Role of Digital Technology in Transforming Chalk and Talk Classroom Teaching into Constructive and Inclusive Learning Environment

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Abstract: The teaching-learning process has undergone a transformative shift, revolutionizing education to become more inclusive and accessible for students from varied cultural socio-economic backgrounds, and individual differences. This paradigm shift has brought about significant changes, ensuring that education is tailored to meet the diverse needs of students, promoting equity, and fostering a more inclusive learning environment. The present classrooms are being transformed from conventional mode with the revolutionary technological settings that results in creating adequate opportunities for equitable and inclusive education to all. This paper investigates how educational technology can revolutionize traditional classroom teaching, creating a more inclusive and constructive Learning Environment supporting with various teaching methods, including blended learning, flipped classrooms, and virtual classrooms, fostering collaborative and interactive learning environments. Educational technologies act as bridging elements in identifying and catering the learning gaps to bring inclusive transformational changes. In the present era edtech tools, personalized learning platforms, adaptive technologies and AI-powered applications can be seamlessly integrated into educational content to enhance learning experiences and cater to diverse student needs. Learners with special need and marginalized communities facilitated with required assistive technologies to enhance the quality of education should cater to individual needs while promoting an inclusive culture and global citizenship, empowering students to thrive in a diverse world. The national education policy 2020 seeks to provide high quality education that is inclusive, equitable, and accessible to everyone. Furthermore, this paper is a brief attempt to address and judge the suitability and accessibility of various educational-technological interventions that can boost student engagement, academic performance, and personalized learning through targeted interventions, including interactive tools, adaptive software, and data driven insights. The findings of the paper highlights that integrating required educational technology within instructional models inclusively create a holistic approach in education helping in adapting the skills needed for the 21st-century era. Shifting the conventional classroom model which is characterized by face-to face instruction and minimal technology use into learner centred and constructive environment with active involvement of learners. However, it majorly emphasizes the potential of ICT to bring revolutionary enhancement in education which prepare learners for the future endeavours with adequate skills, competencies over technology and attainment of digital literacy. Digital technologies empower learners to prevail over various challenges by fostering self- learning and motivation to construct their own knowledge by strengthening the prior knowledge of learners.

Keywords: *Information and Communication Technology (ICT), Modern ICT Tools, Digital Learning, 21st Century Skills, Inclusive Learning Environment.*

I. INTRODUCTION

Digital technology has become a key catalyst in disseminating shared knowledge and driving educational transformation. The adoption of technology-enhanced learning tools such as mobile phones, smartboards, MOOCs, tablets, laptops, simulations, interactive visualizations, and virtual labs has significantly reshaped the educational landscape. Among these innovations, the Internet of Things (IoT) has emerged as one of the most cost-efficient approaches for educating young minds (Lei J, 2010).

The information age marks a transition into a knowledge-driven era, offering unparalleled opportunities for discovery, communication, information exchange, and exploration—ultimately enhancing the teaching-learning

process. Information technologies facilitate global knowledge sharing, enabling both teachers and students to access current and relevant information. Over the past fifteen years, globalization and rapid technological advancements have jointly fostered a new global economy one that is technology-powered, information-fueled, and knowledge-driven. Recognizing this shift, the National Policy on Education (1986) highlighted the crucial role of educational technology in the education sector. This paper aims to explore how innovative teaching practices supported by ICT are transforming traditional classrooms into dynamic and interactive digital learning spaces.

Innovative methods in teaching and learning are essential in today's educational landscape. To support this shift, students need to be equipped to use smart devices effectively. Digital technology in the classroom encompasses a range of tools and software designed to support students, particularly those with specific accessibility needs. Integrating technology into teaching is one of the most efficient ways to minimize repetitive and time-consuming tasks for educators. Consequently, the digitalization of education has led to notable improvements in students' learning outcomes, comprehension, focus, and literacy skills (Lamoureux, Y., & Schutte, J., 2013).

One of the greatest advantages of digital collaboration is its ability to support all types of learners. Whether a student learns best through visual, auditory, or kinesthetic methods, technology offers diverse formats for engaging with content. Moreover, for students with special needs, digital tools can deliver personalized support and accommodations that traditional classrooms often cannot provide.

➢ *Research Questions:*
● What is the necessity of digital technologies in education.
● How digital classroom is important in changing the educational pattern.
● What are the major challenges while implementing digital technologies during classroom transaction.

II. METHODOLOGICAL APPROACH

Adopting an appropriate theoretical and philosophical framework is essential for critically examining the challenges, opportunities, and future potential of integrating smart digital technologies within education systems. The paper is structured as follows: The investigative process underpinning the review discussed in this paper was shaped by a specific methodological approach; following through in-depth studies based on evidences. Furthermore, it focused more on the theoretical aspects of digital technologies that plays vital role in the process of transformation. The paper concludes by presenting a synthesized overview of the preceding discussion and outlining key implications.

A. *Transformation of Traditional Classroom into Constructive and Inclusive Learning Environment:*
The effective integration of technology can lead to learner-centered instruction and promote collaborative, interactive classroom environments. Utilizing ICT in educational settings significantly contributes to the development of students' skills and knowledge (Beauchamp, 2010). The integration of ICT as a teaching and learning tool is strongly linked to a noticeable improvement in students' academic performance (Kisirkoi, 2015). ICTs are reshaping the appearance and functioning of schools and classrooms by introducing curricula focused on real-world problems and project-based learning. They offer tools that enhance the learning experience and provide both teachers and students with greater resources and opportunities for feedback (Bhattacharjee & Deb, 2016). ICT also fosters collaboration among teachers, students, and parents. Continuous and Comprehensive Evaluation (CCE) encourages both students and teachers to utilize more technology, making the teaching and learning process more engaging for the benefit of future generations. Teachers need to be proficient in using ICT within their subject areas to facilitate more effective learning for students. Therefore, knowledge of ICT is crucial for both prospective and in-service teachers. This will enable educators to integrate technology into classroom teaching effectively (Sharma & Priyamvada, 2017). The rise of technology and its integration into classrooms around the world have opened up countless opportunities for students to collaborate, fundamentally changing the way we learn. It has also made collaborative learning methods more accessible to both teachers and students. Various techniques fall under the collaborative learning umbrella, fostering inclusivity. These include jigsaw activities, think-pair-share, group projects, case studies, and learning communities, among others. Each technique has unique advantages and can be applied depending on the learning objectives, the nature of the subject, and the needs and capabilities of students when incorporating educational technologies (Garrison & Vaughan, 2008).

B. *Necessity of Technology in Modern Educational System:*
In essence, collaborative learning represents a shift from the competitive and individualistic learning styles traditionally emphasized in our education system. It challenges the traditional teacher-centered model, where students are passive recipients of knowledge. In today's world, where teamwork, problem-solving, and strong communication skills are highly valued, the approach of collaborative learning is more relevant than ever.

➢ *Interactive Learning Software*
As one of the most promising digital tools in education, interactive learning software encompasses educational apps, simulations, and games that engage students while teaching key concepts. These software solutions offer an interactive and immersive learning experience, encouraging curiosity and enhancing understanding of various subjects.

➢ *Learning Management Systems (LMS)*
Learning Management Systems (LMS) are a significant component of digital technology in education, with the potential to enhance both teaching and learning in schools. These digital platforms simplify the organization and distribution of educational content and resources. They allow educators to manage course materials, assessments, and communication with students in a centralized location,

making it more efficient to deliver instruction and monitor learning progress.

➢ Smart Classroom Solutions

Smart classrooms are outfitted with advanced digital technologies, utilizing devices such as interactive digital boards, smart TVs, digital whiteboards, and smart projectors. These tools are designed to create an immersive learning environment. By enabling real-time interaction and collaboration, they make lessons more engaging, dynamic, and interactive for students.

➢ Educational Apps

Educational apps cover a broad range of tools, including language learning apps, math practice apps, and comprehensive platforms like the iPrep App that offer all-in-one learning resources. These apps are compatible with tablets, smartphones, and computers, enabling students to learn anytime, anywhere, and tailor their learning experience to suit their individual needs.

➢ E-Books and Digital Textbook

Digital textbooks offer a more interactive and portable option compared to traditional printed textbooks. Regarded as one of the most convenient forms of digital technology in education, they are typically available in PDF format, allowing users to store hundreds of textbooks on a single device. Unlike physical books, digital textbooks do not wear out or add extra weight, making them easier for both students and teachers to manage.

➢ Adaptive Learning Systems

Adaptive learning systems represent a cutting-edge and highly promising digital technology in education. These systems utilize data and algorithms to customize the learning experience for each student. By evaluating a learner's current level, strengths, and areas for improvement, they adjust the content to meet individual needs, providing targeted support to help students succeed. An example of this is the "iPrep PAL" app, where PAL stands for Personalized Adaptive Learning.

➢ Digital Libraries

Digital libraries have the potential to transform how students learn and develop across classrooms, libraries, and school laboratories. These are advanced ICT labs equipped with tablets, notebooks, and Android laptops, typically preloaded with comprehensive digital content for grades 1 through 12. Teachers can use these tools flexibly, allowing students to learn and progress at appropriate times. Notably, the i-Prep Digital Library includes a charging trolley that can simultaneously charge all devices, adding to its convenience and efficiency.

➢ Learning Analytics

One of the most crucial digital technologies in education is the one that validates the impact and effectiveness of other digital tools Learning Analytics. This technology focuses on gathering and analysing data related to student performance and engagement. By leveraging this information, educators can make informed, data-driven decisions and pinpoint areas where their teaching strategies or curriculum may need enhancement.

➢ Digital Assessments

Digital assessment tools such as practice sets, quizzes, and tests conducted through devices like tablets, smartphones, or laptops allow teachers to assess student performance effectively and efficiently. These tools provide instant feedback, helping students identify and address their areas of improvement. As a result, they have become a vital component of digital technology in education. Gaining insight into the wide variety of digital tools used in learning environments helps us recognize their transformative power in promoting inclusive access to education and fostering student development.

III. IMPORTANCE OF EDUCATIONAL TECHNOLOGY IN TRANSFORMING CLASSROOM TRANSACTION

An inclusive learning environment ensures that students of all ability levels have equal opportunities to learn together in the same setting. Technologies such as virtual classrooms, videos, augmented reality, robotics, and other digital tools help create engaging and inclusive spaces that promote collaboration and curiosity. At the same time, these tools enable teachers to gather valuable data on student performance (Khojasteh & Salehi, 2021). Students are increasingly using online platforms to collaborate and address ongoing educational challenges. Events like hackathons have proven effective in generating solutions to complex problems. These platforms allow students to share ideas, express themselves, and work together on various projects. The COVID-19 pandemic, along with lockdowns and quarantines, underscored the critical role of digital technologies in education, enabling remote learning from the safety of students' homes. Incorporating technology into education creates an engaging and interactive learning environment, helping students stay focused and motivated. Tools such as projectors, computers, and other advanced equipment can make lessons more captivating and enjoyable. Additionally, video-based instruction, MOOCs, e-books, real-time student assessment, and automation of routine tasks can significantly enhance learning while reducing teachers' workloads. Communication enhanced by information and technology encompasses a wide range of tools—from basic resources like CD-ROMs and videos to more advanced systems such as the Internet and telecommunication networks. Educational technologies like teleconferencing, email, televised lessons, and interactive radio serve diverse instructional purposes. ICT (Information and Communication Technology) includes computers, software, the internet, broadcasting tools, and communication devices, all used for storing, retrieving, processing, sharing, and transmitting information. ICT enhances classroom teaching, promotes independent learning, and supports lifelong education (Bhattacharya & Sharma, 2007). Technology continues to play a vital role in delivering education beyond the classroom, with digital learning encouraging creativity and giving students a sense of achievement, thereby inspiring further learning through non-traditional approaches.

Technological progress has led to the creation and expansion of online libraries, eliminating the need for physical space and enabling seamless interaction among students, educators, and researchers worldwide. Online forums have made it possible for subject experts to engage in discussions on specific topics, and to review curricula, teaching methods, and assessment strategies (Clark & Mayer, 2016). In fact, advancements in technology have significantly strengthened distance education by providing easy access to learning materials and enabling convenient communication with instructors. Teachers can efficiently form and manage student groups using digital tools and social learning platforms. It's also promising to see the growing availability of assistive technologies that support students with physical or learning disabilities, helping them grasp concepts more effectively and actively engage in class. Innovations such as speech recognition software, screen readers, Braille displays, and text-to-speech tools benefit visually impaired students, while closed-captioning apps, sound amplifiers, and video conferencing technologies assist those with hearing impairments by supporting sign language and lip-reading.

IV. FACTORS CREATING CHALLENGES

The initial adoption of modern technology in education can be challenging, especially as some traditional educators may perceive digital tools and gadgets as distractions rather than effective learning aids. However, tools like online classroom calendars, which display class schedules, assignments, field trips, guest lectures, exam dates, and semester breaks, help students stay organized and plan ahead. Additionally, student response systems such as clickers and smartphones enable teachers to quickly gauge students' comprehension and identify areas that require further clarification (Smith, H. J., 2005). One significant issue is the low quality of instruction, often due to teachers lacking subject matter expertise and having limited training. However, technology offers potential solutions to address this challenge by supporting both teacher development and student learning. It can facilitate in-service training through fully online or blended learning approaches that combine digital and face-to-face instruction (Picciano, 2017). Moreover, there is evidence that teachers often need stronger incentives—they may have the ability to teach but lack the motivation. While education has long extended beyond traditional classroom boundaries, the rise of digital and remote learning environments calls for substantial adjustment, preparation, support, and active participation. Many educators and students face challenges with fundamental digital literacy skills necessary for effective use of technology. Bridging this digital skills gap among teachers is crucial to fully leverage the advantages of educational technology. Factors such as limited student interaction, rethinking engagement strategies, adapting teaching methods, addressing diverse learner needs, motivating students, managing time pressures, and working in restrictive environments all play a role in fostering effective and attentive teaching and learning (Mishra & Koehler, 2006). There is also evidence suggesting that low-tech approaches tailored to teaching at the appropriate level can significantly enhance learning outcomes. Since low-tech solutions are generally more affordable, especially for economically disadvantaged nations, it is important to thoroughly evaluate whether high-tech or low-tech methods are more effective. While many teachers now use video-based instruction, this does not always lead to improved teaching compared to traditional in-person methods (Ertmer, 1999). Although the number of Massive Open Online Courses (MOOCs) is increasing, most are not designed for primary education and often fail to address core learning challenges. Online education has also posed difficulties for some students, particularly those from low-income households who may lack access to mobile phones or the internet, making it hard for them to keep up with school (Davis & Tearle, 1999; Higgins et al., 2012). Millions of children do not have internet access at home. Despite early exposure to complex technologies, students under 15 often face health issues like eye strain and back pain. Additionally, many teachers struggle to adapt because they lack experience with digital tools.

V. DISCUSSION

By comprehending these concepts and taking the wider educational context into account, educators and policymakers can craft effective strategies for utilizing ICT to enhance teaching and learning. Solar et al. (2013) contend that integrating ICT leads to improved learning quality and elevates educational standards. Tools like interactive whiteboards and educational software actively engage students, allowing teachers to incorporate multimedia content into their lessons, thus increasing teaching effectiveness and enabling more personalized learning (Davis & Tearle, 1999; Higgins et al., 2012). The strategic use of ICT tools—such as learning management systems and online educational platforms—enables teachers to tailor instruction to individual needs and provide timely feedback, resulting in higher student engagement and better learning outcomes (Ertmer, 1999). Moreover, ICT supports both real-time and flexible interactions among learners, enhancing collaboration, problem-solving, and peer-to-peer learning—skills critical in today's education landscape (Dillenbourg, 1999). Learning management systems (LMS) further promote active participation by allowing students to engage in discussions, share materials, and collaborate on assignments, fostering deeper knowledge construction and social learning (Garrison & Kanuka, 2004).

VI. CONCLUSION

Innovative teaching methods supported by ICT are reshaping traditional classrooms into vibrant digital learning spaces, bringing a host of benefits while also introducing certain challenges that must be thoughtfully managed. By integrating technology, educators can design more engaging, tailored, and collaborative educational experiences. However, to fully realize the potential of ICT, it is crucial to invest in reliable infrastructure, ensure continuous professional training for educators, and promote digital literacy across all education stakeholders. With appropriate strategies, the digital transformation of education can greatly enhance learning outcomes and better equip students for the evolving demands of the modern world. Ultimately, the

strategic use of digital tools not only redefines teaching and learning practices but also fosters an inclusive, stimulating, and adaptable learning environment. Moving forward, the implementation of these technologies is expected to elevate both student performance and the overall quality of digital learning. Additionally, modern technologies contribute significantly to advanced data analysis and decision-making, supporting long-term planning in critical areas such as climate change, resource management, and disaster preparedness.

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