Coursera, edX, and Khan Academy, offer free or low-cost access to quality education to students globally (Means et al., 2013). Additionally, assistive technologies, such as screen readers and voice recognition software, allow students with disabilities to fully engage in learning activities. "Technology fosters inclusivity by providing equal learning opportunities regardless of physical, financial, or geographic constraints" (West, 2013).

- **Personalized and Adaptive Learning**

  Since the emergence of artificial intelligence (AI) and machine learning, education has been made more personalized according to the needs of individual learners. Adaptive learning systems like Knewton and DreamBox evaluate students' performance and adapt teaching material accordingly so that learners can get individualized support (Siemens, 2019). "Technology-driven personalization enhances learning outcomes by addressing individual strengths and weaknesses in real time" (Holmes et al., 2021).

- **Increasing Student Engagement and Motivation**

  Gamification, augmented reality (AR), and virtual reality (VR) have revolutionized the way learners engage with material. Software like Google Expeditions and Minecraft Education Edition enables rich learning environments that foster problem-solving and critical thinking (Dede, 2009). "Interactive digital learning environments make education more

engaging, encouraging students to actively participate rather than passively consume information" (Freina & Ott, 2015).

- **Facilitating Collaboration and Global Connectivity**

  Technology enables seamless collaboration among students and educators through digital platforms. Applications like Microsoft Teams, Zoom, and Google Classroom allow real-time communication, group projects, and knowledge sharing across different locations (Salmon, 2020). "The digital classroom extends beyond physical boundaries, fostering a global exchange of ideas and cultural perspectives" (Vygotsky, 1978).

- **Supporting Lifelong Learning and Skill Development**

  In present era technological advancements and it continuous learning is essential for professional growth. Online courses, micro learning modules, and digital certifications empower individuals to upskill and remain competitive in the job market (Mayer, 2009). "Technology-driven education fosters lifelong learning, enabling individuals to acquire new knowledge and adapt to evolving industries" (Bozkurt et al., 2020).

The Future of Learning: What Lies Ahead?

The education of the future is being defined by the rapid development of technology, revolutionizing the way students learn, interact, and gain knowledge. New innovations like artificial intelligence (AI), blockchain, extended reality (XR), and individualized learning systems are redefining the educational landscape. As Siemens (2019) highlights, "Education is evolving from a static system to a dynamic, technology-driven ecosystem that fosters adaptability and lifelong learning."

- **Artificial Intelligence and Personalized Learning**

  AI is anticipated to assume a central role in education's future, providing instant feedback on learner performance and customizing curricula for individual requirements. AI-driven tutors, chatbots, and predictive analytics will provide personalized learning experiences that can accommodate unique learning styles (Holmes et al., 2021). "AI will not replace teachers but will act as a powerful assistant, enabling educators to focus on creativity, critical thinking, and social-emotional learning" (Luckin et al., 2018).

- **Extended Reality (XR) in Experiential Learning**

  Virtual reality (VR) and augmented reality (AR), as part of extended reality, will revolutionize experiential learning. Immersive simulations will enable students to perform virtual science experiments, visit historical sites, and engage in vocational training hands-on without physical barriers (Dede, 2009). "Extended reality enhances conceptual understanding by making abstract topics tangible and interactive" (Freina &Ott, 2015).

- **Blockchain for Credentialing and Academic Records**

  Blockchain technology is becoming a viable option for secure and transparent academic credentialing. By decentralizing educational records, Blockchain will eliminate fraudulent certifications and streamline student transfers between institutions (Grech & Camilleri, 2017). "Blockchain will empower learners by giving them ownership of their academic records and ensuring their credentials are universally recognized" (Sharples & Domingue, 2016).

- **Global Connectivity and Hybrid Learning Models**

  The future of education will increasingly rely on hybrid learning, blending online and in-person instruction to maximize flexibility and inclusivity (Means et al., 2013). Cloud-based platforms will enable global classrooms, where students from different countries can collaborate on projects and access high-quality educational resources. "Technology-driven global learning will foster cross-cultural competencies and prepare students for the interconnected workforce" (Salmon, 2020).

- **The Rise of Lifelong Learning and Skill-Based Education**

  As industries rapidly evolve, traditional degrees may no longer be sufficient. Instead, micro-credentials, digital badges, and continuous learning programs will become essential for career advancement (Bozkurt et al., 2020). Platforms like LinkedIn Learning, Coursera, and Udacity already provide flexible, skill-based education tailored to industry needs. "Future education will shift from a one-time degree model to a continuous learning framework that adapts to workforce demands" (Davidson, 2017).

Conclusion

The infusion of technology into education is redefining how knowledge is delivered, accessed, and learned.

Digital tools, artificial intelligence, and online learning platforms have made education more inclusive, flexible, and personalized. As advancements continue, the future of learning will likely be characterized by adaptive learning systems, immersive experiences through virtual and augmented reality, and greater global connectivity.

Though technology offers ample opportunities, certain challenges like the digital divide, privacy of data, and the training of teachers are to be met so that the learning is made equitable and effective. The most important factor for a successful transition is finding a balance between pedagogical effectiveness and technological innovation and ensuring that education is made accessible and meaningful for all students.

Finally, the future of education will depend on how well educators, policymakers, and institutions leverage technology to build a more dynamic and student-focused learning environment. By being open to these changes in a thoughtful way, we can empower future generations with the skills and knowledge they must have to excel in an ever-more digital age.

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FEATURE ARTICLE

Transforming Teacher Education Through Canva App or Website in India

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Abstract

Teacher education is experiencing a massive digital revolution in India, revolutionizing the learning process and the process of teaching. The increasing popularity of visual learning, digital literacy, and collaborative pedagogy is making tools like Canva disruptive in the field of teacher training. The Canva Application/Website, a user-friendly graphic design software, is making it possible for aspiring teachers to create interactive, visually appealing content that enhances students' learning experiences.

This article takes into account Canva's growing role in teacher training programs, particularly in the context of India's National Education Policy (NEP) 2020, which encourages digital integration at a robust level in education. Through the examination of actual-life cases from B.Ed. colleges in India, we see how Canva is helping future teachers create innovative lesson content, increasing student engagement, and infusing ideas with a more creativity and colourful life.

Besides its revolutionary nature, the fact that Canva is accessible on mobile phones is a significant contributor to inclusive digital learning, particularly in a nation where smartphones are the main learning devices for the majority of educators. Despite such an advantage, lack of good internet connectivity, readiness for digital materials, and skill gaps still predominate. This paper not only analyses such issues but also provides practical suggestions to ensure the integration of Canva in teacher training without any hitch, enabling teachers with the confidence and ability to excel in the modern technology-based learning environments.

Keywords: Canva, teacher education, visual learning, lesson planning, digital pedagogy, NEP 2020, mobile accessibility, interactive teaching, B.Ed. training, digital literacy

The Digital Shift in Teacher Education

Education is the central pillar of the growth of a nation, having an overbearing influence on personal development and initiating social as well as economic changes. India's former Prime Minister, Atal Bihari Vajpayee Ji, had elaborated in his address, "Strengthening the individual means strengthening the nation." He further added that, "Empowerment is best brought about by rapid economic growth along with rapid social change" (Vajpayee, 2002). This empowerment today is closely related to education that is changing with the times, keeping up with innovation and flexibility. Management expert Peter Drucker also indicated this change by saying, "The only skill that will count in the 21st century is the ability to learn new skills." He cautioned that, "Everything else will become obsolete over time" (Drucker, 1999). These words indicate a very simple fact: education is not merely the acquisition of knowledge; it is learning how to learn, especially in the age of rapidly changing technology.

This change is best seen in the context of teacher education. Lecture and textbook days are over. Learning environments now require teachers to engage students in interactive, picture-rich, and technology-based learning processes. Based on this, prospective teachers not only need to excel in pedagogy but also learn the skills of digital tools and visualize innovative pedagogy. As education is turning into a blend of traditional and digital pedagogic practices, there is an immediate need for teacher education courses to be synchronized with such changing requirements (National Education Policy, 2020).

In India, degrees like the Bachelor of Education (B.Ed.) and Diploma in Elementary Education (D.El.Ed.) are now increasingly integrating digital tools into their curricula. The National Education Policy (NEP) 2020 highlights the pressing need for the integration of technology into teacher education, with a focus on how future teachers need to be well-equipped with the right digital skills (Government of India, 2020). One such resource that is now increasingly playing a vital role in this process is Canva, a user-friendly tool that enables teachers to design visually engaging lesson plans, interactive teaching materials, and digital pedagogical materials.

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This research attempts to look into how Canva is changing the process of teacher education in India. It discusses its role in enhancing the methods of teaching, shows real examples of how it is making an impact, and touches on the challenges of integrating digital tools in B.Ed. courses. Through this inquiry, the study intends to depict how tools like Canva are changing teacher training, making learning more interactive, effective, and future-ready.

What is Canva? A Beginner-Friendly Guide for Educators

Canva is a free web-based graphic design software that gives teachers an efficient way of creating a range of education materials, such as lesson plans, infographics, presentations, flashcards, posters, worksheets, and quizzes. The software comes in a mobile app as well as a website and uses real-time synchronization, making its use efficient. In comparison to other sophisticated design software, Canva has a simple drag-and-drop interface, making its use easy for people who do not have any prior design experience. Such a user-friendly design makes it easy for teachers to easily make their own modifications to their materials, making their teaching materials more visually appealing (Canva, 2025).

One of Canva's biggest strengths is how it consistently runs on a number of devices. It has also been seen to work seamlessly both on its webpage and mobile app, allowing the teacher to design the lesson plan on a PC, laptop, tablet, or smartphone. Whatever is done, it is auto-saved into the cloud, which allows a teacher to start designing a lesson plan on his/her computer, and then finish and edit on his/her mobile, without stopping at any step. The online system minimizes the loss of data and eases the working process (Canva, 2025).

Furthermore, Canva enables more collaborative work because many individuals can work on the same design at the same time. Educators can share resources between teachers or students, provide constructive feedback, and make real-time changes, hence enhancing lesson plan and content creation. Canva has a vast array of pre-made templates, royalty-free images, icons, fonts, and animations, hence enabling instructors to create good educational resources with ease.

The platform also facilitates better sharing and delivery efficiency of content. Teachers can share their work in various formats such as PDF, PNG, and PPT, or directly embed it on platforms like Google Classroom. The openness of the platform makes Canva an indispensable tool in the modern education sector, allowing teachers to

create well-organized and visually stimulating content that enhances the learning experience of students(Canva, 2025).

Fig -1, Source- Canva.com, 2025

Mobile Accessibility: A Game-Changer for our Teacher Trainees

One of the most impressive aspects of Canva is its mobile app, which proves useful especially for teacher trainees who might not have easy access to laptops or desktops. For example, a B.Ed. student at a rural teacher training institute can create a high-level lesson plan using his or her smartphone, thereby proving to be more convenient than conventional software that needs a computer. In the same vein, a D.El.Ed. trainee at a remote place with poor connectivity can pre-download templates and work offline, uploading his or her content once connectivity is restored. The mobile aspect of Canva guarantees that even resource-poor teacher trainees can use digital tools effectively in their pedagogy.

Canva's Role in Teacher Education: Practical Applications

• **Visualizing Complex Educational Concepts**

Many teacher trainees struggle with the task of simplifying complex topics for learners. Canva simplifies the production of infographics, mind maps, and diagrams that enhance the simplicity of lesson comprehension. For example, a science pedagogy student pursuing a Bachelor of Education degree can construct a step-by-step flowchart illustrating photosynthesis and thereby simplify the topic more than a mere explanation. Similarly, a special education trainee teacher can design visual flashcards applicable to learners with learning disabilities and thereby enhance learning and accessibility.

• **Simplifying Lesson Planning**

Lesson planning is an important skill in teacher training, and Canva offers pre-designed templates that make it easier for trainees to plan their teaching material better. For example, a trainee teacher who is

a social science expert can create a visually appealing lesson plan on Indian history using timelines, maps, and photos to enhance the immersive quality of the lesson. Likewise, a student teacher of mathematics can create step-by-step instructional boards of geometric equations so that students can understand the concept through visual display. These kinds of resources enhance lesson planning to a great extent, making lessons more interactive and student-oriented.

- **Enhancing Micro-Teaching Sessions**

  Micro-teaching is a significant component of B.Ed. training, where trainees deliver short practice lessons to fellow trainees. Canva enables them to create interactive educational content for practice sessions. For example, a student teacher practicing classroom management can create an interactive set of illustrated rules on Canva so that they are interactive and memorable. This not only enhances presentation skills but also enhances creativity and confidence levels among trainees.

- **Facilitating Assessment and Feedback**

  Assessment is the priority in teacher training, and Canva provides the possibility of creating innovative assessment tools outside the traditional test. Future teachers can create interactive quizzes, rubrics, and exit slips with the aim of assessing the students' knowledge interactively. For example, a student teacher can create an interactive vocabulary matching activity with Canva so that students can learn and be assessed at the same time. Moreover, the process of peer assessment in teacher training courses can be improved through the use of feedback forms created using Canva with structured criteria that explains and details the process of assessment.

- **Creating Digital Portfolios for Professional Growth**

  A well-crafted teaching portfolio is needed for career growth and job searching. Canva allows teacher trainees to create engaging digital portfolios that present their lesson plans, activities in the classroom, and strategies for engaging students. For instance, a prospective English teacher can include excellent lesson highlights, samples of students' work, and reflective remarks in a fascinating portfolio, thus making it easier for employers to access their work. Design elements provided by Canva also allow trainees to present their teaching philosophy in a fascinating and professional way.

Canva is also a big help for teachers in training who want to build their professional image. Lots of future teachers are using it to create online portfolios that show off their lesson plans, teaching materials, and how they teach. For instance, someone studying to be a teacher can use Canva to create a cool digital portfolio that makes them stand out when they interview for jobs. This fits right in with the NEP 2020 plan to focus on teachers being skilled professionals.

- **Data-Driven Insights:**

- Edgar Dale's Cone of Experience

  Why Multisensory Learning Works: Dale's Cone of Experience (1969) says that people remember:

  - 10% of what they read,

  - 20% of what they hear,

  - 30% of what they see,

  - 50% of what they see and hear (audiovisual).

  Because Canva lets you put together text, pictures, and videos, it helps people in training create learning stuff that sticks with students better. A video about climate change made with Canva is going to have a bigger impact than just reading about it in a book.
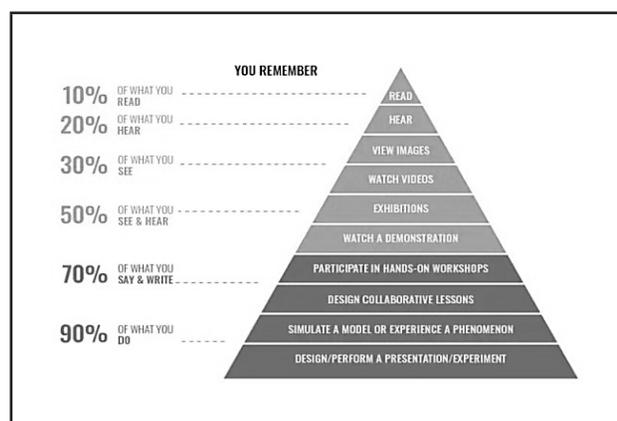
Fig- 2: Impact of Visual Learning on Retention and Engagement with learners or trainee

(Source- https://www.wp-tonic.com/top-visual-learning-facts-and-statistics-for-2024/)

- **Faster Understanding:** Research shows that people understand pictures way faster than text - like 60,000 times faster! So, using visuals to teach can really help students remember what they learn.(Brain-Based Learning Research, 2022)

- **Better Memory:** Using pictures and other visual aids in teaching can improve student memory by up to 400%!

People just remember images and infographics better than plain text.(Educational Psychology, 2021)

- **More Interest:** The EdTech India Report (2023) says that 92% of teachers who used digital tools in class saw their students get more involved because digital resources are interactive and grab their attention.

- **Easier to Understand:** Visual learning also makes things easier to understand, letting students pick up tricky ideas faster. Things like infographics and charts make hard concepts clearer, which helps students learn better.(Neuroscience and Education, 2022)

- **Active Learning & Participation:** Studies show that visual elements such as videos, animations, and graphics promote active learning, leading to deeper comprehension and longer retention periods (Neuroscience and Education, 2022).

Solutions for Addressing Challenges in Implementing Canva in Teacher Education

- Limited Digital Infrastructure in Rural B.Ed. Colleges

  One of the biggest challenges to the adoption of Canva for teacher training is the lack of digital infrastructure for rural B.Ed. colleges. The majority of institutes do not have proper internet connectivity and digital equipment, and this can restrict the adoption of digital tools.

  Solution - The efforts made by the government under Digital India and PM eVIDYA can provide the key resources and infrastructure required to fill this gap. Furthermore, the public-private partnerships can provide digital tools and internet connectivity to rural teacher training institutions.

- **Need for Canva Training in Teacher Education**

  An allied issue is with regard to training for the use of Canva. Some teachers can be resistant to new technology tools, and that can dilute their professionalism.

  Solution: Bachelor of Education colleges can incorporate Canva workshops into their course so that students become familiar with managing this platform. Regular hands-on training sessions would do much to promote familiarity and competence with digital tools. Colleges can collaborate with Canva to provide customized training modules for instructors.

- **Balancing Visuals and Content Depth**

  While visual aids can contribute to better educational results, excessive use of them can reduce the richness of teaching content.

  Solution: Teachers need to negotiate a balance between visual stimulation and rich content. They need to integrate Canva with critical thinking exercises and debates, such that visual content is offered to enhance and not supplant rich learning experiences. Employing visual tools to represent intricate ideas and offer complementary materials can be an effective strategy.

- **Lack of Personalized Content Creation**

  The other issue that most teachers struggle with is not being able to develop customized or individualized content that is specifically designed to meet the diverse learning requirements of their students. Although Canva excels at developing generic resources, developing highly customized resources such as customized assignments or adaptive learning tools remains time-consuming.

  Solution - An effective way to tackle this problem is to use the customization feature of Canva, which provides pre-formatted templates that are editable for different topics and levels of study. Teachers can take some initial effort to develop a base of flexible materials. Later, the templates can be modified and updated at regular intervals, thus saving precious time and resources while maintaining the content as personalized to individual requirements. Teachers can also share the templates among themselves, thus enhancing efficiency and fostering a collaborative approach towards developing study materials.

- **Limited Teacher Confidence with Digital Tools**

  Most teachers, particularly those who have been used to applying conventional pedagogic strategies, would be wary or hesitant to embrace the utilization of online tools like Canva. This is perhaps because they might feel that they are not sufficiently technologically savvy enough to fully utilize a tool of this kind, particularly if they are not already familiar with web design or computer multimedia software.

  Solution: One of the ways to build confidence is to create a learning community of support. Staff training sessions of more experienced teachers, where others are taught Canva, can be very effective. Universities can also create mentorship programs, where new or more tech-friendly teachers teach other teachers how to use Canva. As the teachers gain experience and realize the effectiveness and ease of Canva in the classroom over time, confidence will be built. Step

by step, starting with simple features and gradually moving forward enables teachers to learn at their own pace without feeling overwhelmed.

Aligning Canva with NEP 2020: A Step Towards Future Education

The National Education Policy (NEP) 2020 is a visionary document that seeks to transform India's education sector, making it inclusive, comprehensive, and responsive to 21st-century requirements. One of the main goals is to integrate digital tools into education, thereby empowering teachers and learners with the skills required to excel in a digital world. Canva, being a flexible and affordable digital tool, is apt for many of the main points of the NEP 2020.

- **Digital Literacy for Educators**

    The NEP 2020 emphasizes the importance of digital literacy among teachers, realizing that teachers must be digitally literate so that they can utilize technology to enhance learning and teaching. Canva is an excellent platform where teacher trainees can enhance their digital literacy. Its easy-to-use interface enables even those with the minimum technical expertise to create professionally acceptable teaching material. Incorporating Canva in teacher training centers enables B.Ed. colleges to ensure that would-be teachers are not just aware of digital tools but are also proficient in utilizing them to create engaging and effective learning modules.

- **Experiential and Project-Based Learning**

    The second significant focus of the NEP 2020 is project and hands-on learning, which prepares students to learn from practical problems and real-world scenarios. Canva makes this possible through the capacity of teacher trainees to design interactive activities and projects. For example, a B.Ed. student can use Canva to design a multimedia project on environmental sustainability with infographics, videos, and interactive quizzes. This not only enhances the learning process but also prepares students to implement their knowledge in real-world scenarios.

- **Multidisciplinary Teaching Approaches**

    NEP 2020 promotes interdisciplinary pedagogy, shattering the subject silos, and providing an integrated approach to education. Canva's flexibility makes it the perfect tool to produce interdisciplinary pedagogy

learning content. For example, a pre-service teacher can design an integrated lesson in history, geography, and art by designing visually engaging timelines, maps, and graphs using Canva. This process not only enhances learning interest but also enables the learner to recognize connections between the subjects.

- **Education in Multiple Languages**

    National Education Policy 2020 also gives importance to multilingual education, preferring the integration of local languages along with English. Canva supports such a movement by empowering teachers to create bilingual or multilingual learning materials. For instance, a student of Bachelor of Education majoring in language teaching can use Canva to create bilingual learning materials like posters or worksheets with English text and a local language. Such a process not only fits into the multilingual vision as envisioned by the NEP but also provides improved educational access for learners from various linguistic communities.

- **Teacher Professionalism and Skill Development**

    Finally, the NEP 2020 strongly emphasizes teacher professionalism and skill building. Canva enables teacher trainees to develop professional identities through the creation of digital teaching portfolios that demonstrate their skills and creativity. The portfolios may include lesson plans, teaching materials, and student samples, giving a general idea of the trainee's skills. Building such portfolios with the assistance of Canva enables teacher trainees to visualize their capacity to address the challenges of today's classrooms.

Conclusion

Canva is not just a mere design tool; it revolutionizes teacher training in India in its very essence. Canva enables teacher trainees to develop effective, student-focused lesson plans and digital portfolios that map their own professional growth as teachers. Canva fills the gap between conventional pedagogy and changing demands of contemporary education, giving future teachers the chance to adopt innovative ways of teaching and learning.

With India's shift to a more technology-driven education system, the teacher's role also shifts significantly. In contemporary settings, teachers break away from being mere presenters; they step into the role of learning facilitators, guiding students through engaging and interactive sessions. Canva equips teacher trainees with the tools necessary to

design compelling and visually rich content that is able to evoke the interest of students. Through this empowerment, teachers are enabled to enhance their teaching methods and engage their students more effectively, thereby preparing them for the educational future in an increasingly digital environment.

One of the most impressive aspects of Canva is its ability to promote creativity and innovation. It offers a platform for learners to practice, learn, and have fun in innovative thinking. Its ability to create new content helps to maintain learners in the development of their creative abilities, which are essential in meeting the needs of a multicultural classroom setting. In addition, it helps to ensure that they are able to grow into innovative educators, with the ability to adapt to meet changing needs of learners through new approaches and methods.

Indian classrooms are highly heterogeneous as students come from diverse cultural, linguistic, and socioeconomic backgrounds. Canva facilitates student teachers to handle this diversity by allowing them to design inclusive and accessible instructional materials. A student teacher can use Canva, for instance, to prepare visual supports for students with disability or bilingual instructional materials for students who speak alternative languages. This offers every student an opportunity to learn regardless of his or her background or disability.

Promoting the inclusion of Canva in teachers' professional growth requires the formation of a group of technology-literacy teachers. Through shared Canva development and exchange, potential teachers interact with each other, allowing them to learn from each other and acquire a shared notion of how to effectively utilize digital tools. Their shared environment not only enhances their learning process but also enables them to become cooperative and supportive teachers who can carry on their professional growth among other teachers.

In going forward, embracing digital tools such as Canva will be a key factor in making India's education system more efficient, particularly in light of the new National Education Policy (NEP) 2020. Increasingly, B.Ed. institutions making use of Canva in their operations will not only endow their alumni with technology skills but enable them to employ technology to create meaningful and interactive learning experiences. This will create a generation of educators who will be capable of inspiring, motivating, and empowering learners in the digital era.

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FEATURE ARTICLE

Shaping a Cooler Planet: An Educational Imperative

Subheshwar Jha*

ABSTRACT

The issue of the critical role of education in raising public awareness and fostering a sense of urgency regarding global warming is perhaps one of the most important issues in the world today. Despite the overwhelming scientific consensus, widespread public understanding and proactive engagement remain insufficient. This paper postulates that effective educational strategies are fundamental to bridging this knowledge-action gap. It examines various pedagogical approaches, including formal schooling, informal learning environments, and public outreach campaigns, highlighting their potential to disseminate accurate information, debunk misconceptions, and cultivate environmental literacy. Furthermore, the abstract discusses the importance of integrating interdisciplinary perspectives, promoting critical thinking, and emphasizing actionable solutions to empower individuals to make informed decisions and advocate for sustainable practices. By fostering a deeper understanding of the causes, impacts, and mitigation strategies of global warming, education can transcend mere knowledge transmission, ultimately inspiring behavioral change, collective action, and a global commitment towards addressing this pressing environmental challenge.

Key Words- Fossil Fuel, GHG, HFC, Crust.

Introduction

Around five century BC, Heraclitus, the Greek philosopher (535 to 475 BCE) said - "One cannot step in twice in the same river." The statement holds true even today. The speed of change and its consequent repercussion has led to a radical change in our world. A high degree of volatility, uncertainty, complexity and ambiguity that plagues the world today necessitates a relook at way we are living today and the world we are creating for our coming generations.

Global warming is one such issues that presents a profound challenge in this context and requires a fundamental review of today's education for making it more contextual that might require a multifaceted transformation of how we teach, learn, and structure our educational systems.

This transformation is crucial for both mitigating climate change and adapting to its inevitable impacts.

Our Heating Planet

Since the Industrial Revolution, the global annual temperature has increased in total by a little more than 1 degree Celsius, or about 2 degrees Fahrenheit. Between 1850—the year that accurate recordkeeping began— and 1980, it rose on average by 0.07 degrees Celsius (0.13 degrees Fahrenheit) every 10 years. Since 1981, however, the rate of increase has more than doubled: For the last 40 years, the global annual temperature has risen by 0.2 degrees Celsius, or 0.36 degrees Fahrenheit, per decade.

The result? A planet that has never been hotter. The ten most recent years are the warmest years on record. And the warmer it gets, the more probable it becomes that we trigger climate tipping points (such as rapid glacier melt or thawing permafrost) that can transform natural systems into entirely different states and lead to more warming. In short, there is Global Warming, the effects of which are disastrous.

Global warming refers to the ongoing increase in Earth's average temperature, primarily driven by human activities. It's a critical component of the broader issue of climate change and involves wider effects on our planet's climate system. The world is currently warming at an unprecedented rate, faster than at any point in recorded history. It is caused by excessive emission of greenhouse gases (GHGs) into the atmosphere, which trap the sun's heat.

While natural factors like solar radiation variations and volcanic activity can influence climate, human activities like burning of Fossil Fuels which accounts for over 75% of global GHG emissions and nearly 90% of all carbon dioxide (CO_2) emissions, Electricity and Heat Production, Transportation that releases large amounts of CO_2 and deforestation and land use change are the primary sources for global warming. Other predominant sources of global warming are through ruminant animals like cows and sheep

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that produce methane (a potent GHG) during digestion (enteric fermentation), methane produced by **:** Paddy fields due to anaerobic decomposition, nitrogen-based fertilizers lead to emissions of nitrous oxide (N2O) and storage and handling of animal manure that release methane and nitrous oxide.

Besides the above, certain industrial activities, such as cement production and chemical manufacturing, directly release GHGs, production and use of synthetic chemicals, including fluorinated gases (HFCs, PFCs, SF6), used in refrigeration, air conditioning, and industrial processes, are very powerful greenhouse gases and landfills that produce methane as organic waste decomposes. Wastewater treatment also releases methane and nitrous oxide.

It is thus crucial to recognize that while natural factors cause some variability, it is the human activities, particularly the burning of fossil fuels and land-use changes, are the dominant cause of the accelerated global warming observed in the last century and a half century.

Effects of Global Warming:

The impacts of global warming are far-reaching and affect virtually every aspect of our planet and human life. Global average temperatures have increased significantly since the Industrial Revolution, leading to more frequent and intense heat waves. Shifting temperatures and weather patterns have disrupted ecosystems, forcing plant and animal species to migrate or face extinction, glaciers and polar ice caps are melting at an accelerated rate contributing to rising sea levels threatening low-lying coastal areas and islands are inundating increasing the risk of storm surges.

Because of global warming There is extreme weather events, food and water scarcity health impacts and economic consequences like reduced agricultural productivity, and impacts on infrastructure and human health. India leading to effects on GDP annually due to climate change.

Each year scientists learn more about the consequences of global warming, and each year we also gain new evidence of its devastating impact on people and the planet. They touch on every facet of our lives—our economy and livelihoods, our health, our food supply, and our ways of life. Heat stress is killing workers. Allergies, asthma, and infectious disease outbreaks are becoming more common due to increased growth of pollen-producing ragweed, higher levels of air pollution, and the spread of conditions favorable to ticks and mosquitoes. Communities are migrating from scorched or flooded homelands. Melting ice is reshaping environments and impacting lives from the mountains to the coasts.

Educating for Climate Action

Global warming, characterized by the progressive increase in Earth's average surface temperature, stands as the most formidable environmental challenge of our era. Its far-reaching consequences, from escalating sea levels and extreme weather events to biodiversity loss and food insecurity, threaten the very fabric of human civilization and natural ecosystems. While scientific research continues to deepen our understanding of this crisis, and technological innovations offer promising solutions, the fundamental shift required to effectively mitigate and adapt to global warming lies in transforming human behavior and societal structures. At the heart of this transformation is education, a powerful and indispensable tool capable of fostering awareness, inspiring action, and cultivating the collective will necessary to navigate this complex global crisis.

Thus, it is evident, education serves as the primary means for building the basic knowledge about global warming. Understanding the science behind the greenhouse effect, the sources of greenhouse gas emissions, and the projected impacts is paramount. Climate education should begin early, integrating age-appropriate concepts into school curricula, from primary grades through higher education. This foundational learning equips individuals with the facts necessary to grasp the urgency of the situation, dispelling misinformation and countering climate change denial. By explaining complex scientific principles in an accessible manner, education can demystify the crisis, making it relatable and actionable. It's not just about memorizing facts, but about developing a critical understanding of how human activities are altering the planet's delicate balance and what the implications of these alterations are. Comprehensive climate literacy empowers individuals to discern credible information from propaganda, fostering informed decision-making in their personal lives and as engaged citizens.

Beyond mere awareness, education is crucial for cultivating behavioral changes and promoting sustainable lifestyles. Knowledge without action is insufficient. Effective climate education must inspire a sense of responsibility and empower individuals to adopt more environmentally conscious habits. This includes teaching about energy conservation in homes, reducing consumption, promoting the principles of reduce, reuse, and recycle, encouraging sustainable transportation choices, and advocating for plant-rich diets. Education can highlight the cumulative impact of individual actions, demonstrating that small, consistent efforts by many can lead to significant collective change. For instance, understanding the carbon

footprint associated with different products or activities can motivate more thoughtful consumption patterns. Furthermore, education can delve into the economic benefits of sustainability, such as cost savings from energy efficiency, thereby incentivizing eco-friendly choices not just as an ethical imperative but as a practical advantage. By fostering an environmental ethic, education transforms passive recipients of information into active participants in sustainable living.

Also, education is the foundation for innovation and the development of scalable solutions. Addressing global warming requires not only behavior modification but also revolutionary scientific and technological advancements. Education systems must prioritize STEM (Science, Technology, Engineering, and Mathematics) fields, encouraging research and development focused on renewable energy, carbon capture technologies, sustainable agriculture, and climate-resilient infrastructure. Interdisciplinary approaches are vital, bridging environmental science with engineering, economics, social sciences, and policy studies to create holistic solutions. Universities and research institutions play a critical role in training the next generation of climate scientists, engineers, policymakers, and entrepreneurs who will design and implement the solutions of tomorrow. By investing in education, societies invest in their capacity for future innovation, driving the transition to a low-carbon economy and creating green jobs. This forward-looking aspect of education is about equipping individuals with the skills and knowledge to invent and deploy the tools needed for a sustainable future.

Education can also play a noteworthy role in fostering policy advocacy and civic engagement. An informed population is a powerful force for change. Through education, people can learn about various climate policies, understand their consequences, and actively engage in democratic processes to support effective environmental legislation. This includes understanding the role of international agreements, national policies, and local regulations in addressing climate change. Educated citizens are more likely to vote for environmentally conscious leaders, support carbon pricing mechanisms, demand renewable energy infrastructure, and hold corporations accountable for their environmental impact. Education can empower individuals to engage in grassroots movements, community-based initiatives, and public discourse, creating a strong societal demand for climate action that transcends political divides. It transforms abstract scientific concepts into tangible civic duties, reinforcing the idea that environmental stewardship is a shared responsibility.

Education is also crucial for creating sensitivity about environmental challenges, especially with respect to global warming and for fostering informed action and promoting sustainable practices. Here's a breakdown of how this can be achieved, encompassing various educational approaches and key considerations:

Foundational Understanding and Scientific Literacy:

It is important to start with introduction of this concept of climate change and global warming at an early stages of life. This can be done by introducing concepts related to climate and the environment in primary education, using age-appropriate language and engaging activities. Sensitization efforts through education should continue and so in higher grades, the focus should be on the scientific basis of global warming. This can be done by explaining the Greenhouse Effect i.e. describing how greenhouse gases (CO_2, methane, etc.) trap heat in the atmosphere, how human activities disrupt the natural carbon cycle, presenting compelling evidence of global warming (rising temperatures, melting glaciers, sea-level rise, extreme weather events) supported by data and scientific consensus and clearly identifying major human-induced sources of greenhouse gas emissions (fossil fuels, deforestation, industrial processes, agriculture).

In addition, it would be necessary to encourage students to evaluate information from various sources, distinguish between credible scientific evidence and misinformation, and understand the difference between weather and climate and learn about the impact and consequences of global warming (Relatability and Urgency) which means connecting global warming to real-world impacts that students can relate to in their own communities and regions, broadening the scope to include global consequences like impact assessment of coastal communities worldwide, increased frequency and intensity on droughts, floods, storms, and heatwaves, effects on global food production and distribution and water and other resource shortages.

Equally important educational intervention should be to emphasize that the decisions made today will significantly impact future generations. This can be done by educating about ways to reduce greenhouse gas emissions through renewable Energy like solar, wind, hydro power, reducing energy consumption in homes, schools, and industries. The sensitization programme should also entail day to day activities also like encouraging sustainable transportation like public transport, cycling, walking, electric vehicles and sustainable Agriculture: Practices that reduce emissions

and improve soil health and forestry and Reforestation: Importance of trees as carbon sinks.

Adaptation Strategies: like discussing how societies can adapt to the unavoidable impacts of climate change, and initiating individual Actions like empowering students by highlighting the collective impact of individual choices through teaching Reduce, Reuse, Recycle i.e. Waste management, Conscious Consumption i.e. by sustainable consumer choices and by encouraging participation in climate initiatives and policy discussions.

Pedagogical Strategies

The pedagogical strategies would be of immense value in this respect. Experiential learning by encouraging Field Trips like visits to renewable energy plants, waste management facilities, local conservation areas, creating School Gardens for understanding food systems and sustainable agriculture, and Citizen Science Projects like participating in data collection related to local environmental changes would make a significant improvement in this regard. Project-Based Learning, Debates and Discussions and lectures by Guest Speakers could foster critical thinking and allow students to explore different perspectives on climate solutions and challenges would also add great value to sensitize students about the dangers of global warming and enable them to take proactive steps for mitigating it.

Creating a Culture of Sustainability within Schools could be another necessary initiative to make students aware about global warming and its effects. The development of a culture of sustainability would help much in sensitizing students towards the threats of global warming. Schools can implement sustainable practices themselves (energy-efficient buildings, waste reduction programs, water conservation. students may be empowered to lead environmental clubs, recycling programs, and awareness campaigns and schools mat be connected with local environmental organizations and involve parents and the wider community in climate action.

At the grassroot -level the following steps, if taken, could also be of benefit in this regard.

- **Integrating Climate Change into Curricula (Climate Change Education - CCE):**

  Moving beyond just science, CCE needs to be interdisciplinary, woven into subjects like geography, economics, politics, ethics, arts, and social studies. This helps students understand the complex, interconnected nature of the climate crisis.

  Scientific Literacy could be yet another step in

this direction. Equipping students with a strong understanding of climate science, including the causes, mechanisms (e.g., greenhouse gases, carbon cycles), and predicted impacts of global warming, referencing scientific consensus like that from the IPCC could do a lot to create awareness about climate change and encourage students to take necessary steps to lessen it.

Action-Oriented Learning could be an innovative step in this regard. A conscious shift from rote memorization to practical skills and real-world problem-solving would be very useful in this respect. This could include developing competencies for a low-carbon economy and green jobs, fostering the ability to analyze climate-related information, discern misinformation, and make informed decisions, encouraging sustainable practices in daily life, such as energy conservation, waste reduction, and responsible consumption and empowering students to participate in climate action, advocate for policy changes, and lead initiatives in their communities. Tailoring climate education to local contexts, addressing specific climate impacts and solutions relevant to students' communities, recognizing and addressing climate anxiety in young people, providing safe spaces for discussion, and fostering a sense of hope and agency and ensuring climate education as a continuous process from early childhood through adult education, adapted to different developmental stages would be very necessary in this regard.

Other Interventions

Besides the above, other critical steps envisaged to create a positive awareness about global warming are mentioned hereunder.

- **Reforming Education Systems:** This would include -
  - Mandating climate literacy across the national education framework (NEP 2020) and embedding environmental objectives into education sector plans and national development strategies.
  - Providing continuous training for educators on environmental science, effective teaching methodologies, and how to address the emotional aspects of climate change with students. Many teachers currently feel unprepared to teach about climate change.
  - "Greening" Schools and Institutions by effective curriculum Co-Design. This could be done by involving students and communities in the development of climate education curricula to

ensure relevance and engagement.

  – Integrating sustainable practices into the daily functioning of schools, serving as living examples of climate action, and

  – Investing in climate-resilient school buildings that can withstand extreme weather events (e.g., improved drainage, reinforced structures), utilizing renewable energy sources (e.g., solar panels), and implementing waste reduction programs.

- **Addressing Disruption and Inequality:** This would entail -

  – Ensuring that all schools, especially those in low-income regions, have the necessary resources to implement effective climate change education.

  – Developing strategies to ensure learning continuity during climate-induced disruptions (e.g., floods, heatwaves, droughts) through digital learning platforms, community and

  – Recognizing that climate change disproportionately affects marginalized communities and girls, and implementing policies to safeguard their access to education, and

  – Funding research in climate change and education to generate new information, develop effective teaching resources, and continuously monitor and evaluate the impact of educational reforms.

- **Fostering a Culture of Care:** This would include -

  – Emphasizing the importance of values, attitudes, and behaviors that promote a culture of care for the environment.

  – Helping students understand their role in shaping a sustainable future and encouraging intergenerational dialogue on climate action, and

- Nurturing collaboration between ministries of education and environmental ministries, as well as with NGOs, communities, and international organizations (like UNESCO and UNICEF) to create a coordinated approach to climate education.

In essence, transforming education in the context of global warming means moving towards an Education for Sustainable Development (ESD) model. This approach empowers learners with the knowledge, skills, values, and attitudes to address the complex challenges of climate change and contribute to a more just and sustainable world. It's about preparing learners not just to understand the crisis, but to be active agents of change.

Challenges in Implementing Effective Climate Education.

Despite its immense potential, implementing effective climate education faces several challenges. These include the need for a meaningful curriculum development, effective training for educators, overcoming political resistance to climate science, and ensuring equitable access to quality education globally. To make it happen, there would be a need for strategies for integrating climate change across all subjects, not just science; providing professional development for teachers to ensure they are well-versed in climate science and pedagogy; utilizing digital resources and online platforms to reach broader audiences; fostering partnerships between educational institutions, NGOs, and governments; and promoting experiential learning opportunities, such as field trips, citizen science projects, and community garden initiatives. Furthermore, education must be adaptive, continuously evolving to incorporate new scientific findings and technological advancements, ensuring that learning remains relevant and impactful. Intergenerational dialogue, where elders share traditional ecological knowledge and youth bring fresh perspectives, can also enrich climate education.

In conclusion, education is not merely an optional addition to global warming strategies; it is the cornerstone of any successful and sustainable response. By fostering deep understanding, promoting responsible behavior, catalysing innovation, and empowering civic engagement, education can cultivate a globally conscious citizenry capable of confronting and overcoming the immense challenges posed by climate change. It is an investment in human capital, transforming individuals into agents of change and equipping societies with the intellectual and moral fortitude required to transition to a more sustainable and equitable future. As the climate crisis intensifies, the imperative to educate—comprehensively, critically, and consistently—becomes ever more urgent, standing as our most potent defence and our greatest hope for a liveable planet.

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FEATURE ARTICLE

सर्वश्रेष्ठमानवीयमूल्यमनुशासनम्

डॉ0 धनंजय कुमार मिश्रः *

सार संक्षेपः

भारतवर्षं सप्तसप्ततिः अधिकवर्षतः स्वतन्त्रो जातः। राजनैतिकस्वातन्त्र्येण सह आर्थिकी स्वतन्त्रतापि अभवत्। वैज्ञानिकी प्रगतिश्चापि जाता परं सांस्कृतिकीचेतना अवनतिं गता। मानवमूल्यानां ह्रासः जातः, विकासादधिक ह्रासभावः दृष्टिगोचरः जातः। लोकाः निर्भयात् अर्थसंग्रहहेतो अनैतिकान् कार्यान्प्रति उन्मुखाः अभवन्। लोकाः उपद्रवे, अपहरण, अशान्तौ, उत्कोचे, संग्रहणे, व्यभिचारे, प्राणघाते संलग्ना जाताः। प्रतिदिनम् एताः घटनाः राष्ट्रप्रेग्णिमानसं आन्दोलितम् अकुर्वन्। अस्मात् सांस्कृतिक दुरवस्थातः क्षुब्धो अस्यामपनयायमानवोचितानुचितज्ञानसंवर्धनाय विद्वासः कार्याणि कुर्वन्ति। महाकविरचनासु अन्तर्हितान् मानवमूल्यान् उद्घाटयितु जनाः प्रयासं अकुर्वन्। अहं मन्ये मानवजीवने अनुशासनस्य महती आवश्यकता भवति। अनुशासनं विना शिक्षायाः कल्पना निर्थका। अनुशासनस्य अर्थः अस्ति नियमानां पालनं, आज्ञायाम् पालनं, सन्मार्गस्य अनुसरणम्। नियमानुसारं कार्यम् अनुशासनयुक्तकार्य कथ्यते। प्रत्येकदेशस्य समाजस्य केचित् नियमाः भवन्ति। तेषां पालनेन एव तेषां स्थितिः भवति अन्यथा सः समाजः देशः वा विखण्डितः भवति। अस्मिन् पत्रे अनुशासनस्य आवश्यकता प्रतिपादितास्ति।

कूटशब्दाः – मानवमूल्यानि, अनुशासनम्, श्रुतयः, उपनिषद्, सदाचारः, सन्मार्गम्।

भूमिका :– अस्मिन् संसारे मनुष्ययोनितः विशिष्य न किञ्चिदपि वर्तते। मनुष्यः प्रयासेन स्वस्मिन् दैविकगुणान् समावेशितुं शक्नोति पाश्विकवृत्तिञ्च स्वीकृत्य गर्ते पतितुं शक्नोति वा। मूल्यपरायणस्य सुसंस्कृतव्यक्तित्वस्य निर्माणं मनुष्यस्य लक्ष्यं वर्तते। अनेन परिवारात् विश्वं यावत् सुखस्य शान्तेः समृद्ध श्च वातावरणं प्रशस्ततरं भवति। यावत् मूल्यस्य स्वरूपबोधः न जायते, कार्यरूपे न स्वीक्रियते, आत्मनि न अनुस्यूयते तावत् सुसंस्कृतव्यक्तेः निर्माणम् असम्भवम्।

मानवमनसः द्वे गती वर्तते – प्रवृत्तिः निवृत्तिश्च।1 अनयोः निवृत्तिः श्रेष्ठा परन्तु प्रवृत्तिः यदि लोकपरायणा लोकोपकारिका वा स्यात् तर्हि सापि श्रेयस्करी। स्वं परित्यज्य परोन्मुखीभावः एव मानवीचेतना भवति। अनयोः आलोचनेन मानवमूल्यानि आविर्भूतानि भवन्ति।

मानवमूल्यानि :–

महान्तः ऋषयः मुनयः तपस्विनः महात्मानः जीवनस्य सम्यक् संचालनाय यं मार्गम् आचरणं स्वीकृतवन्तः अद्य तदेव अस्माकं आदर्शः, मानवमूल्यम् अक्षयनिधिश्च। उक्तं च —

" तर्कोऽप्रतिष्ठः श्रुतयो विभिन्ना
नैको ऋषिर्यस्य मतं प्रमाणम्।
धर्मस्य तत्त्वं निहितं गुहायाम्
महाजनो येन गतः स पन्थाः।।"2

स्वस्य बन्धनं विमुच्य परमप्रवृत्तिः एव मानवमूल्यस्य संवर्धनस्य प्रतीकम्। एका मनुष्यस्य ऊर्ध्वमुखी प्रवृत्तिः अपरा च निम्नाभिमुखी प्रवृत्तिः। एकस्य आश्रयेन मनुष्यः मानवतः महामानवः देव अपि भवितु शक्नोति, अपरस्य च आश्रयेन राक्षसः चाण्डालः अध मावधमः कीटः पतंगादिः भवितुं शक्नोति। शिक्षायाः धर्मस्य नीतेः विज्ञानादीनां सर्वेषां इदमेव उद्देश्यं अन्ततः भवति यत् मानवं महामानवं निर्मातुं स्यात्।

धर्मशास्त्रेषु विधिनिषेधयोः वर्णनं प्राप्यते।3 एतयोः ज्ञानं परमावश्यकम्। यावत् उभयोः सम्यक् ज्ञानं न भवति तावत् निषेधस्य वर्णनं विधेश्चाचरणं पालनं न च क्रियते। पुनश्च मनसि संकल्पस्य आचरणस्य ज्ञानमपि आवश्यकम्। सन्देहे दोलायमाने न किमपि भवति। अतः मूल्यज्ञानं मूल्यसंकल्पः मूल्याचरणं सर्वथा स्वीकार्यम्।

ज्ञानात् श्रेष्ठः विज्ञानम्, विज्ञानमेव सम्यक् ज्ञानम्। कस्मिन्नपि देशे काले परिस्थितौ जनसामान्यस्य उदात्तमान्यताः एव मानवमूल्यानि। अस्य द्विधा धारा भवति – प्रथमा व्यक्तेः उदारीकरणं द्वितीया च वृहत्तरं लोककल्याणम्। अनया दृष्ट्या सर्वे सद्गुणाः भावाः विचाराः आदर्शाः मर्यादाः सिद्धान्ताः नीतयः परम्पराः नियमाः मानवमूल्यश्रेण्यां आगच्छन्ति।

साम्प्रतिक स्थितिः – भारतवर्षं सप्तसप्ततिः अधिकवर्षतः स्वतन्त्रो जातः। राजनैतिकस्वातन्त्र्येण सह आर्थिकी

* विभागाध्यक्षः विश्वविद्यालयसंस्कृतविभागस्य, सिदो-कान्हु मुर्मू विश्वविद्यालयः, दुमकानगरम् (झारखण्ड) 814110

स्वतन्त्रतापि अभवत्। वैज्ञानिकी प्रगतिश्चापि जाता परं सांस्कृतीचेतना अवनतिं गता। मानवमूल्यानां ह्रासः जातः, विकासादधिक ह्रासभावः दृष्टिगोचरः जातः। लोकाः निर्भयात् अर्थसंग्रहहेतो अनैतिकान् कार्यान्प्रति उन्मुखाः अभवन्। लोकाः उपद्रवे, अपहरणे, अशान्तौ, उत्कोचे, संग्रहणे, व्यभिचारे, प्राणघाते संलग्ना जाताः। प्रतिदिनम् एताः घटनाः राष्ट्रप्रेष्णि मानसं आन्दोलितम् अकुर्वन्। अस्मात् सांस्कृतिक दुरवस्थातः क्षुब्धो अस्यामपनयायमानवोचितानुचितज्ञानसंवर्धनाय विद्वांसः कार्याणि कुर्वन्ति। महाकविरचनासु अन्तर्हितान् मानवमूल्यान् उद्घाटयितुं जनाः प्रयासं अकुर्वन्।

श्रेष्ठतमं मानवमूल्यमनुॅशासनम् :-

अहं मन्ये यत् अनुशासनं मानवमूल्येषु श्रेष्ठतमम्। अनु उपसर्गपूर्वकं शास् धातोः ल्युट् प्रत्यये कृते 'अनुशासनम्' शब्दः निष्पद्यते।4 अनुशासनस्य अर्थः अस्ति नियमानां पालनं, आज्ञायाम् पालनं, सन्मार्गस्य अनुसरणम्।5 नियमानुसारं कार्यम् अनुशासनयुक्तकार्य कथ्यते। प्रत्येकदेशस्य समाजस्य केचित् नियमाः भवन्ति। तेषां पालनेन एव तेषां स्थितिः भवति अन्यथा सः समाजः देशः वा विखण्डितः भवति।

जीवने अनुशासनस्य विशेषं महत्त्वम् अस्ति। अनुशासनं विना जीवनम् अनियमितं भवति। नियमितं जीवनं विना मनुष्यः उन्नतिं कर्तुं न शक्नोति। तेषां विचाराः भिन्नरूपाः भवन्ति। यदि ते सर्वे स्वेच्छाचारितां आचरेयुः तर्हि समाजस्य विनाशः सुनिश्चितः एव। सामाजिकव्यवस्थास्थापनाय अपि सामाजिक अनुशासनं आवश्यकम्।

वयं पश्यामः यत् प्रकृतिः अपि अनुशासनबद्धा भवति। सूर्यः स्वकाले उदेति चास्तं गच्छति। पूर्वस्याम् एव सूर्योदयः भवति न तु कदापि प्रतीच्यां दिशि। यदि सूर्यः नियमानुसारं न उदेतु तर्हि अस्माकं जीवनम् अपि न सम्भवतु।

प्राणीनां जीवने अनुशासनस्य महती प्रतिष्ठा वर्तते। यदा मनुष्यः अनुशासनपूर्णः भवति, तस्यप्रभावेण सः नितरां प्रगतिपन्थानं गच्छति। तं दृष्ट्वा अन्ये अपि जनाः अनुशासने तिष्ठन्ति। एवम् अनुशासनस्य परम्परा वर्धते।

स्वशासनम् एव अनुशासनम् कष्टायते। अन्य शब्देषु पूर्व निर्धारितानां नियमानां पालनं गुरुणाम् आज्ञानुपालनं च अनुशासनमन्तर्गतमायाति। अतिभाषी अनाज्ञाकारी च नरः अधमः भवति। तदेव व्यक्तिगतमनुशासनं विकसितं भूत्वा सम्पूर्णं राष्ट्रे प्रसरति। इत्थं सम्पूर्णं राष्ट्रे यदा अनुशासने बध्यते तदा सुखं समृद्धिः सर्वत्र प्रसरति। तत्र न रोगो न शोको न दारिद्र्यं क्वचित् भवति। प्रजाः आनन्दयुक्ताः भवन्ति। अन्ये देशाः अपि अनुशासनसम्पुष्टात् राष्ट्राद् बिभ्यन्ति। राष्ट्रस्य शक्तये, सामर्थ्याय, तेजोवृद्धये अनुशासनस्य अत्यावश्यकता वर्तते।

अनुशासनहीनस्य व्यक्तेः जीवनं जघन्यं, तस्य सर्वे गुणाः सर्वाः विशिष्टताः नष्टाः एव। एवं च अनुशासनरहितस्य मनुष्यस्य

जीवनमपि दुःखायितं, निष्फलम्। सर्वं दौर्भाग्यं तस्योपरि आगच्छति। तस्य जीवनस्य शान्तिः नश्यति। अनुशासनं विना जीवनं दुःखमयं विघ्नमयं च भवति। यदि रेलचालकः अनुशासनं त्यजेत् तर्हि दुर्घटना अवश्यमेव भविष्यति। विना अनुशासनेन विद्यार्थिनः गुरुणाम् आज्ञापालनं न करिष्यन्ति, अध्ययनं प्रति सावधानाः न भविष्यन्ति, अतः ते सफलाः न भविष्यन्ति। अनुशासनम् विनयेन भवति। विनयं च विद्यया भवति। सत्यमेव उक्तं —

विद्या ददाति विनयम्, विनयात् याति पात्रताम्।
पात्रत्वाद् धनमाप्नोति, धनात् धर्मः ततः सुखम्।। 6

निःसन्देह सुखस्य आधारशिला अनुशासनमेव। अनुशासिताः जनाः सर्वेषाम् प्रियाः भवन्ति, निरन्तरम् उन्नतिं च कुर्वन्ति।

राजनैतिकदलेषुअपि अनुशासनस्य महती आवश्यकता। यस्मिन् दले अनुशासनस्य अभावः भवति, तस्य सदस्याः स्वेच्छाचारिणः भूत्वा दलस्य विनाशं कुर्वन्ति। प्रजातन्त्रे अनुशासनस्यापेक्षा सर्वत्र अस्ति। अतएव दत्ता शुभाशंसा। यथा —

सर्वस्तरतु दुर्गाणि सर्वो भद्राणि पश्यतु।
सर्वः कामानवाप्नोतु सर्वः सर्वत्र नन्दतु।। 7

सर्वे भवन्तु सुखिनः सर्वे सन्तु निरामयाः।
सर्वे भद्राणि पश्यन्तु मा कश्चिद् दुःखभाग् भवेत्।। 8

कल्याणमस्तु सर्वेषां विलसन्तु समृद्धयः।
सुखाः समीरणा वान्तु भान्तु सर्वा दिशः शुभाः।। 9

राष्ट्रजीवने अनुशासनस्य महत्त्वं सर्वे जानन्ति। अस्माकम् एकम् संविधानम् अस्ति। तत्र नागरिकैः अनुवर्तनीयाः वहवः नियमाः सन्ति। अनुशासितनागरिकस्य इदं कर्तव्यम् अस्ति यत् सः स्वसंविधानस्वीकृतान् नियमान् पालयतु। यदि सः तदा करोति तेन तस्य देशः समुन्नतिं करोति। यदि सः अनुशासनहीनतां प्रदर्शयति, तदा तस्य राष्ट्रजीवनं संकटापन्नं भवति।

यस्मिन् देशे य आचारः पारम्पर्यक्रमागतः।
वर्णानां सान्तरालानां स सदाचार उच्यते।।10

आचार्यः स्वकीयेन आचरेण आचार्यः भवति। यदि आचार्यस्य जीवने आचारस्य स्थानं नास्ति तर्हि छात्राः अपि आचारं न परिपालयन्ति। अनुशासित आचार्यः एव पथ–प्रदर्शकः भवितुं शक्नोति।

उपनिषदि अस्य चर्चा विस्तृतरूपेण अस्ति। यथा तैत्तिरीयोपनिषदि अनुशासनस्य स्वरूपम् व्यापक रूपेण वर्णितम् अस्ति —

''वेदमनुच्याचार्योऽन्तेवासिनमनुशास्ति। सत्यं वद। धर्मं चर। स्वाध्यायान्मा प्रमदः। आचार्याय प्रियं धनमाहत्य प्रजातन्तुं मा व्यवच्छेत्सीः। सत्यान्न प्रमदितव्यम्। धर्मान्न

प्रमदितव्यम्। कुशलान्न प्रमदितव्यम्। भूत्यै न प्रमदितव्यम्। स्वाध्यायप्रवचनाभ्यां न प्रमदितव्यम्। देवपितृकार्याभ्यां न प्रमदितव्यम्।''

''मातृदेवो भव। पितृदेवो भव। आचार्यदेवो भव। अतिथिदेवो भव। यान्यनवद्यानि कर्माणि। तानि सेवितव्यानि। नो इतराणि। यान्यस्माकं सुचरितानि। तानि त्वयोपास्यानि। नो इतराणि। ये के चास्मच्छ्रेयांसो ब्राह्मणाः। तेषां त्वयाऽऽसनेन प्रश्वसितव्यम्। श्रद्धया देयम्। अश्रद्धयादेयम्। श्रिया देयम्। ह्रिया देयम्। भिया देयम्। संविदा देयम्।''

''अथ यदि ते कर्मविचिकित्सा वा वृत्तविचिकित्सा वा स्यात्। ये तत्र ब्राह्मणाः सम्मर्शिनः। युक्ता आयुक्ताः। अलूक्षा धर्मकामाः स्युः। यथा ते तत्र वर्तेरन्। तथा तत्र वर्तथाः। अथाभ्याख्यातेषु। ये तत्र ब्राह्मणाः सम्मर्शिनः। युक्ता आयुक्ताः। अलूक्षा धर्मकामाः स्युः। यथा ते तत्र वर्तेरन्। तथा तत्र वर्तथाः। एष आदेशः। एष उपदेशः। एषा वेदोपनिषत्। एतदनुशासनम्। एवमुपासितव्यम्। एवमु चैतदुपास्यम्।'' 11

अनुशासनम् सदाचारेण सत्संगतेः च वर्धते। 'आचारः परमो धर्मः' इति सर्वे जानन्ति। उक्तं च –

यद्यदाचरति श्रेष्ठस्तत्तदेवेतरो जनः।
स यत्प्रमाणं कुरुते लोकस्तदनुवर्तते।।12

श्रेष्ठजनानाम् आचरणम् एव सदाचारः शीलम् वा कथ्यते। सत्पुरुषाः शास्त्रविहितं प्रशस्तं कार्य कुर्वते, इतरे जनाः तदेव अनुसरन्ति। इति शास्त्रविहितं मतम्। शीलमेव जीवनस्य परमं भूषणम् भवति। सदाचारी जनः शिष्टः, सभ्यः, विनीतः, विनम्रः च भवति। सः परदारेषु मातृवत्, परधनेषु लोष्ठवत्, सर्वभूतेषु च आत्मवत् पश्यति।13 वाक्संयतो भूत्वा सः कामक्रोधादीन् विकारान् निगृह्य कर्मसु प्रवर्तते। सदाचारस्य परिपालनात् एव श्रीरामचन्द्रः मर्यादापुरुषोत्तमः14 इति विश्रुतः अभवत्।

अनुशासनप्रियः मनुष्यः नूनं सज्जनः भवति। सज्जनस्य जीवने केचन गुणाः भवन्ति। कैश्चित् गुणैः विना कोऽपि जनः सज्जनः न भवति। सत्संगतेः मनुष्ये शनैः–शनैः गुणाः निविशन्ति, दुर्गुण ाश्च एकैकं बहिः गच्छति। सत्सङ्ग दोष गुणाः भवन्ति। भारतीयजनमानसे अनुशासनस्य रूपं पदे–पदे दृष्टिगोचरं भवति। यथा –

सत्यं ब्रूयात् प्रियं ब्रूयात् न ब्रूयात् सत्यमप्रियम्।
प्रियं च नानृतं ब्रूयात्   एष धर्मः सनातनः।।15

श्रेष्ठं जनं गुरूं चापि मातरं पितरं तथा।
मनसा कर्मणा वाचा सेवेत सततं सदा।।16

सर्वदा व्यवहारे स्यात् औदार्य सत्यता तथा।
ऋजुता मृदुता चापि कौटिल्यं न कदाचन।।17

युक्ताहारविहारस्य युक्तचेष्टस्य कर्मसु।

युक्त स्वप्नावबोधस्य योगो भवति दुःखहा।। 18

प्रियवाक्यप्रदानेन सर्वे तुष्यन्ति जन्तवः।
तस्मात्तदेव वक्तव्यं वचने का दरिद्रता।। 19

मित्रेण कलहं कृत्वा न कदापि सुखी जनः।
इति ज्ञात्वा प्रयासेन तदेव परिवर्जयेत्।।20

प्रातःकाले त्यजेच्छय्यामीश्वरं प्रथमं स्मरेत्।
नित्यकर्माणि कृत्वा च कुर्यादध्ययनं ततः।।21

पापिनाश्च सदा दुःखं सुखं वै पुण्यकर्मणाम्।
एवं स्थिरतरं ज्ञात्वा साधुवृत्तिं समाचरेत्।।22

निष्कर्षः–

अन्ते वयं कथितुं शक्नुमः यत् मानवीयमूल्यानां सूचयः अतिदीर्घाः सन्ति। तेषु मानवीयमूल्येषु प्रेम, दया, सहानुभूति, सदाचार, त्याग, धर्मरक्षा, उत्साह, सहनशीलता, एकाग्रचित्तता, इन्द्रियनिग्रहः, भोगैश्वर्य–अनाशक्ति, कर्मवीरता, समता, अमोह, कर्तव्यनिश्चयता, स्थितप्रज्ञता, अद्वेष, प्रसन्नता, शान्ति, निरहङ्कारः, निःस्पृहता, सत्कर्म, अध्ययनं, अध्यापनं, कर्त्तव्यकर्मरुपस्वधर्मपालनं, सन्तोष, क्षमा आदयः मानवीयमूल्यानि एकमात्र अनुशासने तिष्ठन्ति। अतएव इयं उक्तिः माननीया –''सर्वश्रेष्ठमानवीयमूल्यमनुशासनम्''।

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3. चाणक्य नीति – चौखम्बा प्रकाशन,वाराणसी

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12. छान्दोग्योपनिषद् – गीता प्रेस गोरखपुर

13. वृहदारण्यकोपनिषद् – गीता प्रेस गोरखपुर

14. प्राचीन भारतीय संस्कृति – अक्षयवट प्रकाशन इलाहाबाद

15. आरोग्य अंक – गीता प्रेस गोरखपुर

লোককথা ও লোকসাহিত্যে ঝাড়খণ্ড সীমান্ত পশ্চিম বাংলার প্রকৃতিক খাদ্যাভাসের ধারাবাহিকতা: ক্ষেত্রসমীক্ষা ও বাস্তব অভিজ্ঞতা

ড.সলিল কুমার দত্ত *

সূচনা:

পৃথিবীর বুকে প্রাণ সৃষ্টির ইতিহাস নিয়ে নিরন্তর চলেছে নানা বিতর্ক। বিশেষত, মানব সভ্যতার উদ্ভব নিয়ে সমাধানের চেষ্টা চলেছে দুরন্ত গতিতে। প্রত্যেকটি ধর্ম সম্প্রদায়ের নিজস্ব বিশ্ব সৃষ্টি প্রাণী উদ্ভিদ ও প্রাকৃতিক উপাদান সৃষ্টির উদ্ভবতত্ত্ব, ডারউইনের তত্ত্ব প্রভৃতি। এছাড়া ও থাকছে নানাভাবে যুক্তিকে সমর্থন করার জন্য বিজ্ঞানের যুক্তি নির্ভর কাল নির্ণয়ের (dating) বিভিন্ন তত্ত্বও। সবারই লক্ষ্য বিবর্তনকে সঠিকভাবে জানা। পৃথিবীর সৃষ্টির প্রথম দিন থেকে বর্তমান কালের চলিত রূপের সঙ্গে অতীতের সম্পর্ক স্থাপন করা নিয়ে ভাবনা থেমে নেই। সাংস্কৃতিক বিবর্তনের ধারাবাহিকতায় সেই মধ্য প্রস্তর যুগের শেষের দিকে যখন লিপির আবিষ্কার হল, সেই সময়কাল থেকেই মানুষের অনুসন্ধানী চিন্তা ভাবনা ও গবেষণার মাধ্যমে জানার চেষ্টা এগিয়ে চলেছে কোন এক সঠিক পথের সন্ধানে। অনেক অজানা, কঠিন ও নিগূঢ় প্রশ্নের সমাধান হয়েছে। প্রতিনিয়ত সমাধানের চেষ্টাও হচ্ছে। তার জন্য প্রয়োজনে কখনো মাটি খোঁড়া(excavation), কখনো মাটির উপরে পড়ে থাকা উপাদান সংগ্রহ ও পর্যবেক্ষণ (exploration) কখনো বা বহু মানুষের পরম্পরাগত অভিজ্ঞতার ভিত্তি, তাঁদের ব্যবহার করা জিনিসপত্র, খাদ্যাভ্যাস, আবহমান কালের পরিধেয় পোশাক - পরিচ্ছদ, সাংস্কৃতিক আদান-প্রদান ও জীবন যাপনের ব্যবহারিক দিক পর্যবেক্ষণ ও সঙ্গে গল্প গাথা সংগ্রহের মাধ্যমে(circumstantial evidences)। এর পেছনে থাকছে নানা যুক্তি, বিজ্ঞানের তত্ত্ব এবং বরাবরই থাকছে তত্ত্ব ও তথ্যের আদান-প্রদান। ক্ষেত্র সমীক্ষায় উঠে আসে নানা গল্প গাথা যেখান থেকে বিভিন্ন ধরনের বিবর্তন কিংবা খাদ্যাভ্যাসের বিবর্তন উঠে আসে পরম্পরা যুক্তি ও অভিজ্ঞতার পসরা নিয়ে। যুক্তি ও তর্কনির্ভর বিজ্ঞানের তত্ত্ব ও তথ্যের মধ্যে যাচাই হচ্ছে, হতেই থাকবে। যাঁরা আফ্রিকার মানব সৃষ্টি তত্ত্বে(Out of Africa Theory) বিশ্বাসী তাঁরা সমালোচিত বহু দেশীয়(Multi Regional Evolution Theory)সৃষ্টিতত্ত্বের সমর্থকদের গবেষণায়। আবার কখনো বা একদল বিবর্তন বিজ্ঞানের উপাসক এদের দুটো দলকেই সমালোচনায় মিলেমিশে যাওয়া(Assimilation Theory)কে সমর্থন করেন। সমর্থন করেন মিলেমিশে একাকার নবপ্রজন্ম

কে। তবে প্রাক ইতিহাসের বস্তুতান্ত্রিক সংস্কৃতির বিবরণকে নৃবিজ্ঞানী ও বিভিন্ন গবেষকেরা যখনই সাংস্কৃতিক ভাবে পুনরুত্থান করেন তখনই চোখের সামনে ভেসে উঠে সেই অতি পরিচিত লোক পরিচালিত জানা তথ্য সংস্কৃতির কথা। আজ অনেক প্রমাণের কোন লিপি নেই, নেই বর্ণনার মাধ্যমে বোঝানোর কোনো বর্ণনাকার। আছে কেবল প্রমাণ হিসেবে পড়ে তাঁদের বস্তুতান্ত্রিক সংস্কৃতিগুলির ভগ্নদেশ(material remains)। তাঁদের ব্যবহৃত বস্তু সংস্কৃতির নানান উপাদান থেকে গবেষক ও বিজ্ঞানীরা সংস্কৃতি উদ্ধার করেন। জীবাশ্ম অনুসন্ধানীরা প্রায় সেই যে সকল জীবাশ্ম সন্ধানে থাকেন যার মধ্যে অন্যতম সেই সময়কার মানবকুলের ফেলে আসা উপাদান। তাঁদের খাদ্যাভ্যাস রচনায় পাওয়া যায় চালচলন, রীতি-রেওয়াজ, আরো আরো কত বর্তমান চলমান সভ্যতার আদলে ফেলা নতুন নতুন নামে প্রমাণের সাথে সামঞ্জস্য ও সমাধান (https://www.nature.com/scitable/)। লোকসাহিত্যে প্রকাশিত বহু তথ্য, নানা পত্র-পত্রিকা ও গবেষণা প্রবন্ধে প্রকাশিত হলেও এমন কিছু অংশ শূন্যস্থান থেকে গেছে যা বর্তমান গবেষণায় উঠে এসেছে এবং সেই সকল অংশ বর্তমান চলিত রূপরেখায় সামঞ্জস্য বিধান করে নৃতাত্ত্বিক ও শিক্ষাবিজ্ঞানের দর্শন দিয়ে ক্ষেত্রসমীক্ষার মাধ্যমে পুরনো ও নতুনের ঐতিহ্যের মেলবন্ধনের সুসামঞ্জস্য বিধানে বিশ্লেষণ করে দেখার চেষ্টা করা হয়েছে।

উদ্দেশ্য:

বর্তমান গবেষণা প্রবন্ধের মূল লক্ষ্য হল সুদীর্ঘ্য অতীত থেকে বিবর্তনের পথে পথে কিভাবে আজও বহু খাদ্য মানুষের প্রাগ্গতিহাসিক কালের ঐতিহ্য নিয়ে চলে আসছে আবহমান কাল ধরে সেই সম্পর্কীয় অনুসন্ধান। প্রকাশনা ও স্থানীয় মানুষের সাথে অংশগ্রহণের মাধ্যমে খাদ্য তালিকায় সংযুক্ত অতীত অভিজ্ঞতার মিশ্রণে আজকের খাদ্য মানুষের প্রাগ্গতিহাসিক কালের কতটা সাক্ষ্য বহন করছে তারই ধারাবাহিকতার অন্বেষণ ও বিশ্লেষণ। প্রাপ্ত তথ্যের বিশ্লেষণ করে বর্তমান কালের সাথে জিহ্বার তৃপ্তি, শক্তি সংগ্রহ ও মানসিক শান্তির একটা সঠিক ও বিজ্ঞান ভিত্তিক সম্পর্ক স্থাপন করা হয়েছে।

* *Teacher and Independent Researcher*

গবেষণা পদ্ধতি:

তথ্য সংগ্রহের জন্য ঝাড়খণ্ড - ওড়িশা সীমান্ত এলাকা ও পশ্চিম বাংলার পশ্চিমাঞ্চলের চারটি(পুরুলিয়া , বাঁকুড়া, ঝাড়গ্রাম ও পশ্চিম মেদিনীপুর) জেলার(গবেষক লেখক নিজেই এই এলাকার অধিবাসী) বর্তমান খাদ্য তালিকায় সংযুক্ত প্রাগৈতিহাসিক কালের খাদ্যের সম্পর্ক বোঝার জন্য অংশগ্রহণমূলক ক্ষেত্রসমীক্ষার মাধ্যমে তথ্য সংগ্রহ করা হয়েছে। প্রকাশিত বই, পত্র - পত্রিকা ও লোক সংস্কৃতির মধ্যে ছড়িয়ে থাকা লোক কথামালা ও প্রাপ্ত তথ্যের মেলবন্ধন করে বিশ্লেষণমূলক একটি গবেষণা প্রবন্ধ রচনা করা হয়েছে

প্রাপ্ত তথ্যের বিশ্লেষণ:

খ্রিস্টপূর্ব প্রায় ২৩ লক্ষ বছরের প্রাগইতিহাসের মানব বিবর্তনের পথের খাদ্য উপাদনের সংস্কৃতিতে ভবিষ্যতের মানুষের দাঁতের ধরন ও তাঁদের চোয়ালের আকার দেখে বর্তমান প্রজন্মের গবেষকরা ও নৃবিজ্ঞান উপাসকেরা নিরীক্ষণ পদ্ধতি ব্যবহার করেন। অনুমান করার চেষ্টা করেন কেমন দেখতে ছিলেন বর্তমান মানবকুল, সেই প্রায় মানুষের দিকে বিবর্তনের পথে এগিয়ে যাওয়া মানুষগুলো বা মানবকুল। গবেষণায় জানতে পারা যায়, এক শ্রেণির উঠতি মানব মুখী প্রাণীকুল চিরুনিদাঁতের (diastema) পরিবর্তে মানুষের মতো দাঁতের প্রানিকুলের পথে এগোনোর জন্য বন্য মানুষমুখী(মানুষের বিবর্তনের পথে এগুনো মানুষ) প্রাণীরা মোটা মোটা ঘাসের মূল এমনকী বাঁশের মূল ও খেতে পারতেন। অনায়াসে কচি বাঁশের মূল চিবিয়ে খেতেন। মানেটা এমনই দাঁড়ালো যে খাদ্যাভ্যাস ও তার প্রমাণ একে অপরের সঙ্গে হাত মিলিয়ে চলে এটা নানা ভাবে প্রমানিত। দাঁতের বিশেষত্ব, মানুষের খাদ্য সম্পর্কে প্রাগৈতিহাসিক ব্যবহার, প্রতিনিয়ত গবেষকদের ধারণায় ও চিন্তায় নতুন নতুন খবর দিয়ে যাচ্ছে। যুগ থেকে যুগান্তরে কেমন ভাবে রসনা তৃপ্তি করেছে তার হিসাব গবেষকদের কাছে আজ অনেকটাই পরিষ্কার হয়েছে। কৃন্তক বা ছেদক, কিম্বা পুরপেষক বা পেষক দাঁত যতই মুখগহ্বরের গাঠনিক বদল করেছে বলে প্রমাণিত হয়েছে ততই দেখা যায় এর পেছনে দায়ী একমাত্র খাদ্যাভাসের পরিবর্তনের ধারাবাহিকতা ও পরিতৃপ্তি। এর সঙ্গে যুক্ত হয়েছে প্রাকৃতিক উপাদান থেকে সংগৃহীত খাদ্যের সম্ভার (https://www.nature.com/scitable/……).

প্রকৃতির অপরূপ সম্ভার থেকে প্রাপ্ত প্রাকৃতিক খাবার দাবার দিয়ে জীবনের প্রয়োজনীয় শক্তি ও আত্মতৃপ্তি তখন কতটা ছিল তা গবেষকরা বিজ্ঞানভিত্তিক জানার চেষ্টা চালিয়ে যাচ্ছেন। কিন্তু দাবানলের আগুনে দগ্ধ প্রাণী ও উদ্ভিদের দেহবশেষ খেয়ে যে তাঁরা উল্লসিত হতেন এবং ক্রমান্বয়ে ঝলসানো খাবারে রসনা তৃপ্ত হতো তা তাদের বংশানুক্রমিক খাদ্য সম্ভারের জীবাশ্ম বিশ্লেষণ থেকে নানা ভাবে প্রমাণিত। কাজেই, রসনা তৃপ্তি ও দিনের শেষে কিংবা ঋতুবদলের প্রাকৃতিক পরিবেশে খাদ্য সামগ্রীর বদলে জিহ্বা ও মুখমণ্ডলের লালারসের মধ্যে নতুন কিছু স্বাদের সঞ্চার করত তা কালের কাছে আত্মসমর্পণের চিহ্ন দিয়ে অনুধাবন করা যায়।

বিবর্তনের সাক্ষী হিসেবে অনেক বড় মাথার মানুষ (Neandarthal sp.) বেশী দিন এই পৃথিবীতে থাকতে পারে নি। কিন্তু মাথার একটা বৃদ্ধি অন্যের থেকে অনেকটা বেশী মস্তিষ্ক বহণের জন্য থেকে গেল। মানুষের মাথাটা যত বড় হয়েছে, ততই খাবার তালিকায় পরিবর্তন হয়েছে। সে প্রায় কুড়ি লক্ষ বছরের বেশী ইতিহাস। বর্তমান মানুষের পূর্বপুরুষ যাঁরা প্রথম সোজা হয়ে দাঁড়াতে পারলেন (Homo erectus) অনেক বেশি খেতে পারতেন। তাঁরা বিভিন্ন প্রাণীর অস্থি মজ্জার সাথে পরম আনন্দে কম বা হালকা আঁশযুক্ত উদ্ভিদের নরম মূল ও খেতেন, যা পরবর্তী কালে খাদ্যনালী ও পাচন তন্ত্রের পরিবর্তন সাধন করে। হজমের প্রয়োজনে অন্ত্র ক্রমান্বয়ে সরু ও লম্বা হতে থাকে(BMDas, 2000)। কিন্তু প্রকৃতি থেকে শক্তি সংগ্রহ করতে তৎকালীন মানবকুল কোন দ্বিধা করতেন না। জিহ্বার তৃপ্তি অবশ্যই হত কিন্তু তা হত পছন্দের খাবার খেয়ে। দুই পায়ে দাঁড়িয়ে দুটো হাত মুক্ত হতেই খোসা ছাড়ানো বা মজ্জাগত খাবারের আসক্তি আসতে শুরু করে। ফলত: মস্তিষ্কের উন্নতি হতে পেরেছে অনেক দ্রুত। তাঁরা মাংস ও মজ্জা খেতে শেখায় মন ও শরীর দুটোই তৃপ্ত হত।

চাষবাস করতে পারা ও কৃষিকাজে নিয়োজিত থাকায় দ্রুত চিন্তাশীল করতে সাহায্য করে। যেদিন ওঁরা বুঝতে পারেন শস্য দিয়ে ক্ষুন্নিবৃত্তি সম্ভব, সেদিন থেকে চাষের প্রতি মনোযোগ দেখানো শুরু হল। সে ও নানা বিবর্তন। মানুষ খাদ্য সম্পর্কে সু - নিশ্চিত হতেই বিবর্তনের সাথে সাথে মানব সংখ্যা ক্রমান্বয়ে বাড়তে শুরু করলো। শিকারী পেশা থেকে স্থানান্তর চাষ ও পরে স্থায়ীচাষ ক্রমান্বয়ে তাদের পরম্পরা কে সংখ্যায় বাড়িয়ে তুলতে সাহায্য করল। সমান তালে বাড়ল খাদ্য তালিকা। বহু রকমের খাবারের আয়োজন ও নানা রকম ভিন্ন স্বাদের রসনা তৃপ্ত করতে যত্নবান হওয়ার সময় এসে গেল।

লক্ষ্য লক্ষ্য বছরের বিবর্তনের সাক্ষী মানুষের জীবনে বিশাল একটা পরিবর্তন এল আনুমানিক প্রায় ১০ হাজার বছর আগে বা তার আশপাশ সময়কালে। যখন গৃহপালিত প্রাণী সম্পদ ব্যবহার করে তাঁরা নিজেদের তৈরী খাবারও বদলে ফেললেন। সেই সময়কার মানুষের চেহারার বদল হল। খাদ্যাভ্যাসে আসল আমূল পরিবর্তন। কোনো কোনো প্রাণীর দুধ থেকে তৈরি হল নানা দুগ্ধজাত উপকরণ। সময়ের সাথে সাথে খাদ্যাভ্যাস আবার বদলাল। নতুন করে পরিবর্তন হল মস্তিষ্কের গঠন ও ক্ষমতা। খাদ্য পরিপাক করার ক্ষমতা ও

পদ্ধতি ক্রমান্বয়ে বদলে যেতে লাগল(সরকার, ২০০০)। খাবারের মধ্যে পছন্দের তালিকাও বদলে গেল ক্রমান্বয়ে। অসুখের হাত থেকে বাঁচতে যেমন বিশেষ খাবার বিশেষ ঋতুতে আগ্রহের সাথে খাওয়ার ঝোঁক আসতে লাগল, তেমনি রসনা ও যেন সময়ের সঙ্গে সঙ্গে নিজেকে তৃপ্ত করার জন্য ঔৎসৌক্য দেখাতে শুরু করল (ভট্টাচার্য, ১৯৭২)।

শিকারী মানুষেরা যখন শিকার পেতেন না, তাঁদের শরীরের শক্তির উৎসের সন্ধানে তখন বাধ্য হতে হয়েছিল প্রাকৃতিক খাবার সন্ধানে। আগুন তখন অনেকটাই করায়ত্ত। প্রয়োজনে আগুন তৈরি করা যায়। আর জ্বালানির তো অভাব ছিলই না। তাই প্রাকৃতিক ও প্রাণিজ নানা খাবারের সঙ্গে আগুনের ব্যবহারে নানা খাবারের প্রায়োগিক প্রস্তুতি বিধি ও সন্ধান ও সেই প্রয়োজনেই অনেক সময় করতে বাধ্য হয়। তারই ফলে হল নতুন করে স্বাদের অভিজ্ঞতা মননে এল জিহ্বার তৃপ্তি, কিছুটা তৃপ্ত হল মন। তখনই নানা শব্দ ভান্ডারের ব্যবহারে নিজেদের মধ্যে কথার আদান-প্রদান চলত, তাই শুরু হয়েছিল নানা রূপ খাদ্য প্রস্তুতি ও তার নানা নামকরণ। মরশুমি বুনো ফসলকে আপন হাতে নতুন করে সভ্যতার সাহসিকতার ছায়া দিয়ে তৈরি করে নতুন নতুন সব খাবার আর লক্ষ্য থাকে তার গুনাগুন এর যথার্থতা বজায় রেখে সঠিক শক্তি সংগ্রহ করা।

কালক্রমে সময় বদলায়। চাষ থেকে উৎপন্ন ফসল ও গৃহপালিত পশু পাখিদের দেহের অংশে খাদ্য সমস্যা মেটানোর ফলে জীবনে আসে নিশ্চয়তা। আসে অভিজ্ঞতা সমন্বয়ে নিজেদের মধ্যে তা বিনিময়ে ও পরীক্ষা- পর্যবেক্ষণ-সিদ্ধান্ত, মানে, নানা প্রাকৃতিক উপকরণে তার পরিপক্কতা আনয়ন এবং রসনা তৃপ্তির মাধ্যমে। এলো শ্রুতি ও শ্রুতিময় কথামালা। যা পরে লিখিত হল পাথরের খাঁজে , গুহার দেওয়ালে, লোক সাহিত্যের মোড়কে। ক্রমে যখন সময় বদলানোর প্রয়োজনের চাহিদায় লিপির আবিষ্কার হল। মধ্য প্রস্তর যুগের শেষের দিকে মানুষ বনের মধ্যে পর্নকুঠিরে কিম্বা গুহার মধ্যে থেকেই বর্ণ তৈরি করল। সামাজিক বিবর্তনে জঙ্গলের বুনো ভাব কাটিয়ে বর্বরতা ও সভ্যতার পথে এগিয়ে নিজেদের চিন্তন ও মননকে লিখিত আকারে সংগ্রহ করতে শুরু করল। ক্রমে তা শ্রুতি থেকে হয়ে উঠল সাহিত্য। তৈরি হল লোক সাহিত্য। লোক মুখে মুখে যা ঘুরে বেড়াত তা লিপির আঁচড়ে বদ্ধ বা লিপিবদ্ধ হতে শুরু করল। ক্রমে ক্রমে নিখুঁত ভাবে অভিজ্ঞতা প্রজন্মের পর প্রজন্মে স্থানান্তরিত হল। বাড়ল মিশ্রিত খাদ্যের নানা গবেষণা ও সরসতার সমন্বয়। সরসতা বা লবণ মিশ্রিত হতে শুরু করল লেখার মধ্যে ঠিক যেমন করে লবণ মিশ্রিত হয়ে খাদ্যের স্বাদ বদল হল তেমনি বদল হল সাহিত্যের রস আস্বাদন। সাধের সন্ধানে অভিজ্ঞ মানুষ তার অজান্তেই অন্বেষণ করতে শুরু করল নানা মুখরোচক খাবারের ও মনোময় সাহিত্যের। আবারো হল সরসতার

সমন্বয়।

খাদ্য ও সমাজ: সমাজ তৈরী হল মানুষের অভিজ্ঞতা ও স্মৃতির সামঞ্জস্য বজায় রাখতে। যত দূর জানা গিয়েছে মানুষের দৈহিক বিবর্তনের মাধ্যমে সকল প্রাণী জগতে নিয়ত শাসন করার অধিকার প্রতিষ্ঠা করেছে। মানুষ যেমন দৈহিক ও খাদ্য বিবর্তনের সাথে সাথে তৈরি করেছে সমাজ, তেমনি সমাজ বিবর্তনের সঙ্গে এসেছে সম্পর্ক ও নানা বিধি নিষেধ। এসেছে নানা চলিত কথা...

> নাই ঘরে খাই খাই,
>
> ঘর আছে খাবার নাই।...

কচু খাওয়ার অভ্যেস আগে থেকে থাকলেও তা উৎকৃষ্ট নয় বলে কচুকে এই এলাকায় সহ্য করতে হল অবিচার.. না পেলে কচু খা.. আজ যদিও কচুর মর্যাদা পূর্ববঙ্গীয় নানা পদে অনেক উচ্চ স্থানে। এদেশিওরা এখনো কচুকে ঠিকমতো সহ্য ও হজম করে উঠতে পারলেন না! এহেন কচুর সঙ্গে আবার নানা অভিযোগে হয়ে উঠল অপূর্ব সুস্বাদু কচুরি। এদিকে, সরসতার প্রকাশ হলো দুদিকেই; প্রকাশিত হল সমাজের সম্পর্ক খাদ্যের স্বাদে..

> দুগ্ধ মিঠা চিনি মিঠা,
>
> নিষ্কর্মা ভাসুরের বচন মিঠা,
>
> নিতুই খান চিতল পিঠা ।(ভট্টাচার্য্য, ১৯৬৬)।

বাংলা, ওড়িশা, ঝাড়খণ্ড - বিহার সীমান্তবর্তী মূলত ঝুমুর কৃষ্টি বলয়ের চলিত ও বিভিন্ন লোকসাহিত্যের খাদ্যাভাস ক্ষেত্র সমীক্ষার কিছু তথ্য এখানে উল্লেখ করে রসনা বিলাসের রসনার সঙ্গে যোগাযোগ রাখার চেষ্টা করা যাক... যেহেতু এলাকাটি সম্পূর্ণরূপে বৃষ্টি নির্ভর কৃষিভিত্তিক তাই ঋতুভিত্তিক সমীক্ষার কিছু খাদ্যাভাসে মানসিক তৃপ্তির প্রকাশ করার প্রয়োজনীয়তা এসেছে সময়ের সাথে সাথেই।

খাদ্যাভ্যাসের বর্ষ লিপি: পৌষ সংক্রান্তির রাত হলো কৃষি বর্ষের শেষ রাত। টুসুমাতা নামক মানবী দেবীর পূজা। ঘরের বা গ্রামের মেয়ের মত টুসু, এখানে এক অধিষ্ঠাত্রী দেবী। আপামর জনগণ টুসু পরবের রাত্রে সারারাত টুসুর গান করেন, এই বন্দনাই টুসু পুজোর মন্ত্র। গানের বহু অংশে নানা খাদ্যের উপকরণকে মিলিয়ে গান রচনা করা হয়। আবার মেয়েদের সাংসারিক জীবনের দুঃখ কাহিনী ও এই টুসু গানের মধ্যে বর্ণিত হয় যেখানে থাকে নানা খাবার-দাবারের নামের বাহুল্য। স্বামীর বা শ্বশুরবাড়ির অত্যাচারে জর্জরিত মহিলা এখানে টুসু গানের সঙ্গে গাইছেন.. এক দুঃখের গান বা পূজার মন্ত্র... "আক্ষা পিঠার(চিত বা আক্ষা) লেখেইন মাইরে ফুলাইন দিইঞ্চে আমদের টুসু বুড়হিকে" (আমাদের ছোট্ট মেয়েটিকে শ্বশুর বাড়িতে মেরে আক্ষা/চিত পিঠের মত ফুলিয়ে দিয়েছে)।

এই এলাকায় পৌষ সংক্রান্তির রাত পোহালেই পয়লা মাঘের শুরু করেন নানা পিঠা(পিঠে) দিয়ে। কৃষি বর্ষ শুরু হয় নতুন স্বাদে ভরা নতুন খাবারের মাধ্যমে। যাঁরা নিরামিষাশী, তাঁরা ছাড়া পশ্চিমবঙ্গের পুরুলিয়া, বাঁকুড়া, ঝাড়গ্রাম, পশ্চিম মেদিনীপুর; ঝাড়খণ্ড -বিহারের পূর্ব সিংভূম, ধানবাদ; উড়িষ্যার বারিপাদা, ময়ূরভঞ্জ, কেওনঝর প্রভৃতি জেলার কুর্মি ও আদিবাসী জনজাতি ও অন্যান্য পারিপার্শ্বিক প্রতিবেশী মানুষেরা মাংসের তৈরি নানা ধরনের ও নানান স্বাদের পিঠা বা পিঠে দিয়ে রসনা তৃপ্ত করেন। সাধারণত, প্রত্যেক সাঁওতাল পরিবার চাপড়া নামক এক ধরনের শাল পাতায় পোড়া পিঠা (তৈরির মূল উপাদান হল টেকিছাটা চালের গুঁড়ি, খাসি ছাগলের মাংস, কোন কোন সাঁওতাল পরিবারের ঘরে ওঠে শুয়োরের মাংস বা মুরগির মাংস। সঙ্গে থাকে তেঁতুল পুদিনা বাটা কাঁচালঙ্কা ও অল্প নলেন কিম্বা আখের গুড়(তেঁইতল পইদনা চাট)। এলাকার বহুল আলোচিত ধাঁধায় আমরা দেখতে পাই ; "অলি অলি অলি, দমকা জ্বালে চৈতে পিঠে, নিভা জালে পুলি"। এই এলাকাতে পুলি খুব বেশি প্রসিদ্ধি না হলেও পুলির মত এক ধরনের পুর পিঠে তৈরি হয় যা পুলির থেকে অনেকটা বড় পুর পিঠে, অল্প দুধ এ জল ও আতপ চালের গুড়ি মিশিয়ে পুলির থকথকে অংশ তৈরি করা হয় ও অতি বা পরম যত্নে তা ভক্ষিত হয়। এই বিশেষ খাবারটি তৈরীর পদ্ধতি অনেকটা পুলির মতো হলেও এখানে বেশি পরিমাণে তৈরি করার প্রয়োজন হওয়ায় উপকরণের অনেক পার্থক্য লক্ষ্য করা যায়।

"শাল বাকলা পড়হা মাস"(শাল গাছের ছালের মধ্যে পড়ানো মাংস) বা আংরা পড়হা মাস (ঘুস ঘুসে আগুনের মধ্যে পোড়ানো মাংস) এক উপাদেয় মাংসের রান্না হিসেবে এখনো বহুল প্রচলিত। প্রকৃতির আগুনে যখন দাবানলে কোন প্রাণীর শরীর ঝলসে যেত, তখন ঝলসানো মাংস খাওয়ার যে প্রকৃতি মানুষের আসে তারই একটা অভ্যেস বোধহয় এই তন্দুরি বা পাতুরির মত করে মাংস খাওয়া। এক্ষেত্রে শাল গাছের ছাল এরমধ্যে টুকরো বা গোটা ছাল ছাড়ানো মুরগী/ছাগল/শুকর এর মাংস মসলা, হলুদ, তেল মিশিয়ে ঘসঘষে আগুন এর মধ্যে ঢুকিয়ে দেওয়া হয় অথবা মসলা, তেল, হলুদ মাখানো মাংস কে সাধারণ কাঁচা শালপাতার মধ্যে পোটলা করে বেঁধে দিয়ে ঘষঘষে আগুনের মধ্যে পুড়িয়ে যে সুস্বাদু মাংস রান্না করা হয় তার সাধ বোধহয় আজকের দিনে পাতুরি বা তন্দুরী হিসাবে মর্যাদা পেয়ে থাকে। বেশকিছু বুনো পাখি যেমন কয়ের, তিতির বুনো পায়রা ও গোড়ুর বলে ছোট্ট একটি পাখির মাংস ও একইভাবে প্রস্তুতি করে খাওয়ার রীতি আজও প্রচলিত। আদিবাসীদের বঙ্গা বা ঠাকুরের উদ্দেশ্যে নিবেদিত যে সমস্ত নৈবেদ্য তৈরি হয় তা এলাকা টেকিছাঁটা চালের ভাতের সঙ্গে মুরগি মাংস ও লাউ ও বিশেষ কিছু বুনো মশলা মিশিয়ে এক ধরনের খাবার তৈরি করা হয় যা শালুই পূজা বা গরাম পূজার

সময় গ্রামের সকলে মিলে মাটির হাঁড়িয়া ও এই মহাপ্রসাদ উপভোগ করে থাকেন। যা পুষ্টিগুণে ভরপুর ও উপাদেয়।

খামআলু (খামালু) বা মেটে আলু আর আলতি/গেঁটে কচু(কালো বা বাদামী রঙের) চাষ লালমাটির একটি বিশেষ মূল/কন্দ চাষ যা এলাকার মানুষ খুব ভাল ভাবে সম্পন্ন করেন খুব বেশী পরিশ্রম না করেই। কিন্তু এর রসনা বিলাস শীত কালে খুব উপাদেয় কিছু বলে মনে করেন । শীতের মাঝামাঝিতে ধান কাটা ও ধান ঝাড়ার কাজ প্রায় শেষ হয়। চাষির গোলা পূর্ণ হয় । মনের আনন্দে তারা সেই সময় পিঠেপুলি যেমন খান তেমনি তার সাথে ঋতুভিত্তিক এই বিশেষ ধরনের রসনা তৃপ্তি তাঁদের জীবনে নিয়ে আসে এক নতুন ও বিশেষভাবে বাঁচার বিশেষ অর্থ। শুঁটকী মাছের(শুকা/শুকাহ/ শুখাহ মাছ) সাথে আলতি(কালো কচু) বা খামালু মিশিয়ে জিরে ও ধনে বাটা সঙ্গে সরু সরু করে আলুর কাটা অংশ দিয়ে ধনে পাতার মিশ্রণে রান্না শক্তিশালী আদিম ও বর্তমানের উচ্চ স্বাদে বিশেষ রসনার বিলাস করতে আজও দেখা যায়। শীতের রোদে উঠোনে বসে দু'পা ছড়িয়ে তৃপ্তির শান্তিতে খালি গায়ে রোদের উপভোগের সঙ্গে সঙ্গে ভাতের থালা নিমেষে উজাড় করে দিতে এর জুড়ি মেলা ভার! গৃহকর্ত্রীকে সেদিন দুমুঠো বেশি চালই দিতে হয় ভাতের হাঁড়িতে। বেগুন ও শুকনো মাছের মিশ্রনে মাটির খোলায় কম আঁচে রান্না করা যে অপূর্ব রসনা তৃপ্তিতে দায়ী পদ করে থাকেন তার প্রতি আকর্ষিত হয়ে তাঁরা গানও বেঁধেছেন.. .'…… মন মাতাইঞ্ছি …খাবি মন… পালের (আড়ত) ঐ ধধরা শুখাহ্ হাটের বাইগন'। শীতের সবজির মধ্যে বেগুন পালং ও সামুদ্রিক পাতাশুটকি মাছ কিম্বা ছোট ছোট ভোলা মাছের শুটকিমাছ ওই সময় হাটে প্রচুর পরিমাণে আমদানী হয়, এলাকার মানুষেরা তাই উপাদেয় খাদ্য হিসেবে খুব তৃপ্তি সহকারে উপভোগ করে থাকেন।

ভূত চতুর্দশী তে চোদ্দ শাক খাওয়ার যে ব্যাখ্যান আমরা নানাভাবে শুনে থাকি, আজকাল তার প্রয়োগ দেখা যায় খুব ভালোভাবে । একটা সময় ছিল যখন বাজারে চোদ্দ শাক পাওয়া যেত না তখন সাধারণ মানুষেরা বিশেষত বয়স্ক মহিলারা ঘুরে ঘুরে প্রকৃতি বিভিন্ন জায়গায় থেকে সেই চোদ্দো ধরনের শাক সংগ্রহ করে তা রান্না করে খাওয়ার প্রচলন আজও আছে। তবে তা শুধুমাত্র ভূতচতুর্দশী নয়। শাকের নানা পদ আজও সমাদৃত হয় তারমধ্যে নটেশাক লালমাটি এলাকায় পুনকা শাক নামে পরিচিত; তার কদর একটু বেশি। খপরকাঁচি ও স্বেতপূর্ণী হিসেবে পরিচিত শাকের সাথে বেগুন ও শুটকি মাছের মিশ্রণে তৈরি বিশেষ পদ সরষে তেলের সান্নিধ্যে মাটির খোলায় কাঠের আগুনে জিরে, ধনে, হলুদ ও ধনেপাতা বাটার মিশ্রণে শুটকি মাছ বা 'সুকা- সাগের' (শাকের) থকথকে যে উপাদেয় বিশেষ তরকারি পান্তা ও মাড় ভাতের সাথে তৃপতিদায়ক যে খাবার কাঁসাই, শিলাই, রূপনারায়ন, দারকেশ্বরী প্রভৃতি নদীর তীরবর্তী এলাকার

মানুষেরা খেয়ে থাকেন, সেই খাওয়ার অভ্যাস শীতকালে অত্যন্ত বেশি সমাদৃত হয়ে থাকে। এ ছাড়া আছে বিভিন্ন ঘাসজাতীয় শাক, যেমন কানশিরা শাক; যা কাঁচা শালপাতার মধ্যে দিয়ে ঘসঘসে আগুনে পুড়িয়ে সরষের তেল সঙ্গে কাঁচা রসুন দিয়ে মেখে পান্তাভাত কিংবা গরম ভাতের সাথে খাওয়া যে অপূর্ব রহস্য স্বাদ তা এলাকার মানুষের কাছ থেকে প্রশংসিত। লাল বা সবুজ রঙের নটে শাককে শুধুমাত্র কাঁচা রসুনের কোয়ার সাথে কাঁচা শালপাতায় মুড়িয়ে ঘসঘসে আগুনে পুড়িয়ে ঘানিতে পেষাই করা কাঁচা সরষের তেলের সাথে মেখে খাওয়ার তৃপ্তি যেন জিভে লেগেই থাকে সারাদিন। তাঁদের বিভিন্ন গল্প গাথা/কথার মধ্যে এই ধরনের খাবার প্রায়স: উঠে আসে। ঝুমুর, টুসু ও খেমটা গানে তার নানা ছন্দে পরিবেশন শুনতে পাওয়া যায় যুগ যুগ ধরে। শুশনি শাক দিয়ে কচি ঝিঙের হালকা জিরেগুঁড়ো বা জিরে বাটার মিশ্রণে মাটির খোলায় সেদ্ধ করা অল্প সরষের তেলের সঙ্গে নাড়িয়ে মন ভোলানো পদ উপভোগ করা যেন এক স্বপ্ন। কলমি শাক কিম্বা বাঁধাকপির উপরের ভাগের শক্ত পাতা কেবলমাত্র শয়ন একাদশী থেকে উথান একাদশীর সময় বাদ দিয়ে(কলমি শাক ও পটল যথাক্রমে শ্রী বিষ্ণুর বিছানা ও বালিশ হিসেবে ঐ সময় নিষিদ্ধ আছে) বাকি সময়টা অত্যন্ত তৃপ্তির সাথে কয়েক কোয়া রসুন লম্বা লম্বা করে কেটে দিয়ে তার সাথে শুকনো লঙ্কা ও সরষের তেল দিয়ে ভেজে খাওয়ার রেওয়াজ আজও বিদ্যমান। কালো বা সাদা তিলের বড়া, কলমি শাক আর পান্তা ভাত এ যেন এক অপূর্ব অমৃত হিসেবে আজও গ্রাম বাংলার পশ্চিম অঞ্চলের বিশেষত মানভূম এলাকার মানুষের কাছে প্রায় সারা বছর অত্যন্ত সমাদৃত। রবীন্দ্রনাথ তাঁর লেখার মধ্যে জমিদারের দ্বিতীয় স্ত্রী চিংড়ি মাছের তরকারির সাথে পান্তাভাতের আকর্ষণ তার বৃদ্ধ স্বামী মারা যাওয়ার পরে কান্না করত শোক পালনের থেকেও অনেক বেশি গুরুত্ব দিয়ে উপভোগ করেছিলেন। ঠিক একইভাবে কুচো চিংড়ি বা চিতি কাঁকড়া কে শক্ত করে ভেজে তার সাথে তেঁতুল বা আমচুর মিশিয়ে টক/অম্বল গ্রীষ্মের দুপুরে কিংবা শীতের দুপুরে খাওয়ার রেওয়াজ ঠিক কবে শুরু হয়েছিল তা বলা আজও মুশকিল কিন্তু রসনার পরিতৃপ্তিতে যে একটুও ভাটা পড়েনি সেটুকু নিঃসন্দেহে বলা যায়।

"মানুষের চিন্তা-ভাবনা ও ভোজন সামগ্রী সম্পর্কে কুর্মি প্রবাদ এখানে উল্লেখ করলে আর ও পরিক্ষার হয়ে ওঠে :

মাছ ধুবি সীঠা, বাটনা বাটবি আঠা।

তবে পাবি মাছেক মিঠা।।"

এখানে নিপুনভাবে মাছ ধোয়ার কথা বলা হয়েছে, যাতে মাছের রং রক্তহীন হয়ে থাকে আর বাটনা বাটা বা শিলনোড়া দিয়ে বাটা মশলাটা এত সূক্ষ্ম ভাবে পেশাই হবে যা আঠার মত অবস্থায় চলে আসবে। সেই মসলা দিয়ে যদি ঐরকম পরিক্ষার

ধোয়া মাছ রান্না করা হয় তাহলে সেই মাছ রান্না অবশ্যই মিষ্টি স্বাদের হতেই হবে।

"আম আমসি আঢ়ই দিন, সনলা বারো মাস।।"

আম বা আমচুর আড়াই দিন, মানে খুব স্বল্প দিনের কথা বলা হলেও ভোজন পরিতৃপ্তিতে সজনের গুরুত্ব অপরিসীম। বারো মাস ধরে রসনার পরিতৃপ্তি করে চলে সজনে। নরম সজনে ডাঁটা কিংবা হালকা নরম সজনে ডাটার পোস্ত লালমাটি এলাকার একটি অতি সমৃদ্ধ ও ব্যয় সাপেক্ষ রসনা বিলাসের বা মানসিক তৃপ্তির খাদ্য তালিকার দলে পড়ে। সজনে শাক সারাবছর শুধু এই এলাকা নয়, বাংলার সর্বত্র এর কদর আছে। এমনকি বিশ্বের বহু দেশ মরিঙ্গা লিভ ডাস্ট সুগার বা মধুমেহর ওষুধ হিসেবে ব্যবহার করে থাকেন। পান্তা ভাত আর রসুন দিয়ে সজনে শাকের ভাজা গ্রীষ্মকালে লালমাটি ও রাঢ় বাংলার বিশেষত ভাগীরথীর পশ্চিম তীরবর্তী এলাকার খুবই জনপ্রিয় একটি উত্তম পরিতৃপ্তিকর বারো মাসের সবজি হিসেবে সমাদৃত। বারোমাসি সজনে বা নাজনের সাথে এঁরা সজনে কে একসাথে দেখেন। তাই এর কদর বারো মাস। ফসলও উৎপন্ন হয় সারা বছর ধরে। সজনের ডাটার সাথে বেসন মিশিয়ে বড়া করে খাওয়া এক আলাদা স্বাদ। এর সাথে আদা দিয়ে মুগ ডাল (রবীন্দ্র ছড়ায় সৌরভ), বা মুশুরির ডাল এখন সবাই খুব ভালোভাবে এক বিশেষ পদ হিসেবে খুব মর্যাদা পেয়ে থাকে। ধাঁধা তে আমরা দেখতে পাই, 'এক গাছে তিন তরকারি দাঁড়ায়ে আছে লালবিহারী'।

খাবারে দাঁতের যত্ন ও শক্তিশালী দাঁত বা দাঁতের বিশেষত্ব রক্ষা করার জন্য অথবা একটু বেশি পরিমাণে ভাত খেতে গেলে যে ধরনের পদের প্রয়োজন তা নিয়েও সুন্দর গীত কথা/গাথা এই এলাকাতে বহুল প্রচলিত। যেমন,

"জনহাইর পড়ায় দাঁতের বেড়ে খুশি, মাছপড়ায় খাওয়ায় দুটি বেশি।।"

জনহাইর(জনহার বা ভুট্টো) পুড়িয়ে খেলে, কথিত আছে যে দাঁত খুব ভালো ও শক্তিশালী করে আবার ছোট ছোট ধানাহালি বা ছোট চুনা মাছ কাঁচা হলুদ পাতায় মুড়িয়ে কাঁচা শাল পাতায় বেঁধে আগুনে পুড়িয়ে কাঁচা সর্ষের তেল আর কাঁচা পেঁয়াজ মেখে খেলে যে কোন খাবার সে মাড় বা ফেনা ভাতই হোক কিম্বা জলঢালা বা পান্তা ভাতই হোক একটু বেশিই খাওয়া যায় এটাই প্রচলিত।

বিভিন্ন শাকের মধ্যে ভালো শাকের কথা বলতে গিয়ে একটি প্রবাদ বাক্য প্রচলিত আছে যেমন;

"সাগেক মইধ্যে পুই, মাছেক মইধ্যে রুই, ছাতুক মইধ্যে উই।। " কুর্মী কথন।

বাংলা সাহিত্যের কথা মতোই এই প্রবাদটিতে আমরা দেখতে পাই সব থেকে ভালো শাকের মর্যাদা দেওয়া হয়েছে পুঁইশাক কেই, মাছের মধ্যে রুই মাছকে আর ছাতা বা ছত্রাক(মাশরুম) এর মধ্যে উইডিবিতে প্রাপ্ত যে ছত্রাক তা উপাদেয় হিসেবে বর্ণিত হয়েছে। লালমাটির উইডিবিতে বর্ষাকালে সুন্দর উপাদেয় যে ছত্রাক বা মাশরুম জন্মায় তা পোস্তো কিংবা জিরে বাটা দিয়ে বিভিন্ন উপাদেয় খাবার প্রস্তুত করে মন পরিতৃপ্তি করার অন্যতম এক উপাদান হিসেবে মানুষ এর উচ্চ প্রশংসা করে থাকেন। রুটকা, কাড়ান, পরব, বরকইনা, কুড়কুড়ি, পোয়াল বা খড় বা বালি প্রভৃতি মাশরুম এর বিভিন্ন পদ কখনো সরাসরি রান্না করে, বা শুধুমাত্র নুন দিয়ে সেদ্ধ করে তার সাথে চিংড়ি মাছ মিশিয়ে আধুনিক নামে মাশরুম পর্ণ কিম্বা এই জায়গায় ছাতু চিংড়ি করে খাওয়ার প্রচলন আমরা লোক সাহিত্যের মধ্যে দেখতে পাই এবং গ্রাম বাংলাতেও তার প্রভাব এখনো আছে। যদি খাদ্যগুণ হিসেবেও দেখা হয় তাহলে এই মাশরুমের খাদ্যগুণ অন্যান্য অনেক খাবার এর থেকে অনেক বেশি। বিখ্যাত আন্তর্জাতিক গবেষণা ও বিজ্ঞান পত্রিকা 'নেচার' এ বাঙালি গবেষক স্বপনবাবুর দাবি, সপ্তাহে একদিন ৫০ গ্রাম 'কুড়কুড়ে ছাতু' খেতে হবে। তা হলে একদিকে ক্যান্সার আক্রান্তরা যেমন রোগের সঙ্গে লড়াই করতে পারবেন, অন্যদিকে বাকিরা ক্যানসারকে দূরে রাখতে পারবেন(রোগ প্রতিরোধী ও ভালো করার ক্ষমতা)। বিখ্যাত ভাইরোলজিস্ট ডা. সিদ্ধার্থ জোয়ারদার জানিয়েছেন, ''বাংলার মাশরুম যে ক্যানসার প্রতিরোধী উপাদানেরও উৎস হতে পারে এই গবেষণা সেটাই দেখাল। গবেষণার ফলাফল যথেষ্ট উৎসাহব্যঞ্জক ও তাৎপর্যপূর্ণ। সেল-লাইনের উপর করা সাফল্য মানুষের শরীরেও (ক্লিনিক্যাল ট্রায়ালে) পাওয়া যাবে, এই আশাই করব। সেক্ষেত্রে এই গবেষণা ক্যান্সার চিকিৎসায় এক নতুন দিগন্ত খুলে দেবে।'' কুড়কুড়ে ছাতু। বীরভূম, বাঁকুড়া,পুরুলিয়ার রাঙামাটিতে এই ছত্রাক পরিচিত। মূলত শাল-পিয়াল-হরীতকী, বহেড়ার নিচে মাটিতে ছোট ছোট আলুর মতো দেখতে এই ছত্রাক জন্মায়। স্থানীয় অধিবাসী এবং আদিবাসীরা এই ছত্রাক নিজেরা খান, বাজারে বিক্রিও করেন। ফাইবারে উৎকৃষ্ট এই মাশরুম অত্যন্ত সুস্বাদু। পুষ্টিগুণেও ভরপুর। সহজে রান্না করা যায়। এলাকার শাল জঙ্গলে প্রচুর হয়। এবার এই ছত্রাকের ক্যান্সাররোধী ক্ষমতাকে প্রকাশ্যে আনলেন রহড়ার রামকৃষ্ণ মিশন বিবেকানন্দ শতবার্ষিকী কলেজের উদ্ভিদবিদ্যা বিভাগের অধ্যাপক গবেষক ড. স্বপনকুমার ঘোষ। গবেষণাপত্রটি প্রকাশিত হয়েছে বিশ্ববন্দিত নেচার পত্রিকার সায়েন্টিফিক রিপোর্টস বিভাগে। এই ছত্রাকের থেকে সংগৃহীত 'এফ১২ প্রোডাক্ট'-এর ক্যান্সার নিধনের ক্ষমতা আছে। নিয়মিত এই মাশরুম খেলে ক্যান্সার হওয়ার সম্ভাবনাও কমে। সেটাও প্রমাণিত হয়েছে গবেষণায়।''(এই সময়……https://eisamay.com)।

করুইল বা কচি বাঁশের তরকারি বিভিন্ন রাজপরিবারের খুব উপাদেয় এক রসনা পরিতৃপ্তি পরিচায়ক হিসেবে বিভিন্ন ক্ষেত্র কর্ম থেকে বেরিয়ে এসেছে। আশ্চর্যজনকভাবে হাঁসাপাথর বা বেলেপাথরের বিশেষ ঝোল আলুর সাথে মিশিয়ে তখনকার দিনে রাজাদের মন পরিতৃপ্তিতে যেমন বহু মানুষ তাক লাগিয়ে দিয়েছিলেন ঠিক তেমনি আজও তার কদর আমরা পেয়ে থাকি বেলেপাথর পরিবেষ্টিত ঝাড়গ্রাম, পুরুলিয়া ও বাঁকুড়া জেলার বিভিন্ন অঞ্চলে। রান্নার পর পাথরগুলোকে তরকারিতে পরিবেশন করা হলেও ভোজন রসিকদের কাছে অবগত থাকে ও মুখে নেওয়ার আগে তার থেকে সরিয়ে নেওয়া হয় সেই অপূর্ব ঝোলের রস আস্বাদন করে। পরে সেই হাঁসা বা বেলেপাথর আবার অন্য আরেকবার রান্নার সময় কাজে লাগানো হয়।

গ্রীষ্মকালে ও শীতকালে পুই গাছের গোড়া ও শক্ত অংশ চিরে চিরে তাতে ভাতের ফেনা বা পান্তা ভাতের আমানি বা আতপ চালের নরম জলো ভাত দিয়ে তৈরি এক বিশেষ ধরনের খাবার যার মধ্যে আমচুর অথবা কাঁচা তেঁতুল মিশিয়ে হালকা অম্বল হিসেবে রসনা বিলাস করতে দেখা যায়। কাঞ্জি নামক এক বিশেষ খাবার আমরা বাংলা লোকসাহিত্যের ষষ্ঠ খন্ডে সুন্দরভাবে পরিবেশিত হতে দেখি প্রবাদের মাধ্যমে- টোটকা শাস্ত্র বা লৌকিক আয়ুর্বেদ হিসেবে বিবেচনা করা হয় যেমন; আগুনে ওল, পৌষে কাঞ্জি, মাঘে তেল, ফাগুনে চূড়ান্ত বেল। ধাঁধার মধ্যে যখন আমরা আসি তখন দেখতে পাই;

> আপনার বেলা কাঁঠালে আর ক্ষিরে,
> ঠাকরুন খায় পুঁই -ডাঁটা আলুনি,
> তায় ভাঙ্গা পাতরের বেড়ে।

টোটকা শাস্ত্রে আবার কিছু খাবারে বাধা দেওয়া হয়েছে। যে খাবারগুলো বেশ সুন্দরভাবেই সবাইকে অনেক আনন্দ দিয়ে থাকে কিন্তু একসাথে মিশিয়ে খেলে যে বিপদ হতে পারে তার উল্লেখ করা হয়েছে, যেমন; কখনো খেও না ওলে আর ঘোলে, কখনো ভুলোনা ঢ্যামনা বোলে। এখানে রসনা বিলাস মত্ত হলেও মনকে সজাগ রেখে শরীরকে মানিয়ে চলতে বলা হয়েছে, নতুবা খারাপ মানুষের প্রকোপে পড়ে যেমন বহু মানুষের ক্ষতি হতে পারে তেমনি ঐ দুটি খাবারের মিশ্রিত রূপ গলাধকরনে মানুষের ক্ষতির সম্ভাবনা তৈরি করে।

লোকসাহিত্য অন্বেষণে অজস্র ভালো খাবার পাওয়া যায় যা এখন বিভিন্ন দামি বা নামী রেস্তোরায় পরিবেশক অনেক গালভরা নাম দিয়ে আজকের ভোগবাদী সমাজকে ভোগের নিমিত্তে উন্মোচিত করতে পেরেছেন। একটা সময় পায়রার মাংস, কচু বা আলতির সাথে মিশিয়ে রোগীর পথ্য হিসেবে ব্যবহার হতো মুরগি বা হাঁস মাংসের সাথে কাঁচা পেঁপে বা কচু মিশিয়ে রান্না করা ওই উপাদেয় খাবারই রোগীর পথ্য হিসেবে

গরম হালকা ঝোলের সাথে খাওয়া গ্রাম বাংলার প্রায় প্রত্যেকটি অঞ্চলে দেখতে পাওয়া যেত। আজকের সময়ে পালং শাক এর সাথে মুরগির মাংসের মিশ্রণ কিংবা মিক্সড ননভেজ বা মিশ্রিত আমিষ খাবারের মধ্যে এখন এই ধরনের উপকরণ ব্যবহার করে বিভিন্ন খাদ্য পরিবেশক খাদ্য পরিবেশন করে থাকেন। মাছের সাথে বিভিন্ন ডাটা মিশিয়ে মিশ্রিত মাছের মন হরণকারী নানা পদ এখন নামিদামী রেস্তোরাঁ পরিবেশিত হয়ে থাকে। এখনো দেখতে পাওয়া যায় সরু দেশী ধানের চালের ভাত কিংবা টেঁকিছাটা চালের ভাতের সাথে বেশকিছু হালকা রসনা পরিতৃপ্তিকারী উপাদেয় খাবার বিভিন্ন দুর্বল ও অসুখ থেকে সদ্য বেরিয়ে আসা রোগীর উপাদেয় পথ্য হিসেবে ব্যবহার হয়ে থাকে। ঠিক যেমনভাবে আমরা ধাঁধায় দেখতে পাই - 'ইলিশ, কাঁচকলা দিয়ে গিলিস'।

আবার বৈদিক যুগে এক সময় বেশকিছু মাছকে নিরামিষ হিসেবে পরিগণিত করে রসনা বিলাস করা হতো, যা এই এলাকার মানুষের বিভিন্ন ধরনের পূজা অংশগ্রহণে দেখতে পাওয়া যায়। লোকসাহিত্যের সংস্কৃত শ্লোক মিশ্রিত ধাঁধার মাধ্যমে; ইলিশ, খলসে, ভেটকি, মাগুর ও রুই জাতীয় এই পাঁচটি মাছের রান্নাকে বৈদিক ও পরবর্তী কালে নিরামিষ হিসেবে দেখা হতো। টোটকা শাস্ত্রে এই সমস্ত মাছগুলোকে বিভিন্ন সবুজ সবজির সাথে মিশিয়ে জিরে ও ধনে বাটা মিশ্রণে তৈরি উপাদেয় খাবার হিসেবে দুর্বল রোগীর রক্তবর্ধক ও বলবর্ধক পথ্য হিসেবে ব্যবহার করা হয়। উপরিউক্ত পাঁচধরনের মাছকে এখনও বেশ কিছু অঞ্চলে সুন্দর ভাবে নিরামিষ খাবার হিসেবে পরিবেশন করা হয় ও সবাই মিলে উপভোগ করে থাকেন। আজ ও ছোটনাগপুর ও মধ্য বঙ্গের কিছু মন্দিরের উপাসকের মুখে এই ধরনের কথা শুনতে পাওয়া যায়।

উপসংহার:

পরিবেশের সঙ্গে মানিয়ে বহু খাবার এক সময় খুব বেশি উপভোগ করা হতো তার উদাহরণ দেখতে পাওয়া নানা ধাঁধার মাধ্যমে, যেমন -উড়কি ধানের মুড়কি আর সরু ধানের চিঁড়ে, সঙ্গে দই মিশিয়ে খাওয়ার রেওয়াজ চৈতন্যচরিতামৃতেও দেখতে পাওয়া যায়। শ্রী চৈতন্যদেব যখন নীলাচল যাত্রা করেছিলেন তখন কলিকাতার সন্নিকটস্থ সোদপুরের কাছে গঙ্গার তীরে বসে বিশ্রাম নিয়েছিলেন। তার সেই শ্রীপদ ছোঁয়ায় বহু নারী- পুরুষ ও শিষ্য শ্রীচৈতন্য মহাপ্রভুর দর্শন প্রার্থী সেদিন উপস্থিত হয়ে সবাই মিলে যে ভোগ বা নৈবেদ্য পরিবেশন করেছিলেন তার সংস্কৃতি বহন করে চলেছে সেদিন থেকে আজও। সোদপুরের ওই ঘাটে আজও প্রতিবছর শ্রীপাদ মেলা অনুষ্ঠিত হয়। সেই চিঁড়ে, দই, মধু ও গুড়ের অমৃত মিশ্রণ প্রায় ৫২০ বছরের ইতিহাস নিয়ে এখানে সবথেকে বেশি পরিমাণে বিক্রি হয় ও মানুষ অকাতরে সকলের মধ্যে

পরিবেশন করেন যা সকলে খেয়ে পরিতৃপ্ত হন। উপাদেয়তা আসে যখন সরু ধানের চিঁড়ে ও দই গুড়ের সাথে পরিবেশিত হয়। কনক কনকচূড় ধানের চিঁড়ে দিয়ে আজ জয়নগরের মোয়া প্রবাদ বাক্যের রূপ থেকে বেরিয়ে বাস্তব রূপ নিয়ে আছে। উড়কি ধানের মুড়কি বা কনকচূড় ধানের মুড়কি হাঁ করে মুখে দিলেই গুলিয়ে যায় বলে আমরা কোনো কঠিন কাজকে সহজে করতে পারব না বলে থাকি; হাতের মোয়া.. নাকি যা সহজে সম্ভব! স্থানীয় মানুষের কথায় "ধাঁধা ও প্রবাদে আমরা তাই মোয়াকে ব্যবহার করে থাকি অনেক কাল আগে থেকেই।"

লোকসাহিত্যে যে সমস্ত খাবার দেখা যায় তার বেশিরভাগ খাবারই নামিদামী রেস্তোরাঁতে আজকের দিনে নতুন নামকরণ করে মানুষের জিহ্বার তৃপ্তি ও স্বাদে পরিতৃপ্ত করে চলেছে। যেমন নাকি চিকেন দো-পেয়াজী.. সাধারণ মুরগির মাংসের সাথে পেঁয়াজের আধিক্যে ও কিছু বিশেষ মশলার আধিক্যে তৈরি খাবারের এই গালভরা নাম। ঠিক এরকম ভাবে মাখনের সাথে মাশরুম মিশিয়ে বাট ন মাশরুম কিংবা আলু সেদ্ধ, শশা ও কয়েক পরত পাউরুটির খাবার স্যান্ডউইচ ইত্যাদি। কাজেই রসনা বা জিহ্বার পরিতৃপ্তি ও বিলাস আজকে যে নতুন নামেই দেখা হোকনা কেন তার গোড়াপত্তন হয়েছে সেই আদি লোকসাহিত্যের রসনা বিলাস এর মাধ্যমে। রবীন্দ্রনাথ তাঁর বিভিন্ন সাহিত্যে অসামান্য লোকসাহিত্যের বহু খাবার এর নাম নানাভাবে উল্লেখ করে গেছেন। শুধুমাত্র লোক সাহিত্য নিয়ে যাঁরা গবেষণা করেছেন তাঁদের গবেষণার জন্য যতগুলি পুস্তকই লেখা হোক না কেন কোনভাবেই স্থান সংকুলান হওয়া মুশকিল আছে। যা কিনা সভ্যতার সেই আদি লগ্ন থেকে আজও বিবর্তিত হয়েছে কিংবা তার একইরূপে নানা নামে আমরা নানা এলাকায় রসনার সম্ভোগের মাধ্যমে উপভোগ করা হয়েছে কোন ছোট্ট পরিসরে যা কয়েকটি বিশেষ পুস্তকের মাধ্যমে সম্পন্ন করা বেশ কষ্টকর। বর্তমান এই গবেষনা লেখনীতে একইভাবে সম্পূর্ণ করা যথেষ্ট কষ্টের। যে সমস্ত মানুষেরা নানা পরীক্ষা-নিরীক্ষার মাধ্যমে প্রকৃতির বিভিন্ন কাঁচা উপাদান নিয়ে রচনা উপভোগের উপাদান তৈরি করেন তার বর্ণনা এই স্বল্প পরিসরে যতটুকু সম্ভব পরিবেশন করা চেষ্টা করা হয়েছে।

গ্রাম্য জঙ্গল জীবনের খাদ্যাভ্যাস বিশ্ববন্দিত বিজ্ঞান পত্রিকা 'নেচার'-এ বাঙালি বিজ্ঞানীর গবেষণা যে গুপ্তধনের দৌলতেই এলাকার আদিবাসী মানুষের কাছে ঘেঁষতে সাহস পায় না মারণরোগ ক্যান্সার। হদিশ অনেকেই জানতেন। কিন্তু, তা যে দুর্মূল্য তা জানা ছিল না। এবার সেই গুপ্তধনের ক্ষমতা মান্যতা পেয়েছে আন্তর্জাতিক মঞ্চে। সেই সঙ্গে উন্মোচিত হয়েছে একটি রহস্যও। জানা গেছে, এই গুপ্তধনের দৌলতেই সাঁওতালদের কাছে ঘেঁষতে সাহস পায় না মারণ ক্যান্সার। সুতরাং খাদ্যগুণ সমৃদ্ধ সঙ্গে নানা প্রতিরোধ ক্ষমতায় সমৃদ্ধ

হয়ে আছে এলাকার খাদ্য পরিমণ্ডল। বাস্তুতান্ত্রিক সংস্কৃতি ও বস্তুতান্ত্রিক সংস্কৃতির এক অপূর্ব মেলবন্ধন দেখা যায় এলাকার খাদ্যাভ্যাস ও সাংস্কৃতিক আচরণের মধ্যে।

উদ্ভিদবিদ্যার বিশেষ গবেষণা সম্প্রতি এই মাশরুমের সঠিক ও বিজ্ঞানভিত্তিক ময়নাতদন্ত করায় উঠে আসে চাঞ্চল্যকর তথ্য। ৬০টির বেশি কম্পাউন্ড পাওয়া গিয়েছে এই মাশরুমে। সেগুলির শুদ্ধিকরণ করে 'এফ১২ প্রোডাক্ট' বের করা হয়। এতে ক্যান্সাররোধী পাঁচটি 'ফ্যাটি অ্যাসিড' আছে। যা 'পি৫৩ জিন'-কে এমনভাবে প্রভাবিত করে যে, ক্যান্সার কোষের বিভাজন আটকে যায়। গবেষণার পর্যবেক্ষণ, পি৫৩ জিনকে 'গার্জেন অফ জিনোম' বলা হয়। এই অভিভাবক নড়বড়ে হয়ে গেলেই শরীরে ক্যান্সারের মতো রোগের প্রকোপ শুরু হয়। এই মাশরুমে মজুত 'এফ১২ প্রোডাক্ট' পি৫৩কে সক্রিয় করে। 'অ্যাপোকটিসিস' বা ক্যান্সার কোষের মৃত্যুকে ত্বরান্বিত করে (https://eisamay.com)।

লোক সাহিত্য ছাড়াও সাধারণভাবে যে সমস্ত মানুষ এলাকার প্রাকৃতিক উপাদান থেকে প্রাপ্ত খাবার নিজেদের মতো করে সুস্বাদু ও প্রয়োজনীয় মানসিক তৃপ্তির প্রয়োজনে ও ক্ষুধা নিবারণের প্রয়োজনে ব্যবহার করে থাকেন তা তাঁদের জীবনের শুধু খাদ্যাভ্যাস নয় রোগ প্রতিরোধ ক্ষমতা ও প্রাকৃতিক সম্পদ রক্ষণাবেক্ষণে সর্বদায়ই সাহায্য করে। তাই আগামী দিনে এই ধরনের গাছ ও স্থানীয় উদ্ভিদ ও প্রাণিসম্পদকে সুষ্ঠুভাবে রক্ষণাবেক্ষণ করে জনমানষে সুষ্ঠু ব্যবহারে রোগ প্রতিরোধ এবং জীবন যাপন আরো সুন্দর হতে পারে। এই ধরনের বাস্তুতান্ত্রিক ও বস্তুতান্ত্রিক সংস্কৃতির চর্চা ও চর্যার আশু প্রয়োজন। আগামী দিনে সরকারি সহায়তায় এলাকার উদ্ভিদ ও প্রাণিকুল এর প্রয়োজনীয়তা ও রক্ষণাবেক্ষণের গবেষণা আরো সমৃদ্ধ হোক মানুষ জীবনের গুণগতমান আরো উন্নত করুক। আগামী প্রজন্মের কাছে নব গবেষণায় থাকলো সেই সুন্দর ভবিষ্যতের আশা।

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FEATURE ARTICLE

''রূপান্তরিত শিক্ষায় পরিবর্তিত পাঠ্যক্রম''

Dr. Sabitri Jhuri*

সারসংক্ষেপ

পৃথিবীর কোথাও শিক্ষাপদ্ধতি একজায়গায় থেমে থাকে না। জগৎ নিত্য পরিবর্তনশীল বলেই শিক্ষাও পরিবর্তনশীল। মানুষের প্রয়োজনেই শিক্ষা। যেটা মানুষের প্রয়োজনে লাগে না, সেটা মানুষ শিখতে চায় না। শিক্ষায় অনুশীলন লাগে। সংস্কৃত ঔশিক্ষি শব্দের অর্থ হল—অভ্যাসের দ্বারা কোনও বিষয়কে আয়ত্ত করা। কিন্তু শিক্ষা যদি রূপান্তরিত হয়, অর্থাৎ বদলে যায়, তাহলে নিশ্চিতভাবে তার শিক্ষাপদ্ধতি বা অনুশীলন পদ্ধতিও পরিবর্তিত হবে।

সুপ্রাচীন বৈদিক যুগ থেকে অদ্যাবধি, শিক্ষণীয় বিষয়বস্তু, তৎসহ শিক্ষাপদ্ধতির আমূল পরিবর্তন যে ঘটেছে, সেকথা বলার অপেক্ষা রাখে না। পূর্বে শিক্ষা ছিল শ্রুতি-নির্ভর। অর্থাৎ গুরুর মুখনিঃসৃত বাণী, শিক্ষার্থীগণ কর্ণেন্দ্রিয় দ্বারা শ্রবণ করে স্মৃতিতে ধরে রাখাই ছিল প্রাচীন শিক্ষাপদ্ধতি। এরপর করণ বা কায়স্থ-জাতি অর্থাৎ 'লিপিকার' শ্রেণীর উত্থানে বিভিন্ন প্রকার লিপি এবং আঁচড়ের দ্বারা মৌখিক ভাষা থেকে লেখ্য-ভাষার উৎপত্তি হল, যথা—বর্ণলিপি, শিলালিপি, চিত্রলিপি, ছন্দলিপি, স্বরলিপি ইত্যাদি। ফলে, শিক্ষাপদ্ধতির আমূল পরিবর্তন ঘটে যায়।

এরপর আসে শিক্ষাপদ্ধতির নানান কৌশল। কিন্তু লিপি অর্থাৎ পুঁথির প্রয়োজনীয়তা একটুও কমেনি। জ্ঞানার্জনের নানা পন্থা, নানা বিষয় মানুষের মনকে বিকশিত করে। মানুষ বহু বিষয়ে জিজ্ঞাসু হয়। শিক্ষাদানের নানা কৌশল বা পন্থা আবিষ্কৃত হয়। আমাদের দেশের ঋষি-মুনিরা যেমন, তেমনি ইউরোপের গ্রীস দেশীয় সক্রেটিস, প্লেটো, এ্যারিস্টটল প্রভৃতি মনীষীরাও তেমনি অগ্রসর হয়েছিলেন। এই সময়ে, পৃথিবীর নানা প্রান্তে, বহু পুঁথি রচিত হয়। এ বিষয়ে করণদের ভূমিকা অনস্বীকার্য।

কিন্তু আধুনিক কালে, মুদ্রণযন্ত্রের আবিষ্কারের ফলে জ্ঞানচর্চার এক বৈপ্লবিক পরিবর্তন ঘটে। ফলে, হস্তলিখিত পুঁথির যুগের অবসান ঘটে কিন্তু গবেষণা প্রভৃতি বা পেশার পরিবর্তন ঘটিয়ে ভিন্ন-পেশায়, অর্থাৎ রাজকর্মচারী রূপে পরিচিত হন।

এর পর আসে আধুনিক সভ্যতা, যেখানে শিক্ষার পাঠ্যক্রম একটি গুরুত্বপূর্ণ বিষয় হয়ে ওঠে। সেই পাঠ্যক্রমও আবার নানা সময়ে পরিবর্তিত হতে থাকে।

মৌলিক শব্দ (Key-words) : বৈদিক, শিক্ষা, করণ, লিপিকার, পুঁথি, শিক্ষাপদ্ধতি, বিভিন্ন প্রকার লিপি, দার্শনিক, মুদ্রণযন্ত্র।

মুখবন্ধম্

প্রাচীনকালে লিখিত বেদ ছিল না। সবই আর্য-ঋষিরা তাঁদের শিষ্যদের মৌখিকভাবে শিষ্যপরম্পরায় সংরক্ষিত রাখতেন। শুনে শুনে সংরক্ষিত হতো বলেই বেদের অপর নাম ছিল ''শ্রুতি''।১ প্রথমে ছিল অখণ্ড-দেব বা 'ঋক্‌বেদ'। 'ঋক্‌' শব্দের অর্থ মন্ত্র। কিন্তু অনেক পরেষ 'করণ' বা কায়স্থ-জাতির উত্থানে 'কথ্যভাষা' রূপান্তরিত হয় 'লেখ্যভাষা'য়। জন্ম হয় আর্যভাষা। এই সময় লিপিকারদের বিপুল কর্মযজ্ঞ। বেদ, বেদান্ত, পুরাণ, মহাকাব্য ইত্যাদি সকল সাহিত্য ও কর্মগ্রন্থ সংস্কৃত (প্রাচীন) ভাষায় রূপান্তরিত হয়। এজন্য আজও সংস্কৃত লেখ্যভাষাকে 'কায়েতি লিপি' বলে। নানা রেখা ও আঁচড়ের সাহায্যে ওই কথ্যভাষাকে লেখ্যভাষায় রূপান্তরিত করা হয়। ফলে, সুপ্রাচীন মৌখিক শিক্ষা ব্যবস্থার অবসান ঘটিয়ে নতুন শিক্ষা-ব্যবস্থার জন্ম নেয়। ব্যাকরণের জন্ম হয়। রচিত হয় বৈদিক 'শিক্ষা-গ্রন্থ'। যেমন—পাণিনীয় শিক্ষা, নারদীয় শিক্ষা ইত্যাদি গ্রন্থ। সমস্ত কাহিনী ভিত্তিক মহাকাব্য, যেমন—রামায়ণ, মহাভারত প্রভৃতি—সবই লিখিত রূপে পুঁথির দ্বারা সংরক্ষিত হয়। তবে সেগুলির মধ্যেও প্রচুর অসঙ্গতি, ভুল-ভ্রান্তি তো ছিলই। পরবর্তীকালের গবেষকরা সেগুলি সংশোধিত করার জন্য সচেষ্ট হন।

বৈদিক কথ্য-মন্ত্রগুলিকে ভাষায় রূপান্তরিত করার পর, যে-সব 'ঋক্‌' বা মন্ত্র গানের উপযোগী কিংবা বিশেষভাবে পাঠের উপযোগী, সেগুলিকে নানা রেখা বা চিহ্ন দ্বারা নির্দিষ্ট করা হয়। মন্ত্রের মাথায় রেখা বা দাঁড়ি চিহ্ন দ্বারা ''উদাও'', মন্ত্রের নিচে অধঃরেখা দ্বারা'' অনুবাদাও'' এবং কোনও চিহ্ন ছাড়াই সেগুলিকে ''স্বরিত'' রূপে নির্দিষ্ট করা হয়েছিল। পরবর্তীকালে সামগান যখন আরো উন্নত হয়, তখন আরো নানা চিহ্নদ্বারা গানের অলংকার প্রভৃতিদের নির্দিষ্ট করা হয়।২ মনে রাখতে হবে, তখনও গান্ধর্ব বা ''মার্গ-সংগীতের'' সা, রি, গ, ম, ইত্যাদির জন্ম হয়নি।

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গান্ধর্ব বা মার্গ-সংগীতের সৃষ্টির পর, সংগীতের নানান বিধিনিষেধ ভিত্তিক সংগীত হচ্ছে এই গান্ধর্ব বা মার্গ-সংগীত৷ এটি সম্ভবত খ্রিঃ পূঃ ১২০০ শতকের ঘটনা৷ গীত-বাদ্য-নৃত্য নাট্যের বিচিত্র নিয়মকানুন তাঁরা যা সৃষ্টি করেছিলেন, তা আজও আমাদের বিস্ময়ের উদ্রেক করে৷ এইখান থেকেই ভারতীয় সংগীতের জয়যাত্রা৷ সংগীতশিক্ষারও নতুন শাখা-প্রশাখার জন্ম হয়৷ আরও সেইসব সাংগীতিক বিধিনিষেধ সসম্মানে পালিত হয়৷ বহুবিধ বাদ্যযন্ত্র নির্মাণ, রাগ (Melodies) ও জাতির (Modes) বৈচিত্র্য এবং তালের বৈজ্ঞানিক বিধিনিষেধ, এসবই গন্ধর্বদের আবদান৷ তাছাড়া, নৃত্য, নাট্য প্রভৃতিরও বিস্তৃতি ঘটেছিল৷ সমগ্র বিশ্ববাসী তা অপলক নিমেষে প্রত্যক্ষ করেছিল৷ সংগীতশিক্ষা ব্যবস্থার নূতন শাখা-প্রশাখা তৈরী হল৷

প্রথম পরিচ্ছেদ

যে-গান্ধর্ব বা মার্গসংগীতের কথা আমরা বক্ষ্যমাণ অনুগবেষণার মুখবন্ধে উল্লেখ করেছি, প্রশংসা করেছি বিষয়ের জ্ঞান-ব্যাপ্তি নিয়ে—সেই গান্ধর্ব বা মার্গ-সংগীত শিক্ষার পাঠ্যসূচী কেমন ছিল—কিভাবেই বা সেগুলির শিক্ষাদান করা হতো—সে বিষয়ে পাঠকদের পাঠিকাদের স্বাভাবিক কৌতুহল থাকবেই৷ কিন্তু দুঃখের বিষয় এই যে, কোনও গ্রন্থ বা পুঁথিতে এবিষয়ে কিছুই বলা নেই৷ তাহলে আমাদের উপায়টা কী? উপায় একটা অবশ্যই আছে৷ সেটি হচ্ছে প্রাচীন সংগীতজ্ঞানীদের লিখিত সংগীতশাস্ত্রাদি৷ সব গ্রন্থই যে প্রাচীন সংগীতশিক্ষা ব্যবস্থার ইঙ্গিতবাহী এমন নয়৷ নাট্যশাস্ত্র (ভরত-মুনি), সংগীত-রত্নাকর (নিঃশঙ্ক-শাঙ্গদেব), সংগীত-সময়সার (পার্শ্বদেব) … ইত্যাদি ইত্যাদি গ্রন্থাদিতে প্রচুর সংগীত-বিষয়ক তথ্য থাকলেও তথ্যগুলি গুছিয়ে বা সাজিয়ে লেখা নেই, ব্যতিক্রম শুধু 'সঙ্গীত-রত্নাকর' গ্রন্থটি৷ এটি এমন এক গ্রন্থ যেখানে বিষয়-বিন্যাস, অধ্যায়-বিন্যাস সত্যিই অপূর্ব. পূর্বে আর অন্য কোনও গ্রন্থে এমনটি আর দেখা যায় নি৷ সংগীত-রত্নাকরে সাতটি অধ্যায় আছে বলে গ্রন্থটির অপর নাম 'সপ্তাধ্যায়ী'৷ অধ্যায়গুলি হল—স্বরাধ্যায়, রাগাধ্যায়, পুকীর্ণাধ্যায়, প্রবন্ধাধ্যায়, তালাধ্যায়, বাদ্যাধ্যায় এবং নর্তনাধ্যায়৷৩

স্বরাধ্যায়ে আলোচ্য বিষয়বস্তু হল—শরীর নাদের উৎপত্তি স্থল, সবরস্থান, এবং শ্রুতি (অন্তরশ্রুতি এবং শ্রুতি জাতি)৷ এর পর সাতটি শুদ্ধ-স্বর, দ্বাদশ বিকৃত স্বর, স্বরের বংশ জাতি, বর্ণ দ্বীপ, ঋষি ও দেবতা, স্বরসমূহের ছন্দ ও বিনিয়োগ, স্বরগ্রাম, মূর্চ্ছনা, স্বরের সংখ্যা সহ কূটতান ও শুদ্ধ-তান, স্বরের প্রস্তার, নষ্ট ও উদ্দিষ্ট জ্ঞাপক খণ্ডমেরু, স্বর-সাধারণ৷ জাতি-সাধারণ, বাকলী ও অন্তর স্বর-দুটি প্রয়োগ, বর্ণের সংজ্ঞা, তেষট্টিলংকার, ১৩ প্রকার জাতি-লক্ষণ, গৃহ-অংশ ইত্যাদি৷ কপাল ও কম্বলগীত, অন্যান্যগীত প্রভৃতি৷

দ্বিতীয় অধ্যায় হচ্ছে রাগবিবেকাধ্যায়৷ এই অধ্যায়ে বর্ণিত হয়েছে, গ্রামরাগ, উপরাগ, রাগ, ভাষারাগ, বিভাষা ও অন্তর ভাষা রাগ৷ এরপর রাগাঙ্গ, ভাষাঙ্গ, উপাঙ্গ ও ক্রিয়াঙ্গ রাগাদির বর্ণনা৷

তৃতীয় অধ্যায়ে বাগ্গেয়কার, গান্ধর্ব, স্বরাদি প্রভৃতি গায়ক, গায়কের গুণ-দোষাদি, তাদের স্বর-ভেদ শব্দের গুণ-দোষ, শারীর বা কণ্ঠস্বর এবং তার গুণ-দোষ, গমক, স্থায়, আলাপ, বৃন্দ-লক্ষণ ইত্যাদি আলোচিত হয়েছে৷

এরপর প্রবন্ধ-অধ্যায় অর্থাৎ চতুর্থ অধ্যায়৷ দু'প্রকার সূড় প্রবন্ধ অর্থাৎ শুদ্ধ প্রবন্ধ (Compositions), সালগ বা ছায়ালগ প্রবন্ধ আলিক্রম প্রবন্ধ ইত্যাদির বর্ণনা৷

পঞ্চম অধ্যায়৷ তালাধ্যায়৷ এতে গান্ধর্ব-তাল বা মার্গ-তালের বিস্তৃত পরিচয়৷

ষষ্ঠ অধ্যায় হচ্ছে বাদ্যাধায়, যাতে গান্ধর্ব বা মার্গ বাদ্যসমূহের এবং দেশী বাদ্যাদির বিশদ বিবরণ দেওয়া আছে৷

সপ্তম অধ্যায় হচ্ছে নর্তনাধ্যদায় যাতে মার্গ-নৃত্য এবং নাট্য বর্ণিত হয়েছে৷

উপরোক্ত অধ্যায়সমূহকে পর্যালোচনা করলে বোঝা যায়, সেই সময়ে সংগীতশিক্ষার ব্যাপ্তি কত বিস্তৃত ছিল৷ তখন কিন্তু বর্তমান কালের মতন চাকুরী বা ব্যবসায়িক ভিত্তিতে সংগীতচর্চা হতো না৷ সংগীত-সাধকগণ সমাজে খুবই সম্মানীয় ছিলেন৷ সংগীতশিক্ষা অবশ্যই আশ্রমিক ছিল৷ তবে পূর্বোক্ত চর্চার বিষয়গুলি থেকে মনে হয়,—

(i)   কণ্ঠসংগীতের শিক্ষার্থীদের স্বরাধ্যায়ের বিষয়গুলি ;

(ii)   রাগাধ্যায়ের আলোচ্য বিষয়গুলি ; এবং

(iii)   তালাধ্যায়ের বিষয়গুলি ;

(iv)   তাছাড়া, চর্চিত হতো প্রবন্ধাধ্যায়৷

এছাড়া, যাঁরা ততবাদের শিক্ষার্থী, তাঁদের সম্ভাব্য চর্চিত বিষয়গুলি ছিল—

(a) বাগাধ্যায় ; (b) তালধ্যায়, এবং (c) বাদ্যাধ্যায় ইত্যাদির আলোচ্য বিষয় ;

উপরন্তু সুষিরাবাদ্যের ক্ষেত্রে, উপরোক্ত তিনটি অধ্যায় পাঠ্যক্রমের অন্তর্ভুক্ত থাকার সম্ভাবনা ছিল বলে মনে হয়৷ অবশ্য এ ব্যাপারে নিশ্চিত করে আমরা কিছু বলতে পারি না৷ সবই অনুমান-সাপেক্ষ৷ কিন্তু প্রাচীন গান্ধর্বীয় সাংগীতিক পাঠক্রম কতদিন চালু ছিল সে ব্যাপারেও আমরা নিশ্চিত করে কিছু বলতে পারি না৷ তবে, ধারণা করা যায়, বৌদ্ধযুগের শুরুতেই (আনুমানিক খ্রিঃ পূঃ ৫ম শতক), বেদ-বিরোধী,

ব্রাহ্মণ-বিরোধী বৌদ্ধধর্মের বিকাশে এই প্রাচীন ঐতিহ্যবাহী সংগীতশিক্ষার অবসান ধীরে ধীরে ঘটে৷ তার স্থলাভিষিক্ত হয় অভিজাত ''দেশী'' সংগীত৷ এর শিক্ষা-ব্যবস্থা ও পাঠ্য-ক্রমও পৃথক৷ এব পরের ইতিহাস পরবর্তী পরিচ্ছেদ অংশে বিবৃত হবে৷

দ্বিতীয় পরিচ্ছেদ

গান্ধর্ব বা মার্গ সংগীতের যুগ অবসানের পর থেকেই শুরু হয় বৌদ্ধ-যুগ৷ এই যুগের প্রধান বৈশিষ্ট্য হল—'দেশীয়' বা আঞ্চলিক সংস্কৃতিকে প্রাধান্য দেওয়া৷ 'দেশী' সংগীতের প্রধান বৈশিষ্ট্যই হচ্ছে আঞ্চলিক ভাষা-ভঙ্গি-সুর বা রাগ, তাল, ছন্দ প্রভৃতি বিষয়ের ওপর অধিক-গুরুত্ব আরোপ করা৷ দেশী-সংগীত তিন প্রকার, যথা—(i) অভিজাত-দেশী বা নাগরিক, (ii) গ্রামীণ ; (iii) উপজাতীয়৷৪ আমাদের সংগীতশাস্ত্রে গ্রামীণ ও উপজাতীয় সংগীতের কোনও চর্চা নেই৷ অতঃপর আমরা আমাদের আলোচ্য সংগীতের পাঠ্যক্রম বিষয় থেকে সেগুলি বাদ দিতেই পারি৷ সুতরাং আমাদের আলোচনা অভিজাত দেশী-সংগীতের ওপর সীমাবদ্ধ রাখতে হবে৷ অভিজাত দেশী-সংগীতগুলির নানারীতি (Form) থাকে, যেমন—পদ-গান বা প্রবন্ধ, ধ্রুপদ, বাংলা কীর্তন, টপ্পা, ঠুমরী, ইত্যাদি ইত্যাদি উত্তর ও দক্ষিণ মিলিয়ে বহু প্রকার গীতরীতি৷ এইসব গীতরীতির শিক্ষাপদ্ধতি ছিল পরম্পরাগত (traditional)৷ গুরু-শিষ্য পরম্পরাগতভাবে শিক্ষনীয়, জ্ঞানও লিখিত পাঠ্যক্রম ছিল না৷ লিখিত শাস্ত্র অবশ্য মধ্যযুগে দেখা যায়৷ বিশেষতঃ পঞ্চদশ শতাব্দী থেকে উনবিংশ-বিংশ শতাবাদী পর্যন্ত৷

কোনও লিখিত শাস্ত্রগ্রন্থ অথবা পাঠ্যক্রম ছিল না বোলেই, খ্রিস্টীয় ১৯শ-২০শ শতক জনৈক মারাঠী ব্রাহ্মণ পণ্ডিত বিষ্ণুনারায়ণ ভাতখণ্ডে লিখতে হয়েছিল ''শ্রীমল্লক্ষ্যসংগীতম্'' অর্থাৎ আমার দ্বারা পরিলক্ষিত সংগীত৷ তিনি নানা অন্তাবদর কাছে শোনা নানান্ তঞ্চকথা, কিছুটা নিজের—সব মিলিয়ে ওই গ্রন্থ রচনা করেছিলেন৷ এই রকম দক্ষিণ ভারতেও পঃ রামামাত্য রচিত ''স্বরমেল-কলানিধি'' (১৬৫০ খ্রিঃ) বেঙ্কটমদী রচিত 'চতুর্দণ্ডীপ্রকাশিকা' ও 'রাগলক্ষণম্' গ্রন্থদুটি দক্ষিণ-ভারতীয় সংগীতে খুবই গুরুত্বপূর্ণ এবং কর্ণাটক সংগীতে নতুন পথের সন্দান দেয়৷

আজও হিন্দুস্থানী ও কর্ণাটক সংগীতে পাঠ্যক্রম বলতে যা বোঝায় ওই দুটি গ্রন্থ নির্ভর, অর্থাৎ শ্রীমল্লক্ষ্যসংগীতম্ এবং চতুর্দণ্ডীপ্রকাশিকা নির্ভর৷ এই সময়টা ছিল তুর্কী-মুসলিম রাজত্ব কাল৷ উত্তর ভারতে তখন দরবারী-সংগীতের প্রাধান্য চলছিল৷ ফলে, ঘরানা-সংগীতের নিরঙ্কুশ প্রাধান্য ছিল৷ ঘরানা-সংগীতে কোনও লিখিত পাঠ্যক্রম ছিল না৷ সংগীত-পরিবেশনের কতকগুলি নির্দিষ্ট স্তর ছিল যা ঘরানেদার

প্রত্যেক শিক্ষার্থীকে আবশ্যিকভাবে পালন করতে হতো৷ একে পরিভাষায় বলা হতো—''সিল্সিলা''৷৫ সিল্সিলা অমান্য করলে, সেই শিক্ষার্থীকে ঘরনোদার রূপে স্বীকৃতি দেওয়া হতো না৷ এছাড়াও উপরন্তু, সিল্সিলা ছাড়াও শিক্ষার্থীকে সাংগীতিক সৃজনশীলতাকে প্রকাশ করতে হতো, যা তাঁদের কল্পনাপ্রসূত ভাবনা দিয়ে৷

মনে রাখতে হবে, মধ্যযুগটি পুরোপুরি উত্তর-ভারত বা হিন্দুস্থানে এই প্রথাকে দরবারী সংগীতের অন্তর্ভুক্ত, বিশেষত : শাস্ত্রীয় ও উপশাস্ত্রীয় সংগীতে, এই ঘরানা-প্রথা প্রচলিত ছিল৷ এবপর ভারতবর্ষে ইংরেজ শাসনের যুগ৷

তৃতীয় পরিচ্ছেদ

আমাদের দেশে বিজ্ঞানভিত্তিক ও পদ্ধতিগত পাঠ্যক্রম বলতে যা বোঝায় তার সূত্রপাত ঘটেছিল ইংরেজ রাজত্বে৷ সেটি ইউরোপীয় শিক্ষাপদ্ধতিতে প্রভাব বলা যেতে পারে৷ ঊনবিংশ শতাব্দীর গোড়ার দিকে দু'একটি স্কুল-কলেজ, বিশেষত সংগীত বিষয়ে এই পাঠ্যক্রম চালু হয়েছিল৷ কিন্ত দক্ষিণ ভারতে, উত্তর ভারতেরও আগে পাঠ্যক্রম-ভিত্তিক সংগীতশিক্ষা দান, চালু হয়েছিল৷

পশ্চিম বাংলায় বিদ্যালয় স্তরে সংগীতশিক্ষা, খুব সম্ভব, 1955 সাল থেকে শুরু হয়েছিল৷ সংগীত-নায়ক গোপেশ্বর বন্দ্যোপাধ্যায় লিখিত ''গীত-প্রবেশিকা'' গ্রন্থে 1955 সালের, Board of Secondary Education-এর এখটি পাঠ্যক্রম দেওয়া আছে যা সংগীত-নায়ক নিজেই রচনা করেছিলেন৷ নিম্নে ঐ পাঠ্যসূচীটি প্রদত্ত হল৬

Voice and ear training : simple ear tests such as to recegnise any note of the scale, the key-note being given, Alamkar Sadhan : Definition of the technical terms of musie, climentary theory of swaras ; Rāgas and Rāginis.

Dandamātrik and Ākārmātrik notation : Reading and writing simple notations.

One Bengali or Hindusthāni song in each of the following Rāgas and Rāginis with common Ālāp, swarvistār, Bol-Bistār. Dwigun, Bāāt, Tān, Tehaī etc.

Ālāhiyā, Brindabanī Sārang, Khāmlaj, yaman, Kāfī, Behāg, Desh, Bhairabi, Kedārā, Bāgesrī, Bhaīralo, Pūrabī, Jaūnpurī, Bhupalī and Mālkash.

The above Rāgas and Rāginīs in any of the following Tālas:

Tritala, Ektāl, Chautāl, Jhāmptal, Teorā Surphānktāl, Each of the above eight Tālas with Mātrās, Division and Bani so as to be able to demonstrate cerrectly with beating of hands with or without the aneonpaniment of Pereussion instruments one seng from each of the following :

1. Old style Bengali song
2. Folk song.
3. Bhajan.

One Kirtan in Lophā and one in Jhamptāl.

Tuning of the Tārpura

Three songs of Rabindra Nath of which one must be in Dhrupad style and others in this choracteristic style.

National-Anthem :

Bande-Mātaram—First stanza

Janagana Mana-Adhināyaka—First & last stanza

The following books are recammended :

1. Gīta-Pravesikā 3rd Edition—by Sri Gopeswar Banerjee (Basumati Sahitya Mandirl
2. Kirtan-Gīta-Pravesikā—by Sri Khagendra Nath Mitra.

সরকারী শিক্ষা-প্রতিষ্ঠানে এখান থেকে পাঠ্যক্রম চালু হলেও এখানেই কিন্তু শেষ নয়। এর পর নানা সময়ে সামাজিক, রাজনৈতিক, অর্থনৈতিক উত্থান-পতনে নানাবিধ শিক্ষায় পাঠ্যক্রমেরও বিপুল পরিবর্তন হয়। নানা বিশেষজ্ঞদের দিয়ে পাঠ্যক্রম তৈরী হলেও, কোন্‌টি নিখুঁত হয়েছে সে কথা জোর দিয়ে বলা যায় না। কারণ ফাঁক-ফোকর থেকেই যায়। কিন্তু বেসরকারী ক্ষেত্রে, এর পূর্বেও বেশ কিছু পাঠ্যক্রমের কথা আমরা জানি। যেমন, কবিগুরু রবীন্দ্রনাথ প্রতিষ্ঠিত শান্তিনিকেতন ব্রহ্মচর্য বিদ্যালয়, সংগীত-ভবন, বিশ্বভারতী ইত্যাদি ইত্যাদি শিক্ষায়তনগুলির কথা উল্লেখ করা যায়। তাছাড়া বিষ্ণুপুর ঘরানার 'রামশংকর সংগীত বিদ্যালয়' প্রভৃতিতে একটা পাঠ্যক্রম (সম্ভবতঃ মৌখিকভাবে) চালু ছিল। পরে অবশ্য এর অবস্থা কেমন ছিল আমরা জানি না। তবুও আমাদের মনে রাখতে হবে, বিষ্ণুপুর ঘরানা রসসংগীতগুণীরা— ভারতবর্ষে একমাত্র ঘরানা-গুণী—যাঁরা সংগীতের উপপত্তি এবং ক্রিয়া—যুগপৎ সমানভাবে চর্চা করেছেন এবং এখনো করে চলেছেন। এই জিনিষটা উত্তর-ভারতের কোনও ঘরানায় দেখা যায় না। এমন কি সেনী ঘরানাতেও নয়। এই ঘরানাকে

সমৃদ্ধ করেছেন, সংগীত-নায়ক রামপ্রসন্ন বন্দ্যোপাধ্যায়, সংগীত-নায়ক গোপেশ্বর বন্দ্যোপাধ্যায়, সংগীতাচার্য সত্যকিঙ্কর বন্দ্যোপাধ্যায়, ড. অমিয়রঞ্জন বন্দ্যোপাধ্যায় এবং আরো অনেকের নাম করা যায়। এঁদের গ্রন্থগুলি পাঠ করলে এঁদের সংগীত-তত্ত্বের জ্ঞানের গভীরতা সম্বন্ধে সম্যক পরিচয় পাওয়া যায়। বিষ্ণুপুর ঘরানা নিশ্চিতভাবে বাংলার গর্ব বলা যায়।

তথ্যসূত্র :

১. শ্রীরাজ্যেশ্বর মিত্র, বৈদিক ঐতিহ্যে সামগান, (জিজ্ঞাসা, কলিকাতা, ১৯৮৬), ৩

২. তদেব, ৭ (About 400 words)

৩. নিঃশঙ্ক শার্ঙ্গদেব, সংগীত-রত্নাকর, অনুবাদ : ড. সুরেশচন্দ্র বন্দ্যোপাধ্যায়, (রবীন্দ্রভারতী), ২০০৬), ১।

৪. ড. বিমল রায়, সংগীত শব্দকোষ, (২য় ভাগ), (প. ব. রাজ্য সংগীত আকাদেমি ২০০২)

৫. ড. প্রদীপ কুমার ঘোষ, ভারতীয় সংগীতে ঘরানার ইতিহাস, (রিসার্চ ইন্‌টিটিউট ইন্ডিয়ান মিউজিকালকি, ২০০২)

৬. সংগীত-নায়ক গোপেশ্বর বন্দ্যোপাধ্যায়, গীত প্রবেশিকা, (বসুমতী সাহিত্য মন্দির, ১৯৩৭), ভূমিকা।

গ্রন্থপঞ্জী

১. মিত্র, শ্রীরাজ্যেশ্বর, বৈদিক ঐতিহ্যে সামগান, (জিজ্ঞাসা, কলিকাতা, ১৯৮৬)

২. তদেব, ৭ (About 400 words)

৩. রায়, ড. বিমল, সংগীত শব্দকোষ, (২য় ভাগ), (প. ব. রাজ্য সংগীত আকাদেমি ২০০২)

৪. ঘোষ, ড. প্রদীপ কুমার, ভারতীয় সংগীতে ঘরানার ইতিহাস, (রিসার্চ ইন্‌টিটিউট ইন্ডিয়ান মিউজিকালকি, ২০০২)

৫. বন্দ্যোপাধ্যায় গোপেশ্বর, সংগীত-নায়ক গীত প্রবেশিকা, (বসুমতী সাহিত্য মন্দির, ১৯৩৭), ভূমিকা।

YOGA and Personality Development

Dr. K. Narayanan*

The younger generation faces a myriad of challenges, including academic pressure, social media influence, and stress, which can hinder their holistic development. Yogic practices, rooted in ancient traditions and supported by modern research, offer a comprehensive approach to fostering personality development. This paper explores how effective yogic techniques can enhance cognitive, emotional, and social attributes, backed by scientific evidence and measurable variables.

Personality development in youth is pivotal for shaping their future. It encompasses cognitive growth, emotional intelligence, social skills, and moral values. Traditional education systems often neglect the holistic aspects of development, focusing solely on academic achievement. Yogic practices, encompassing *Asana, Pranayama, Dhyana* (meditation), and *Chittha Prasada* (mindfulness), can bridge this gap by promoting physical health, emotional stability, and mental clarity. This paper examines the role of yoga in enhancing key personality traits and presents research evidence supporting its effectiveness.

Father of Yoga, Patanjali Maharshi compiled the yoga sutras around second century in an attempt to define and standardize classical yoga. It comprises 195 sutras or threads as well as an eight fold path. Srimad Bhagavad-Gita declares that Yoga is a balance. Again, it asserts that Yoga is a skilled action. According to philosophy Yoga is union between purusha and prakriti, Shiva and Shakti realizing Brahman. Primer drawings on walls of caves in Indus valley display the evidence that yoga was practised as early as 5,000 years ago. Even today the implementation of yoga practices comprising asanas, pranayama etc.. appear effective in helping the people to overcome stress and anxiety. It improves the coordination of mind and body and thereby the intellect. The practise of yoga enables to achieve a high level of serenity which leads to healthy physical, mental and emotional life.

Yoga is a holistic practice that integrates the mind, body, and spirit. Rooted in ancient Indian philosophy, it derives from the Sanskrit word "Yuj," meaning "to unite" or "to join." Traditionally, Yoga aims to harmonize individual consciousness with universal consciousness, fostering physical, mental, and spiritual well-being. Yoga's origins trace back over 10,000 years to the Indus-Sarasvati civilization. It was systematized in Patanjali Maharshi's Yoga Sutras, which outline the philosophical framework of yoga. Patanjali Maharshi's Yoga Sutras describe the eightfold path for achieving self-realization and it was listed at seriatim as Eight Limbs of Yoga (Ashtanga Yoga)

1. Yamas (Ethical restraints): Non-violence, truthfulness, non-stealing, moderation, non-possessiveness.

2. Niyamas (Personal disciplines): Purity, contentment, self-discipline, self-study, surrender to a higher power.

3. Asanas (Postures): Physical poses that enhance flexibility, strength, and balance.

4. Pranayama (Breath control): Techniques to regulate and expand the life force through breathing.

5. Pratyahara (Sense withdrawal): Detaching the mind from sensory distractions.

6. Dharana (Concentration): Focus on a single object or thought.

7. Dhyana (Meditation): Continuous meditative absorption.

8. Samadhi (Liberation): A state of blissful union with the universe.

Benefits of Yoga:

Yoga offers comprehensive benefits across physical, mental, and emotional domains:

- Physical Health: Improves flexibility, strength, posture, and cardiovascular health; alleviates chronic conditions like back pain and arthritis.

- Mental Health: Reduces stress, anxiety, and depression; enhances focus and memory.

- Emotional Balance: Fosters self-awareness, resilience, and inner peace.

Spiritual Growth: Encourages self-reflection and a deeper connection to one's purpose.

Modern Adaptations of Yoga:

Yoga has evolved over centuries and has many styles tailored to diverse needs:

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- Hatha Yoga: Focuses on physical postures (Asanas) and breath control (Pranayama).

- Vinyasa Yoga: Combines fluid movements with synchronized breathing.

- Iyengar Yoga: Emphasizes alignment and precision, often using props.

- Kundalini Yoga: Awakens spiritual energy through dynamic movements, chanting, and meditation.

- Restorative Yoga: Focuses on deep relaxation and stress relief.

- Power Yoga: A fitness-oriented approach that enhances stamina and strength.

Scientifically validated in many Research highlights that yoga's efficacy in improving mental clarity, emotional resilience, and physical health. Studies show reductions in Cortisol levels (stress hormone), enhanced immune response, and improved heart rate variability, reflecting better stress management. Yoga is a timeless practice that transcends physical exercise. It is a pathway to self-discovery, balance, and harmony. As the world embraces yoga's transformative power, it continues to bridge ancient wisdom with modern lifestyles, enhancing holistic well-being.

Categorically many key components described in Personality Development can be benefitted by the Yogic interventions. They are :

1. **Cognitive Enhancement:** Cognitive enhancement involves improving mental faculties such as concentration, memory, decision-making, and problem-solving. Specific yoga Asanas (poses) stimulate blood flow to the brain, enhance neuroplasticity, Improves focus memory, problem solving skills and promote mental clarity

   Asanas: The most important set of practices relevant in this respect are the Asanas. These asanas like 1.Vrikshasana (Tree Pose) enhance concentration. 2. Padmasana (Lotus Pose) improves brain function by encouraging controlled breathing and oxygenation and Supports better memory and learning by fostering relaxation., 3. Sarvangasana (Shoulder Stand), increases blood flow to the brain, enhancing mental alertness and focus, stimulates the thyroid gland, which regulates metabolism and energy levels for optimal brain function and Reduces fatigue, allowing for improved cognitive performance, 4. Adho Mukha Svanasana (Downward-Facing Dog Pose) boosts circulation to the brain, improving memory and concentration, relieves tension in the neck and shoulders, reducing cognitive load and Encourages mental rejuvenation and alertness., 5.Vajrasana (Thunder bolt Pose) enhances digestion,

indirectly supporting mental clarity and decision-making, Encourages mindfulness and the ability to stay present and supports relaxation and better stress management, key for cognitive tasks, 6. Shavasana (Corpse Pose) facilitates deep relaxation and mental rejuvenation, lowers stress and improves overall brain function and enhances attention and problem-solving by allowing the brain to reset,7. Tadasana (Mountain Pose) improves posture, ensuring better oxygen flow to the brain, enhances mindfulness and grounding, improving focus and decision-making and Reduces mental fatigue and enhances clarity. In pranayama practice Bhramari (Bee Breath - often paired with poses) calms the mind and improves concentration, boosts auditory processing and enhances memory retention and reduces anxiety, promoting a focused and alert state.

Meditation: Practices like (Chitha Prasada Dhyana) mindfulness meditation improve attention span and cognitive flexibility. Many techniques can be utilized for managing the Cognitive flexibility.

i. Focused Attention Meditation: A specific practice within mindfulness that involves concentrating on a single object, such as the breath.

ii. Mindfulness-Based Stress Reduction (MBSR): A structured program developed by Dr. Jon Kabat-Zinn that is widely used in clinical settings.

iii. Mindfulness-Based Cognitive Therapy (MBCT): A therapeutic adaptation combining cognitive behavioral therapy and mindfulness practices.

iv. Vipassana: The original meditative practice from which mindfulness is derived, meaning "insight" in Pali.

Open Monitoring Meditation is a kind of meditative practice that leads to a broader form of mindfulness involving non-judgmental awareness of all experiences as they arise. Various studies including one published in *Frontiers in Psychology* (2017) demonstrated that regular yoga practice enhances executive functions, including working memory and decision-making abilities, in adolescents.

2. **Emotional Intelligence:** Yoga practice Reduces stress, enhances self-awareness, and fosters empathy. Relevant Practices particularly Pranayama Techniques like Nadi Shodhana (Alternate Nostril Breathing) and *Anulom Vilom* reduce Cortisol levels and promote emotional stability. Yoga Nidra; Deep relaxation techniques enhance emotional resilience. A research in *The Journal of Clinical Psychology* (2019) found that yoga practitioners exhibit lower levels of anxiety and depression, with improved emotional regulation.

3. **Social Skills Development:** Yoga has been proved to encourage teamwork, communication, and conflict resolution. Relevant Practices established in Group yoga sessions foster collaboration and Partner yoga enhances trust and cooperation had given positive results on social skills development. Evidence revealed in Studies, such as one in *Social Science & Medicine* (2020), highlighted improved interpersonal relationships among youth who practice yoga regularly.

4. **Moral and Ethical Growth:** Yoga practice cultivates values like honesty, compassion, and discipline. Relevant Practices by adopting Yamas and Niyamas and ethical guidelines outlined in Patanjali's Yoga Sutras and other scriptures provide a moral framework in this regard. It provides tremendous changes in the personality structure if the implementation process had happen or inculcating through the routine.

    Evidence: many of the study had happened. Research by Harvard Divinity School (2021) linked yoga-based moral education programs with increased altruistic behavior in students.

Evaluating the Impact of Yoga

Certain Variables and Methodologies may be adopted and relevant to evaluate the impact of yoga on personality development for Research**.** The following variables were considered in this context:

1. **Cognitive Metrics:**
   o Attention span (measured using Stroop tests)
   o Memory retention (evaluated through recall exercises)

2. **Emotional Stability:**
   o Stress levels (measured via Cortisol analysis)
   o Anxiety reduction (assessed through standardized questionnaires)

3. **Social Adaptability:**
   o Peer interaction quality (rated through surveys)
   o Conflict resolution skills (observed in group activities)

4. **Ethical Awareness:**
   o Value-based decision-making (analyzed via case studies)

Discussion

Based on the above overview of different facets of Yoga a its effects on personality development, it can be said that it contributes significantly to many attributes necessary for personality development of individuals, especially the following three facets as indicated below.

- **Holistic Development:** Yoga integrates physical, mental, and spiritual dimensions, making it uniquely suited for comprehensive personality growth.
- **Accessibility and Scalability:** Schools and colleges can incorporate yoga programs with minimal infrastructure.
- **Cultural Relevance:** Yoga aligns with traditional values, making it culturally resonant for youth in many regions.

Conclusion and Recommendations

Effective yogic practices offer transformative benefits for the younger generation, fostering cognitive clarity, emotional intelligence, social skills, and moral integrity. Institutions should prioritize integrating yoga into educational curricula, supported by trained instructors and regular assessments. Future research should focus on longitudinal studies to further substantiate these findings and explore innovative methods to make yoga more engaging for youth. In addition to this the entire performances of the youth and students have increased tremendously by practicing the various yogic practices.

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Additional Research Articles

1. **"The Psychological Benefits of Yoga in Adolescents"** (*International Journal of Yoga Therapy*, 2018): This study outlines the positive effects of yoga on adolescent mental health, particularly in managing anxiety and improving focus.
2. **"Yoga for Emotional Regulation and Stress Reduction in Teenagers"** (*Mindfulness and Compassion Journal*, 2020): A comprehensive review of how yoga-based interventions help teenagers navigate emotional challenges.
3. **"Social Cohesion Through Group Yoga"** (*Journal of Adolescence*, 2021): Explores how group yoga practices improve interpersonal relationships and community bonding among youth.
4. **"Ethics and Values Through Yoga Education"** (*Educational Psychology Review*, 2022): Investigates the role of Yamas and Niyamas in fostering moral growth and ethical decision-making in students.

Changing Course: Transforming Education

Dr. Pradip Kumar Singha Deo*

UNESCO believes that education is a human right for all throughout life and that everyone has the right to access quality education opportunities. The Organization is the only UN agency with a mandate to cover all aspects of education. It has been entrusted to lead the Global Education 2030 Agenda through Sustainable Development Goal, focused around the provision of quality and inclusive education for all. The COVID-19 pandemic had disrupted education worldwide in an unprecedented ways. Today like never before the multiple dimensions of learning institutions appear clear, as learning, well-being, social and protection sites for children and youth alike. With the spread of the Omicron variant, governments have resorted once again to school closures. As of today, more than 635 million children and youth worldwide are affected by full or partial school closures. Countries in the Gulf Region are no exception with schools only partially open in most of the countries.

A new social contract is needed where all involved actors ought to share a similar vision of the public purposes of education. Concerted and coordinated efforts, participation, partnerships, including the private sector, are key to deliver on the Sustainable Development Agenda. Strengthening a range of learning modalities is urgently needed to ensure that all learners have access to both learning and services to support their well-being.

Reimaging schools and learning institutions as sites of inclusion and equity, where the well-being of children and youth is promoted, is pivotal to build the societies and futures we strive for. Learning disparities need to be addressed through differentiated interventions and targeted policies that direct additional resources to those further disadvantaged. Pedagogies need to be more strongly centered on the learning of each child and young person.

Developing pedagogies around 21st skills and competencies, emphasizing ecological, intercultural and interdisciplinary learning that help children and youth navigate the complex demands of their lives and steer the change they want to see in society is critical.

Teachers and parents need support with the challenges created by the disruption of face-to-face learning. Teaching should be further professionalized and teachers recognized in their roles as knowledge producers and agents of change, key figures for educational and social transformation.

The Indian education system is quite an old education system that still exists. It has produced so many genius minds that are making India proud all over the world. However, while it is one of the oldest systems, it is still not that developed when compared to others, which are in fact newer. This is so as the other countries have gone through growth and advancement, but the Indian education system is still stuck in old age. It faces many problems that need to be sorted to let it reach its full potential.

Our Indian education system faces many problems that do not let it prosper and help other children succeed in life. The biggest problem, which it has to face, is the poor grading system. It judges the intelligence of a student based on academics, which is in the form of examination papers. That is very unfair to students who are good in their overall performance but not that good at specific subjects.

Moreover, they only strive to get good marks not paying attention to understanding what is taught. In other words, this encourages getting good marks through mugging up and not actually grasping the concept efficiently.

Furthermore, we see how the Indian education system focuses more on theory. Only a little percentage is given for practical. This makes them run after the bookish knowledge and not actually applying it to the real world. This practice makes them perplexed when they go out in the real world due to lack of practical knowledge. Most importantly, the Indian education system does not emphasize enough on the importance of sports and arts. Students are always asked to study all the time where they get no time for other activities like sports and arts.

For the above mentioned problems, for changing the course, a structured Transforming Education" policy is needed. It should be a crucial conversation to be had, especially in today's fast-paced, technology-driven world.

President, VECSO (India), Deoghar

It is a thought-provoking topic that encompasses various aspects of reforming and innovating educational systems. Change is necessary in our life. We may be able to transfer any course credits we have already gained, but if the course we want to transfer to is very different, this may not be possible, and we may need to start the new course at the very beginning. This could mean another year of tuition fees, accommodation, and other expenses.

Key Areas of Transformation:

There are various approach to align today's education to the changing socio-economic environment and preparing todays generation to meet the challenges of today's times successfully. The first of the key areas of transformation is personalized learning that customizes the learning experience to meet the individual needs, interests, strengths, and goals of each student. It's a fundamental shift from a "one-size-fits-all" model to one where instruction, content, and pacing are tailored to the learner..

The second key area of transformation relates to Competency-Based Progression which means focusing on students' demonstration of skills and knowledge rather than on the amount of time spent learning or on traditional age-based progression. It's a fundamental shift from "seat time" to "evidence of learning."

Inquiry-Based Learning (IBL) is the third important area for transformation of education. It is a dynamic, student-centered approach to education that prioritizes questioning, exploration, and discovery over rote memorization of facts. Instead of simply receiving information, students are actively engaged in the process of investigating questions, problems, or scenarios, much like real-world researchers or problem-solvers.

The fourth key area is about Technology Integration. It refers to the purposeful and effective use of digital tools, resources, and strategies to enhance teaching, learning, and assessment. It's not just about having technology in the classroom, but about using it meaningfully to support pedagogical goals and improve student outcomes.

Lastly, Emotional Learning, often referred to as Social-Emotional Learning (SEL), in the context of education is necessary wherein students acquire and apply the knowledge, skills, and attitudes to develop healthy identities, manage emotions, achieve personal and collective goals, feel and show empathy for others, establish and maintain supportive relationships, and make responsible and caring decisions..

Enabling Factors:

There are several enabling factors also which needs to be harnessed in order to accelerate the process of transforming education to meet the need of the times. This includes professional development of teachers and enabling them in acquiring new skills and mindsets and curriculum redesign i.e. aligning educational content with 21st-century skills and competencies. In addition, there is a need for innovation in the methods of assessment and moving beyond traditional standardized tests to more holistic, competency-based evaluations. The need for fostering partnerships between schools, local businesses, and organizations to provide real-world learning opportunities is also an area that requires special thrust in this regard.

Challenges and Opportunities:

Transforming education in the 21st century is a monumental task, driven by rapid technological advancements, evolving societal needs, and a growing understanding of how humans learn best. It involves a fundamental rethinking of traditional models to create more effective, equitable, and relevant learning experiences. This transformation presents both significant challenges and immense opportunities.

The main challenges in transforming education today pertains to Resistance to Change and Inertia, inability to eject from Entrenched Systems that are often deeply rooted in traditional structures, curricula, and assessment methods, overcoming inertia and resistance from various stakeholders, including teachers, administrators, parents, and even students who are accustomed to the status quo and dearth of transformational leadership.

Then there are Resource and Infrastructure Constraints, unsatisfactory level of Teacher Preparedness and Professional Development, Curriculum and Assessment Challenges like Overloaded Curricula, Outdated Assessment Methods and Lack of Standardization of content.

Next Steps:

Transforming education for the future requires a multi-faceted approach that builds upon current best practices and anticipates the evolving needs of individuals and society. Here are some key future actions for transforming education, drawing on the concepts we've discussed and anticipating emerging trends:

- Reimagining the core of learning from content delivery to competency development. This would involve deepening competency-based progression which

would need Moving away from time-based progression (e.g., fixed grade levels by age) to true mastery-based advancement. This means students' progress when they demonstrate proficiency in defined competencies, not just after a set period.

- Elevating inquiry-based and project-based learning by making inquiry and project-based approaches the dominant pedagogical models. shift from teaching *about* subjects to facilitating students' active investigation and creation around real-world problems and questions.

- Prioritizing Social-Emotional Learning (SEL) as Foundational means for transforming eduction. This would require Embedding SEL explicitly and implicitly across all aspects of the curriculum and school culture, recognizing it as equally important as academic content.:

- Leveraging technology for personalized and scalable education and implementing ai-powered adaptive learning platforms that truly tailor content, pace, and instructional strategies to each student's unique needs, learning style, and progress.

- Immersive and experiential learning with VR/AR/ Metaverse and introducing and integrating Virtual Reality (VR), Augmented Reality (AR), and eventually metaverse environments to create highly immersive and experiential learning opportunities

- Ubiquitous connectivity and digital fluency by ensuring equitable access to high-speed internet and computing devices for all students and educators, bridging the "digital divide.":

- Evolving the role of educators by redefining the teacher's role and ensuring a Shift the primary role of teachers from content deliverers to facilitators of learning, instructional designers, data analysts, mentors, and social-emotional coaches.

- Flexible learning spaces and structures and designing physical and virtual learning spaces that are flexible, collaborative, and adaptable to diverse learning activities and group sizes.:

- Creating lifelong learning ecosystems and fostering a culture of lifelong learning that extends beyond formal schooling, with education systems collaborating with industry, community organizations, and informal learning providers

- Introducing data-driven decision making and utilising educational data analytics to understand student progress, identify learning gaps, and personalize interventions, while rigorously adhering to ethical guidelines and privacy protections.

Transforming education is a complex, ongoing process that requires collaboration among policymakers, educators, parents, students, and technology developers. By focusing on these interconnected actions, education systems can better prepare individuals for a future that demands adaptability, critical thinking, creativity, and strong human skills.

BOOK REVIEW

The Story of My Life: A Saga on Multifarious Perspectives of Education

Sumedha Mukherjee *
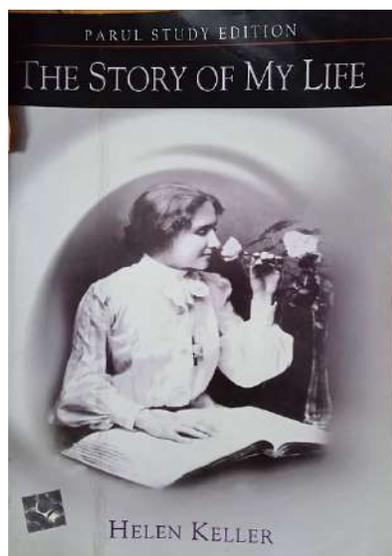
The Story of My Life deals with the journey of a deaf and blind girl who later in her life achieved worldwide fame. Composed in an autobiographical format this text seems to be the 'Bible' of inclusive education. This book may be compared to a Bildungsroman, as it also sketches the growing up of a child whose childhood was cursed with absence of light and words and how she overcame the difficulties establishing her in the society. How the loss of hearing is more terrific than the loss of sight is evident from the speech by Helen Keller herself, "Blindness separates people from things. But deafness separates people from people." This book is also a document of the process of teaching learning process for a student suffering from deaf-blindness. Till now, inclusive education has not been spread widely. Even a large portion of children with special needs are still in the periphery of our progressive educated society despite the sanction of many policies so far. So, it is easy for the readers to understand how much difficulties Helen Keller had to face at the time of receiving education in her era. This book is the source of inspiration not only for the students with such difficulties but also the other people who abstain themselves from doing a work due to lack of self-confidence or fear for their any sort of limitation. As Helen Keller lost the power of hearing in her early childhood, she could not speak for a long period in her life. But she defeated this loss of speech one day proving the Indian hymn true, which says, "Mūkaṁ karoti vācālaṁ paṅguṁ laṅghāyate girim" i.e. a speechless person can speak and a lame person can also climb the mountain. In twenty-three chapters Keller has captured many moments of her life overall in a linear chronological progression with some description of event using 'flash back' technique. These chapters depict the transformation of her character in different stages of life, her tenderness as well as aggressive attitude, her struggle to be educated in an integrated classroom, her feelings including both joy and grief etc.

The text has been explored with psychological factors of a child. The author has never concealed her disgust or other negative feelings. The author's motto was not to establish herself as an iconic figure. She has tenderly portrayed the destructive forces also which are common in a natural human being. Like, in chapter 2 she has confessed that she used to kick her nurse when she was angry. Later, when she calmed down, her heart became repentant. Still, she continued the same whenever she used to lose her temperament. In the same chapter she also described how she felt happy to lock her mother and later her teacher in a room. For a long time, she treated her own little sister as an intruder. This is a very common picture observed often in the case of siblings, as at first they cannot always welcome their brothers or sisters thinking that his or her importance will be less in the family due to the newcomers. Helen Keller was also in such a mental crisis. This psychological issue led her to harm her little sister. One day when she found her sister sleeping in the cradle which was actually used for her favorite doll, little Helen Keller became so angry that she had overturned the cradle. That day her sister might die but had been rescued by her mother. Thus, it is clear that the author has expressed all her feelings honestly.

Thus, this book is applicable to promote value education also. With these confessional entries, throughout the text the author has proved herself an honest human being. It is a very educative statement when Helen Keller writes, 'I am content that others should be wiser than I'. When the values are being degenerated, children must be acquainted with such thought. Moreover, it is also interesting to witness how a deaf and blind girl can feel the feeling of a crab whom she had brought home from sea shore to place

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it inside her well and later when she had not found it in that well, despite being disappointed for some time, later she became happy that it had not been a wise task to forcefully separate a dumb creature from his habitat and became delighted thinking that the crab perhaps had returned to the sea. Thus, the story of her life is inspirational for other people also. She has adopted challenges after challenges in her life. She could easily succeed if she would pursue her higher studies in institutions for the children with special needs. But she willingly welcomed to be a part of mainstream education where she was bound to compete with the students who are blessed with perfect organs. How problematic would be the situation to study in a general institution where there were not enough opportunities for her to study in her own way. Moreover, her urge to be a part of co-education is also equally significant. In chapter xviii she stated, "When I was a little girl, I visited Wellesley and surprised my friends by the announcement 'some day I shall go to college—but I shall go to Harvard!' When I was asked why I would not go to Wellesley, I replied that there were only girls there… When I left New York the idea had become a fixed purpose, and it was decided that I should go to Cambridge. This was the nearest approach I could go to Harvard and to the fulfillment of my childish declaration." (The Story of My Life, chapter xviii). This concept of gender inclusivity was also a liberal and progressive thought in her era. So, in all respects she was in favour of inclusivity and it was a remarkable step for the then society.

Apart from the field of inclusive education it is also appropriate to be included in the field of teacher education also. Helen Keller perhaps could never have succeeded in her life, if she did not get the assistance of her teacher Miss Anne Sullivan. All the teachers should learn from this teacher how to keep patience in every adverse situation, how to show the right path to his/her students, how to control the aggressiveness or grief of a student. It is also not easy for a teacher to make a little girl realize the meaning of an abstract idea called 'love'. There are many instances in the text highlighting the success of Miss Sullivan as a great teacher. Her sacrifice is the key to the achievement in the life of Helen Keller. Thus, she is not only the teacher of Keller but also, she has secured her position as a 'Guru'.

The text is also a treasure trove of literature. The way all the events have been narrated definitely touches the core of the heart of its readers. There are no bombastic words but the language sweetens the mind with the essence of choosing a wonderful way of expression. Thus, the book is not only lucrative for the literature-lovers but also it is comprehensible to those readers, who are afraid of studying in English language often being confused with its syntactic design and semantic approach. Despite being deprived of sight and hearing, her mesmerizing depiction of nature and natural objects with the decoration of language is worth mentioning. The way she has expressed her vain attempt to teach her pet dog in her childhood reminds the readers of the little girl in Tagore's poem 'Master Babu', where the girl pretends to be a teacher busy in teaching her cat complaining her mother that the cat cannot be taught. The readers can visualize the panoramic view going through the description of natural objects. The readers will also learn the technique of writing autobiography in a simple but evocative and emotive way.

Another attraction of the book is that relevant black and white pictures have been inserted in the beginning of every chapter. Thus, the readers will get the opportunity to get a glance of the Keller Homestead, little Helen Keller with her dog Belle, Perkins Institute for the Blind in South Boston, Helen Keller with her teacher Miss Anne Sullivan, view of Tennessee river from Lookout Mountain, the Cape Code Beach, Horace Mann school, Helen Keller with Alexander Graham Bell and so on.

The Editor of this book has also offered the Bengali translation with glossary after the completion of each chapter. So, the Bengali readers who cannot read English or face difficulty in reading English may also be enriched with this literary and educative piece of writing.

The price of the book is very reasonable and cheap and that is why the readers need not seek permission from their pockets before purchasing it. The binding of the book is in paperback mode and is not so good but as per the price the binding is satisfactory. The same comment is also applicable to its quality of pages. The font size is medium and standard. The readers will have no problem to handle the book.

The cover page of the book is also very pleasant and appropriate. The cover page shows the picture of Helen Keller smelling a flower in front of an open book. Helen Keller was really a voracious reader who had found her universe in the midst of the books. Moreover, being deprived of sight and hearing, smelling was another option for her to identify objects. This olfactory sense is very vital for such children. The picture can be decoded from another perspective. The life of Helen Keller is itself a very precious book for the children with special needs as well as for the whole mankind. The fragrance she smells is actually the fragrance that fills the life of the dejected and marginalized people.

As it is an autobiography, it cannot be written till the end of the life of the protagonist. So, Keller had to stop her writing after describing up to a certain stage of life. But the readers must be interested to explore more about such a personality. If the readers want to know more about the later episodes in the life of Helen Keller, they have to study the other books written by Helen Keller and on Helen Keller. However, this book even after more than hundred years still carries an empathetic as well as encouraging appeal to the readers of this generation. Inclusive society is a dream of National Education Policy 2020 as well. And this dream was also dreamt by Helen Keller more than a century ago. Helen Keller is itself an instance of 'struggle for existence' and 'survival of the fittest'. Thus, Ms. Keller along with her autobiography is still relevant in this era of 'equitable and inclusive education' inculcating the messages of the most vital pillars of education— 'Learning to live together' and 'Learning to be'.

"Transforming Education with Artificial Intelligence: Advancements in Teaching and Learning"

Prof. (Dr.) Taposh Ghoshal
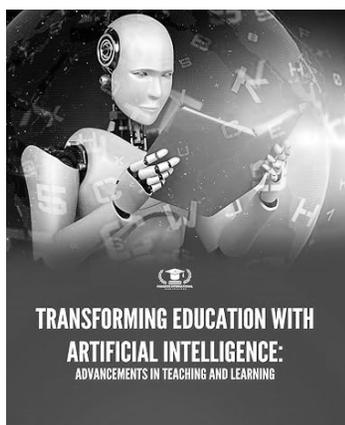
"Transforming Education with Artificial Intelligence: Advancements in Teaching and Learning" is a pivotal and timely contribution to the discourse surrounding the integration of AI into educational paradigms. Edited by a team of leading scholars in educational technology and artificial intelligence the 194 page book presents a comprehensive and nuanced exploration of how AI is not merely augmenting but fundamentally reshaping the landscape of teaching and learning. Running to approximately 2000 words, this review will delve into the book's core themes, its strengths and limitations, and its profound implications for the future of education.

The book is structured into several thematic sections, each addressing a critical facet of AI's application in education. These sections typically move from foundational concepts and theoretical frameworks to practical implementations, case studies, and future trajectories. This logical progression allows readers to build a robust understanding of the subject, irrespective of their prior familiarity with AI or educational technology.

One of the book's most compelling strengths lies in its comprehensive scope. It goes beyond the superficial hype surrounding AI to explore its genuine potential across various educational domains. Chapters dedicated to personalized learning, for instance, meticulously detail how AI algorithms can analyze student data – learning styles, progress, weaknesses, and strengths – to create highly individualized learning pathways. This goes beyond simple adaptive testing, delving into intelligent tutoring systems that can offer real-time feedback, suggest optimal learning resources, and even anticipate student difficulties before they arise. The discussions are grounded in pedagogical theory, emphasizing that personalization is not an end in itself but a means to foster deeper understanding and greater student agency.

Another significant area explored is the transformation of teaching practices. The book posits that AI is not replacing educators but rather empowering them with tools that can automate mundane tasks, provide data-driven insights into student performance, and free up valuable time for more meaningful interactions. Chapters on AI-powered assessment tools showcase how AI can offer rapid and detailed feedback, moving beyond traditional grading to provide diagnostic insights that inform both teaching and learning. Similarly, the book examines how AI can assist in content creation, curriculum development, and even professional development for educators, offering tailored resources and learning opportunities.

The book also delves into the exciting possibilities of AI in fostering equitable access to education. For learners in remote areas, those with disabilities, or individuals facing socio-economic barriers, AI can bridge gaps by providing accessible learning materials, real-time translation services, and adaptive interfaces. The discussions on AI for special education are particularly insightful, highlighting how AI can personalize instruction, offer assistive technologies, and track progress for diverse learning needs, thereby promoting inclusivity.

Beyond these practical applications, "Transforming Education with Artificial Intelligence" does not shy away from the ethical considerations and challenges inherent in this technological shift. A dedicated section addresses critical issues such as data privacy, algorithmic bias, and the potential for AI to exacerbate existing inequalities if not implemented thoughtfully. The authors stress the importance of transparency in AI algorithms, the need for robust data governance frameworks, and the imperative of human oversight in all AI-driven educational initiatives.

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This thoughtful engagement with the darker side of AI demonstrates the book's commitment to a balanced and responsible approach to technological integration.

Furthermore, the book tackles the crucial question of preparing future generations for an AI-driven world. It argues that education itself must evolve to equip students with the skills necessary to thrive in an increasingly automated and intelligent society. This includes fostering critical thinking, problem-solving, creativity, and digital literacy, as well as an understanding of AI's capabilities and limitations. The book suggests that AI can be a powerful tool for teaching these 21st-century skills, for example, through AI-powered simulations, collaborative AI projects, and opportunities for students to engage with AI development themselves.

While the book's breadth is commendable, its depth varies across chapters, as is often the case with edited volumes. Some chapters offer highly detailed technical explanations and robust empirical evidence, while others are more conceptual or exploratory. This is not necessarily a weakness, as it caters to a diverse readership with varying levels of technical expertise. However, a more consistent depth across all contributions might have further strengthened the overall coherence.

Another potential area for further exploration, though touched upon, is the sociological impact of AI on the student-teacher relationship. While the book emphasizes AI as a tool for empowerment, the subtle shifts in human interaction and the potential for over-reliance on AI by both students and teachers warrant continued critical examination. Similarly, while the ethical considerations are well-addressed, the practical mechanisms for ensuring accountability and redress in cases of algorithmic error or bias in educational settings could be further elaborated.

Despite these minor points, "Transforming Education with Artificial Intelligence" stands out for its forward-thinking perspective and its commitment to rigorous academic inquiry. The authors consistently emphasize that successful AI integration in education requires a holistic approach that considers not only the technological aspects but also the pedagogical, ethical, and societal dimensions. They advocate for a human-centered AI, where technology serves to augment human capabilities and foster a more engaging, personalized, and equitable learning experience.

The book's relevance extends beyond academic circles. Policymakers, educational administrators, curriculum developers, teachers, and even parents will find invaluable insights within its pages. For policymakers, it offers a roadmap for developing national strategies for AI in education, emphasizing the need for investment in infrastructure, research, and professional development. For educators, it provides practical guidance and inspiration for leveraging AI tools in their classrooms. For researchers, it identifies key areas for future investigation and encourages interdisciplinary collaboration.

In conclusion, "Transforming Education with Artificial Intelligence: Advancements in Teaching and Learning" is a meticulously researched and profoundly insightful book that offers a panoramic view of AI's transformative potential in education. It masterfully balances optimism with pragmatism, showcasing the incredible opportunities while soberly acknowledging the challenges. It is a clarion call for educators, policymakers, and technologists to collaborate in harnessing the power of AI to create a future where learning is more accessible, personalized, and effective for all. This book is not just a valuable resource; it is an essential guide for anyone invested in shaping the future of education in an increasingly intelligent world. Its timely arrival ensures that the conversation around AI in education is informed, robust, and directed towards truly transformative outcomes.

ARTICLE DIGEST

Toward the Digital Transformation in Education

Article by - Andreas Schleicher
Article Digest by: Prof. (Dr.) Taposh Ghoshal

Andreas Schleicher, Director for Education and Skills at the Organisation for Economic Co-operation and Development (OECD) and the driving force behind the Programme for International Student Assessment (PISA), presents a compelling vision for the digital transformation of education in his article "Toward the Digital Transformation in Education." A leading voice in global education reform, his work, particularly articulated in "Toward the Digital Transformation in Education," offers a nuanced and critical perspective on how technology can and should reshape learning systems worldwide. Schleicher consistently argues that digital transformation is far more profound than simply integrating devices into classrooms; it necessitates a fundamental rethinking of pedagogy, curriculum, assessment, and the very purpose of education in the 21st century. He argues that while technology has always played a role in learning, the current era, particularly with the advent of artificial intelligence (AI), offers an unprecedented opportunity to fundamentally reshape educational systems. The article moves beyond simply digitizing existing practices to envision a future where digital tools lead to a more effective, equitable, and personalized learning experience for all.

In his article, he has deliberated upon some of the important aspects of transformation in education through digital modes. Schleicher talks about the imperative for transformation as an approach that goes beyond incremental change. He begins by underscoring the urgency of digital transformation, not as a technological fad, but as an existential necessity for education systems. He postulates that the current educational models, largely designed for an industrial age, are ill-equipped to prepare students for a world characterized by rapid technological advancement, complex global challenges, and an unpredictable future of work. The COVID-19 pandemic, he quotes, served as a stark accelerator and revealer, exposing both the vulnerabilities of traditional systems and the immense potential of digital tools when strategically deployed. However, he cautions against the temptation to simply digitize existing practices,

emphasizing that true transformation demands a shift from "doing better what we already do" to "doing things differently."

Schleicher postulates that digital technology, including AI, has the potential to significantly improve the effectiveness and quality of education across several key dimensions. Firstly, it can enable **personalized education**, tailoring learning pathways, content, and pace to individual student needs and learning styles. Intelligent digital learning systems, for instance, can observe how students engage with material, identify their interests and difficulties, and adapt the learning experience with a granularity far beyond traditional classroom settings. This moves away from the "one-size-fits-all" approach, recognizing and catering to the diverse learning profiles of students.

Secondly, digital transformation can make education more **inclusive and equitable**. The article highlights how technology can bridge geographical and socio-economic barriers, providing access to high-quality learning resources for individuals who might otherwise be excluded. Examples like Massive Open Online Courses (MOOCs) are cited as transformative tools that democratize access to education, overcoming gender and other societal obstacles. The rapid growth of online learning platforms, particularly evident during the COVID-19 pandemic, demonstrated technology's capacity to sustain educational opportunities and reach millions globally. This includes providing specialized materials in multiple formats and bridging time and space limitations, making education accessible to a wider demographic, including students with special needs.

Finally, Schleicher suggests that digital transformation can improve the **cost-efficiency** of the education sector. By leveraging digital tools for content delivery, assessment, and administrative tasks, systems can potentially optimize resource allocation and reach more learners with quality instruction. The article emphasizes that the value proposition of education in the digital age is shifting from merely acquiring information (which is readily available

online) to knowing what to *do* with that knowledge. This elevates the importance of teaching, moving it beyond content delivery to fostering critical thinking, problem-solving, and adaptability.

The vision presented is not merely about integrating technology into existing classrooms but about a profound systemic shift. It's about creating dynamic learning environments that support 21st-century learning methods, facilitate experiential learning through project- and inquiry-based approaches, and provide real-time formative assessments.

A central tenet of Schleicher's philosophy is that technology should be a means to an educational end, not an end in itself. He vehemently argues against a technology-driven approach, asserting that successful digital transformation hinges on a clear pedagogical vision. The question is not "How can technology enhance current teaching?" but "What kind of learning do we want to foster, and how can technology help us achieve that?" This "pedagogy first" principle means that educators and policymakers must first define the desired learning outcomes – focusing on competencies like critical thinking, creativity, collaboration, and complex problem-solving – and then strategically select and integrate digital tools that genuinely support these goals. Without a strong pedagogical foundation, technology risks becoming a costly distraction, merely amplifying outdated teaching methods.

In his article, Schleicher identifies several interconnected pillars crucial for effective digital transformation:

1. Reimagining Curriculum and Learning Design: The traditional curriculum, often siloed into discrete subjects and focused on content mastery, needs to evolve. Schleicher advocates for a curriculum that is more interdisciplinary, project-based, and relevant to real-world challenges. Digital tools can facilitate this by providing access to vast resources, enabling collaborative projects across geographical boundaries, and supporting personalized learning pathways. He envisions learning environments where students are active co-creators of knowledge, engaging in inquiry-based learning and developing a deeper understanding of complex concepts, rather than passively receiving information.

2. Transforming Teacher Professional Development: Teachers are the linchpin of any educational reform, and digital transformation places new demands on their roles. Schleicher emphasizes that teachers must move beyond being mere transmitters of information to become facilitators, coaches, mentors,

and designers of rich learning experiences. This requires comprehensive and ongoing professional development that goes beyond basic digital literacy. Teachers need to learn how to leverage technology to differentiate instruction, foster student agency, integrate computational thinking, and effectively use data to inform their practice. Furthermore, professional learning communities, supported by digital platforms, can enable teachers to share best practices and collectively innovate.

3. Innovating Assessment Practices: Current assessment systems, often reliant on standardized, summative tests, are often misaligned with the competencies needed for the digital age. Schleicher argues for a shift towards more authentic, formative, and performance-based assessments that measure deeper understanding, problem-solving skills, and collaborative abilities. Digital tools can play a transformative role here, enabling adaptive testing, providing real-time feedback, supporting portfolios of student work, and analyzing learning patterns to offer personalized insights. The goal is to make assessment an integral part of the learning process, guiding instruction and empowering students to take ownership of their progress.

4. Ensuring Equitable Access and Robust Infrastructure: While emphasizing pedagogy, Schleicher does not diminish the importance of foundational infrastructure. Equitable access to reliable broadband internet, appropriate devices, and secure digital platforms is non-negotiable. He highlights the persistent digital divide, both within and between countries, and stresses that digital transformation must actively work to bridge these gaps. Without equitable access, technology risks exacerbating existing inequalities, leaving the most vulnerable students further behind. This also includes addressing issues of digital safety, privacy, and responsible online behavior.

1. 5. Fostering Adaptive Leadership and Governance: Successful digital transformation requires strong, adaptive leadership at all levels – from national policymakers to school principals. Leaders must articulate a clear vision, allocate resources strategically, foster a culture of innovation and experimentation, and be willing to challenge traditional norms. Governance structures need to be flexible enough to support rapid iteration and learning from both successes and failures. Schleicher suggests that effective leadership involves empowering educators, engaging communities, and creating a policy environment that encourages, rather than constrains, pedagogical innovation.

Schleicher is acutely aware of the challenges inherent in digital transformation. These include the risk of superficial adoption, the temptation to revert to traditional methods, the need for significant investment, and resistance to change from various stakeholders. He particularly stresses the critical importance of equity. Digital transformation must not only avoid widening existing disparities but actively work to reduce them. This means designing solutions that are inclusive, accessible, and culturally relevant, ensuring that technology serves as a powerful equalizer, providing opportunities for all students, especially those from disadvantaged backgrounds, rural areas, or with special educational needs.

Ultimately, Schleicher's vision for digital transformation in education is one where technology enables more resilient, personalized, and human-centric learning systems. He envisions a future where learning is not confined to the classroom, but is lifelong and ubiquitous; where students are empowered to navigate complexity, embrace uncertainty, and shape their own futures; and where education systems are dynamic, responsive, and continuously evolving. By focusing on the strategic integration of technology to achieve profound pedagogical shifts, Schleicher argues that education can move beyond its industrial-age legacy and truly prepare individuals to thrive in the digital age.

ARTICLE DIGEST

Education 4.0: A New Paradigm in Transforming the Future of Education in India

Article by - Dr Ruchi Tandon, Amity University, Noida, and

Dr Sanjeev Tandon, ITS, Mohan Nagar, Ghaziabad

Article Digest by: Prof. (Dr.) Mintu Halder *

This article, *'Education 4.0: A New Paradigm in Transforming the Future of Education in India'* appearing in the I*nternational Journal of Innovative Science, Engineering & Technology, Vol. 7 Issue 2, February 2020 (pp 33-54),* draws the attention of the necessity of Industrial Revolution 4.0 (IR 4.0) and its corresponding changes in the education system of India. In this article, the authors have investigated the awareness level of Education 4.0 and the challenges posed by Industry 4.0. They are of the opinion that there has been a necessity of a paradigm shift in the education of India in the face of Fourth Industrial Revolution (IR 4.0). Especially, in the era of artificial intelligence (AI), robotics, big data, autonomous vehicles, bio and nanotechnology, 3-D printing, quantum computing, material science, energy storage and internet up-gradation, the education system of India needs to be redesigned to accommodate the prerequisites of work force for upcoming industries. This Article unveils a prolific correlation between the fourth industrial revolution (IR 4.0) and Education 4.0 that has become a buzzword among educationists across the globe.

In this article, the authors have explained that Indian education system has to rise to the occasion with the requirements of IR 4.0. The curriculum and training schedule Education 4.0 should be made in conformity with the requirements of job market. An inevitable question comes in the minds of authors that are we preparing the country for the incorporation of education 4.0 in our educational system. Therefore, Ministry of Human Resource Development (MHRD) needs to inculcate relevant academic programs and curriculum.

The authors opine that an urgent attention is required for the expansion of university curriculum for promoting skill development of learners. Alongside, well-knitted preparation for mapping of contemporary job positions, necessity of focused attention on awareness about IR 4.0, Education 4.0 and correlation between IR 4.0 and

Education 4.0 are to be disseminated with the joint venture of public-private partnership. The requirements of IR 4.0 are to be effectively communicated to all the stakeholders of educational enterprise. For this, a rigorous marketing strategy in defence of the relevance of Education 4.0 is the need of the hour.

The authors have explained that the dynamics of educational system has undergone a revolutionary change in the era of Digital revolution and technology advancement. In the past, the world has also witnessed change in the structure and curriculum of education with the change in the preceding industrial revolutions. This is the high time to bring about change in education system keeping in view the necessity of workforce of the 21st Century. In fact, the IR4.0 has changed the world around us. The acquisition of new knowledge and training of staff in regular basis is an essential part of IR 4.0. In the contemporary world of fast changing technology and information overload, students are to be trained to access relevant information.

In support of the need of 4.0 education, authors have observed that digitalization increases its effects in modern manufacturing system making room for incorporation of 4.0 technologies in the industry. It focuses strictly on the integration of human capacity and technology in manufacturing process. The IR 4.0 describes the use of electronics and information technologies (IT) in manufacturing process and service sector. In their view, only qualified, highly educated and skilled employees will be able to control the innovations of industrial setup.

The authors have observed that the way in which industry 4.0 gives stimulus to online quality control, in the similar manner education 4.0 has put importance on formative assessment. First, peers become very significant in the learning process in education 4.0. The students learn together, along with their peer group, while the teachers assume the role of facilitators in this learning process. Second, the learning is not classroom

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centric; it may take place anytime and anywhere. The guidelines followed in education 4.0 are of a flipped classroom approach. Third, rigorous practice is to be made available for the student, until the mastery level is attained.

The students are to be prepared to meet up the exigencies of the fundamental principles of education 4.0 so that they can fulfil the requirements of 4.0 industry. Education 4.0 wants to incorporate the knowledge of advance technology to supplement the teaching learning process. This is a holistic approach for moving from the traditional teaching factory to teaching factory 4.0 (Demartini, C., & Benussi, L. 2017).

In support of the Education 4.0, authors have mentioned observations of different intellectuals. Dunwill (2016) says that the advancement of technology keeps on changing and transforming the teaching method and the setting of the learning process. Kozinski (2017) highlighted the following learning preferences of the Gen Z students. To perform the Industry 4.0, there are six different design principles – i) Interoperability, ii) Transparency of information, iii) Technical support, iv) Real-time data acquisition and processing, v) Modularity and vi) Distributed decision (Mehmet Baygin, Hasan Yetis, Mehmet Karakose and Erhan Akin 2016).

The authors have said that in developed countries, some universities are already developing infrastructure for education 4.0. However, for shaping of this new world of education and expectations of students, we need more planned and systematic collaboration across sectors. Thus, India needs renovation in its education system to avail the full advantage advanced technology.

Authors have studied the thoughtful correlation between Industry 4.0 and Education 4.0 and summed up the findings in the following ways;

1. It is found that 98.1% of the respondents are aware of the fact that in the last 250 years, world has experienced four industrial revolutions, which have entirely changed the face of industry of the respective decades.

2. Among the respondents, 82.6% respondents admit that, changes in the education system should be in accordance with the industrial job requirements.

3. The respondents (50.2 %) are of the opinion that students are valuable members of the workforce in the contemporary industrial era. However, 42.7% of the respondents partially agree to the above statement.

4. It is found that 70.9% respondents believe that educational paradigms need to be rebuilt along with each new industrial revolution in society. However, 21.6% believe that the statement is partially true.

5. Responding to the nature of framework of study, 52.6% respondents are of the opinion that academic framework was rigid and feel the need of introduction of flexi classes and flipped classrooms as part contemporary education system. In the era 4.0, there is a need to propagate various pedagogical tools, which are relevant and flexible in nature.

6. Concerning the introduction of computer, 53.5% respondents felt that in the future Artificial intelligence (AI) will dominate the education system. Gradually, the teaching learning and assessment process will be guided AI. Even, advanced robotics and AI will guide the computer aided smart manufacturing.

7. The respondents (81.2%) believed that in the era of fast changing technology and information overload, the students should be trained and taught. However, in the Education 4.0 the students need to be trained, rather than taught. Training is an integral part of education 4.0. The conventional mode of lecture has to be quickly replaced by flipped classes and interactive learning.

8. The respondents (61.5%) highlighted that the students should be given lesson to find relevant information rather than presenting readymade information to them.

9. The respondents (67.1%) agreed to the viewpoint that students should be guided to develop their skills rather than being taught in a predefined rigid form. All students are unique and have to be dealt in tutorial classes accordingly.

10. The respondents (75.1%) are of the view that Education 4.0 needs to be aligned with Industry 4.0.

11. The respondents (59.6%) expressed that teachers have a major role as a mentor, rather than lecturer. The responsibility of a teacher is to guide the student to be an active lifelong learner.

12. The respondents (59.6%) are of the opinion that the goal of Industry 4.0 is to build a fair and self-sustaining model for education rather than knowledge transfer in a rigid form. Its aim is to make room for a plural society. However, 40% of the respondents do not know the essence of education 4.0.

13. The respondents (47.4%) expressed that education system should be made more conducive and productive. Until the education system is not aligned with the industry 4.0, there will be a gap between demand and supply of the job seekers.

14. The majority respondents (84%) are of the view that, education system should encourage value based beliefs and insights, which makes us more human. The value system is the underline force behind making the castle of social structure and norms of society. The correlation between and among man, machine and technology should be governed by human values.

15. It is found that 68.1% respondents opined that Education 4.0 should prepare students to visualize all that are required for the future society. The students are required to learn the lessons that are in conformity with the future job positions. Artificial Intelligence, Robotics, 3D printing and virtual augmented technologies etc. are going to the integral part of academic curriculum.

In this article, authors have suggested following recommendations to overcome challenges posed by IR 4.0:

1. The world has become a global village because of scientific and technological innovations. There is massive leap in communication, transport, space exploration and educational technologies.

2. The curriculum and pedagogy used in the present education system needs a serious discussion and consequent redesign. Academic bodies like, CBSE, AICTE, UGC etc. must also seek students' opinion in designing and updating the curriculum. The rapidly increasing of higher education institutes, with no quality control by statutory bodies, have been producing low quality human resource for the industry.

3. The contemporary education system has to defend the challenges of recent technological advancements, like artificial intelligence, robotics, autonomous vehicles, bio and nanotechnology, 3-D printing, material science, quantum computing, e-learning etc. The curriculum and contemporary industrial job positions have to be aligned accordingly.

4. The concept of Flipped Classroom is to be applied for it will facilitates the class instructor to plan the learning activities with a view to support the Social Emotional Learning of students.

5. A proper monitoring initiative by AICTE/ UGC for higher education institutions will ensure quality control. Higher education and training institutions should take proactive measures to develop digital skills and knowledge for the students.

6. Students should be inspired to go through project-based learning and hands-on-learning through field experience such as collaborative projects, mentoring and internships. The theoretical knowledge has to be combined with usage of data interpretation and reasoning skills.

7. The system should move towards a socio-technical-digital ecosystem and should encourage Massive Open Online Courses (MOOCs) and other online learning platforms in the teaching and learning process.

8. The 4.0 era should focus on three Hs: Head i.e. knowledge, Heart that is wisdom and Hand that is skills. Role of higher institutions is to provide enough resources to encourage academicians to use technologies in their classrooms.

9. The teaching pedagogy should incorporate hands-on-activities. It would help to increase student engagement through direct practical experience. The students are expected to involve more on physical activities, rather than merely listening to lectures and watching demonstrations.

10. The use of interactive platforms such as "Kahoot", a game-based learning program enhances the aura of the overall learning, and "Socrative", a cloud-based students' application, by academicians will be much more amiable for effectively engaging students during assessments.

The Power of Pedagogy: Transforming Education and Learning

Article by Pravie Govender
Article Digest by: Dr. Babita Kumari *

The article 'The Power of Pedagogy: Transforming Education and Learning,' is an insightful and thought provoking writing by Pravie Govender. Published on July 20, 2023 (Pravie Govender: https://education.adaptit. tech/author/pravie-govender/), the article emphasizes the pivotal role of pedagogy in modern education and defines pedagogy as the theory and practice of teaching and learning, encompassing strategies, methods, and principles educators use to facilitate knowledge, skills, values, and attitudes in students.

In the article, the author meticulously explores the pivotal role of pedagogy as the cornerstone of effective education, moving beyond the mere transmission of knowledge to a more profound and transformative learning experience. Govender argues that true educational reform hinges not on technological advancements or curriculum overhauls alone, but fundamentally on how teachers teach and how students are empowered to learn.

The article begins by deconstructing traditional pedagogical approaches, often characterized by rote memorization and passive reception of information. Govender posits that while these methods have historical roots, they are increasingly ill-suited to the demands of the 21st century, which necessitates critical thinking, creativity, problem-solving, and adaptability. The author highlights how such conventional teaching can stifle curiosity and diminish intrinsic motivation, leading to superficial understanding rather than deep, lasting learning.

Govender then pivots to advocate for a paradigm shift towards student-centered pedagogies. This involves creating dynamic learning environments where students are active participants in their educational journey. Key elements discussed include inquiry-based learning, collaborative projects, experiential education, and differentiated instruction. The author emphasizes that these approaches acknowledge the diverse learning styles, backgrounds, and intelligences of students, fostering an inclusive environment where every learner can thrive. By positioning the student at the center, pedagogy transforms into a facilitative process, guiding learners to construct their own knowledge and understanding.

A significant portion of the article is dedicated to the role of the educator in this evolving landscape. Govender redefines the teacher's role from an instructor to a facilitator, mentor, and guide. This requires educators to possess not only subject matter expertise but also a sophisticated understanding of learning theories, cognitive development, and classroom management techniques that promote engagement and critical discourse. Professional development for teachers, therefore, becomes paramount, focusing on equipping them with the pedagogical skills necessary to implement innovative teaching strategies effectively.

Furthermore, Govender addresses the integration of technology within pedagogical frameworks. While acknowledging technology's potential to enhance learning, the author cautions against its indiscriminate use. The argument is that technology should serve pedagogy, not dictate it. When thoughtfully integrated, digital tools can personalize learning, provide immediate feedback, and connect students to global resources, thereby amplifying the impact of sound pedagogical practices.

The article also touches upon the assessment strategies that align with transformative pedagogy. Instead of relying solely on summative evaluations, Govender advocates for a balanced approach that includes formative assessments, peer evaluations, and self-reflection. These methods provide ongoing feedback, inform instruction, and encourage a growth mindset, reinforcing the idea that learning is a continuous process of improvement.

In conclusion, Govender powerfully asserts that pedagogy is the engine of educational transformation. It is the deliberate art and science of teaching that can unlock student potential, cultivate essential 21st-century skills, and prepare individuals to navigate an increasingly complex world. By prioritizing robust pedagogical practices, education systems can move beyond mere schooling to

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truly foster lifelong learners and critical global citizens. The article serves as a compelling call to action for educators, policymakers, and communities to invest in and champion pedagogical excellence for the future of learning.

The article outlines two primary pedagogical approaches:

- **Teacher-centred pedagogy:** The teacher is the primary source of knowledge, and students are recipients. This traditional method is effective for factual learning and introducing new concepts, especially when there's a good teacher-student relationship.

- **Learner-centred pedagogy:** Learners actively participate in their learning, with the teacher acting as a facilitator. This approach is beneficial for building on prior knowledge, stimulating individual cognition, and promoting experiential learning, leading to deeper understanding and retention.

Pedagogy transforms education by enhancing student engagement, fostering critical thinking, inspiring creativity, promoting lifelong learning, and preparing students for the digital workforce. The article details several ways that the pedagogy achieves this. It includes 'Active Learning' that encourages student participation through discussions, problem-solving, and hands-on activities, 'Student-Centred Learning' that shifts focus to the student, promoting autonomy and self-directed learning and 'Inquiry-Based Learning' that fosters curiosity and critical thinking by encouraging students to ask questions and investigate problems.

The author also discusses in details the need for Technology Integration in making pedagogical approaches and suggests utilization of technology to create engaging and accessible learning experiences. Besides, he underlines the importance of 'Assessment for Learning' and uses formative assessments and feedback to guide instruction and help students improve. Pravie Govender also talks about 'Multimodal Learning' to present information through various modalities (text, visuals, audio, hands-on) to cater to diverse learning styles and 'Collaborative

Learning' for promoting teamwork and communication through group projects and peer teaching. The author says that an effective pedagogy must also have a 'Real-World Relevance' so as to connects lessons to real-life situations to show the practical application of knowledge and also 'Lifelong Learning Skills', necessary to develop critical thinking, creativity, communication, and adaptability.

The article further highlights innovative pedagogical approaches that educators are implementing. Pravie talks about Flipped Classroom to enable students to learn content at home and use class time for active learning with teacher guidance, Project-Based Learning (PBL), where students can work on real-world projects to develop critical thinking and problem-solving skills and Problem-Based Learning (PBL) focusing on complex, real-world problems for students to research and solve. The author suggests inclusion of Gamification also to integrate game elements to make learning engaging and motivating. Flipped Mastery to enable students to progress at their own pace, demonstrating mastery before moving on and also Peer Teaching where students teach each other, enhancing understanding and communication skills.

In addition, Pravie also touches upon Experiential Learning i.e. learning through direct experience (internships, field trips, simulations), Personalised Learning i.e. tailoring instruction to individual student needs using technology and data, Blended Learning that combines face-to-face instruction with online learning tools, Collaborative Learning that emphasizes group work and student collaboration and Assessment for Learning (Formative Assessment) for Ongoing assessments to gauge progress and adjust teaching strategies.

In conclusion, the article asserts that various pedagogical approaches and methods are powerful tools for transforming education. They provide a framework for effective teaching and learning, support individualized instruction, encourage active engagement and critical thinking, and foster the development of well-rounded individuals prepared for the complexities of the modern world.

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2.   Manuscripts including the Abstract, Tables, Figures and References should be 4000-5000 words.

3.   The Abstract should be of maximum 200-250 words.

4.   All the manuscripts should be typed in double-space with 12 point font in Times New Roman and One Inch margin on all sides on A 4 size paper.

5.   The cover page should contain the Title of the paper, Author's Name, Designation, Official Address, Address for Correspondence, Contact Phone numbers and E-Mail address.

6.   The main text should not contain footnotes. References should be given at the end of the manuscript and should contain only those cited in the text of the manuscript. The full reference should be listed at the end in alphabetical order running the APA style

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