The Advancement And Incorporation Of New Technologies In The Indian Educational Landscape

Rajeev Kumar Mishra

Research Scholar
Department of Education
Nirwan University, Jaipur (Rajasthan)

Abstract: This paper is an attempt to understand the concept of innovation and the integration of new technology within the Indian education sector, as well as how to effectively measure its impact. The COVID-19 pandemic has significantly affected the education system in India at all levels. The Digital India initiative by the Indian government places a strong emphasis on improving teacher development to enhance the quality of education nationwide. The incorporation of technology has greatly enhanced the educational landscape, becoming essential for the advancement of education. Technology is playing an increasingly crucial role in the field of education, offering numerous benefits to students across all levels of learning. As India strives to become a global leader, its education system must undergo significant changes to align with the digital education standards of developed nations. Educational technology has the potential to revolutionize education, making it more accessible and affordable. The rising costs of education in a country with one of the largest populations in the world can be mitigated through the use of technology, providing opportunities for those who have been previously unable to access quality education. The study also explores the implications of online teaching and learning practices, as well as suggests avenues for further research.

I. INTRODUCTION

Technology plays a crucial role in education by providing various tools and resources to enhance the teaching-learning process. Educational technology involves the ethical use of technology to facilitate e-learning, which aims at improving performance through the creation, utilization, and management of appropriate technological tools. The initial successful models in educational technology focused on providing software and hardware to enhance the classroom experience. The current government is promoting the implementation of e-learning in all schools, but the main challenge lies in sourcing and updating suitable multimedia content regularly. Without a sustainable number of high-quality content creators, the dream of widespread e-learning in India may not become a reality.

The impact of e-learning in India has been significant. The year 2020 brought about unprecedented changes due to the global impact of Covid-19. One of the most noticeable changes in the education sector during this time was the shift to virtual education. This new system relies heavily on online classes, which have become the new standard for teaching. This shift to online education has been observed not only in India, but also in other countries.

What is Education Technology ?

The term 'technology' encompasses the advancements in methods and tools utilized to solve problems or achieve goals. In educational settings, technology can range from traditional tools like pencils, paper, and chalkboards to modern tools such as presentation software, tablets, online collaboration platforms, and more. These new technologies enable educators to explore innovative teaching methods in both physical and virtual classrooms. The choice of technology depends on the specific educational objectives. The integration of technology in classrooms greatly benefits students by enhancing their understanding and retention of the material being taught. For example, visual learners can benefit from projection screens connected to computers, allowing them to view notes instead of solely relying on verbal instruction. Additionally, there are various software programs available to supplement the curriculum, offering quizzes, tests, activities, and study materials to support students' learning outside the classroom.

II. HISTORY OF USE OF TECHNOLOGY IN EDUCATION

Educational technology has a long history, dating back to the earliest tools such as cave wall paintings. However, its more recognized history begins with the introduction of educational films in the 1900s and Sidney Presser's mechanical teaching machines in the 1920s.

The widespread use of new technologies can be traced back to the training of US soldiers during WWII through training films and other mediated materials. Today, presentation-based technology, which is based on the idea that people can learn through aural and visual reception, exists in various forms such as streaming audio and video or Power Point presentations. In the 1990s, there was a rise in schools implementing Computer-based learning (CBL) systems. These systems were often based on constructivist and cognitivist learning theories, focusing on teaching abstract and domain-specific problem-solving skills.

The 2000s saw the emergence of multiple media and ubiquitous technologies, which gave a new boost to situated learning theories that favor learning in contextual scenarios. Students are now growing up in a digital age where they have constant exposure to a variety of media.

III. TECHNOLOGY IMPLEMENTATION IN INDIA

India has established itself as a premier education hub in the global education sector. The country boasts top-tier schools, universities, and colleges that have drawn talented individuals from around the globe. The Indian education system is renowned for its resilience and solid groundwork. As per the Indian Brand Equity Foundation, the education market in India is valued at $100 billion, with higher education accounting for 59.7%, school education for 38.1%, pre-school education for 1.6%, and the remaining 0.6% attributed to technology and multimedia-based education.

India has not been at the forefront of adopting technology in the education sector, but with the availability of high-speed broadband internet and affordable computers and mobile devices, there has been a significant increase in the use of technology for learning purposes. Today, India is considered one of the fastest-growing markets for e-learning products and services. It is projected that this sector will reach a turnover of $40 billion by 2017. There are various ways in which technology can be utilized to bring about reforms in the Indian education system. The government is also aiming to enhance the digital literacy rate in the country from the current 15% to 50% by implementing favorable policies to promote technology-based

learning. Many entrepreneurs and startups have seized this opportunity to create technology-driven educational products for both private and government schools, colleges, and universities.

IV. CURRENTLY USE OF TECHNOLOGY IN EDUCATION

(i) Classroom based distance learning : This type of technology gained popularity in the late 1990s and continued to be used throughout the last decade. Satellite beaming of live classes, also known as VSAT, and study centers equipped with hardware for students to interact with teachers remotely became common in many private sector tutorials, particularly for test preparation. The Indian government has also attempted to promote this model in the past with assistance from IITs, and EDUSAT was a project in this direction. However, while the low cost and high speed of the internet have made this technology more feasible and VSAT unnecessary, the infrastructure cost of study centers and real estate prices act as a constraint on this model.

(ii) Access to variety of resources : The use of technology makes it simple to deliver audio-visual education. The range of learning resources continues to expand. With this extensive and vibrant approach integrated into the IT curriculum, students are motivated to view computers as essential tools for all areas of their education.

(iii) Social platform for a classroom to interact online : Peer to peer learning is of great significance, and it is essential for a class to maintain interaction and collaborative learning even beyond regular class hours. This concept has inspired the emergence of various social platforms where students can share learning resources and notes with each other. It is remarkable to see learners from smaller towns, who are familiar with computers, coming together to find solutions. Such instances highlight the effectiveness of social learning platforms. In India, websites like pagalguy.com, Great Learning, and Upgrad serve as excellent examples of this concept. However, there is a noticeable lack of social learning platforms, particularly for primary and high school education. School boards have a significant role to play in promoting and facilitating such initiatives.

(iv) Classroom emulating online environments : In addition to technology that enhances the classroom experience or is utilized within the classroom, another significant area of technology is online learning platforms. These platforms allow individuals to learn, take exams, participate in lectures, access study materials, and engage with faculty and peers.

(v) Mobile based learning management system : In India, a larger number of individuals can utilize smartphones with internet compared to computers with broadband connections. This has led to a substantial investment in mobile-based learning technology for higher education courses by iP leaders. Nearly half of the users opt to access our courses on smartphones and tablets, while the rest prefer computers. Developing mobile-based courses requires optimization for smaller screens, lower computing power, and slower internet speeds. Although challenging, several Indian startups have successfully tackled this issue.

(vi) Learning through mobile apps : A recent report from Counterpoint Research revealed that India has now become the second largest smartphone market globally, trailing only behind China, with over 220 million active users. This development presents a significant opportunity for the delivery of e-learning content through mobile applications. Educational mobile apps are now widely accessible on popular platforms such as Android and iOS, with developers focusing on creating apps tailored to specific subjects. These apps aim to simplify complex concepts through easy-to-understand illustrations, animations, puzzle games, and more. Subjects covered by these educational apps include grammar, physics, chemistry,

mathematics, and others. As the prices of tablets and smartphones continue to decrease, individuals in rural and remote areas can also take advantage of these apps to enhance their learning and skills.

V. DIGITAL LEARNING IN INDIA

Digital learning has been rapidly advancing in India in recent years, revolutionizing the way students grasp concepts in educational institutions. The shift from traditional teaching methods to more interactive digital solutions has significantly enhanced the learning experience for students at all levels. Online education has emerged as a valuable tool for learners and a groundbreaking innovation in the field of education. The digital education sector has expanded the horizons of the industry, offering a lucrative platform for potential investors. By providing a new approach to learning, digital education encourages students to broaden their mindset beyond the confines of traditional schooling. With over 370 million internet users in India, online education is experiencing exponential growth. The current digital learning market in India is valued at over 3 billion, and it is projected to reach 1.96 billion by 2021, as per a study conducted by KPMG in collaboration with Google. The research indicates that the number of paid users is expected to increase sixfold from 1.6 million in 2016 to 9.6 million in 2021.

In the past three years, numerous innovations and successful startups have emerged in the realm of online education. According to predictions made by Technavio's market research analysts, the digital education market in India is projected to grow at a compound annual growth rate (CAGR) of approximately 19% by 2020. Recent analysis from Coursera, the largest online education provider globally, indicates that 1.3 million users in India are among the 18 million registered learners. The growing demand for flexible and career-oriented online courses has led to a significant increase in new registrations in India, which have surged by 70 percent over the last year. The survey reveals that India ranks as the third largest market for online learning, following the United States and China.

Implementation of Digital Learning in India

Educational institutions are gradually recognizing technology as a means to enhance pedagogical approaches and connect with students in a technologically relevant manner. Nearly everyone, regardless of age, possesses a smartphone. Google serves as our library, while Wikipedia functions as our encyclopedia. The thesaurus acts as our dictionary, and Kindle represents our textbook. In this context, adapting our teaching strategies to include technology is essential for illuminating the educational experiences of our students. What initiatives are schools undertaking to facilitate this transformation?

(i) Smart Class : Education has evolved from traditional methods of teaching with whiteboards, chalk, and markers to utilizing projectors, VCD, DVD players, and eLearning systems. Teachers now incorporate tutorial videos and online sessions to make learning enjoyable. Schools are equipped with TVs or projectors connected to whiteboards, allowing for seamless transition from traditional to interactive digital sessions. This shift to digital learning encourages students to be more engaged in this era where Google is a primary source of information.

(ii) Being Digitally Updated : In today's technology-driven society, educational materials can quickly become obsolete due to constant advancements. Ensuring that students stay informed about current events and relevant subjects is crucial for their personal growth. With students heavily relying on laptops, phones, and iPads, it is important to direct them towards reliable online sources and websites that provide accurate and up-to-date information.

(iii) Converting Books To PDFs : The transition of books to Kindle and other tablets has become prevalent. Providing students with notes, references, and additional information in PDF formats, which can be conveniently accessed on laptops, smartphones, and tablets, serves as an effective method to motivate them to enhance their study habits.

(iv) Encouraging Online Tests : Educating students through engaging online quizzes periodically can foster a positive educational atmosphere. By offering online assessments and quizzes that can be completed remotely, it is possible to replace traditional homework assignments that students often try to avoid.

(v) Conducting Online Webinars : Students' level of attentiveness may decrease when there is only one-way communication with the teacher at the front of the classroom. This can lead to noise or disinterest among students. By incorporating online seminars and webinars where students can actively participate through comments and questionnaires, it is possible to keep them engaged and alert. Maintaining student interest during lectures is a skill that teachers must possess in order to enhance the overall learning experience. Encouraging two-way communication in seminars and lectures is crucial for student engagement.

(vi) Supporting Online Research : Encouraging students to be well-prepared for classes, similar to how a teacher prepares for a classroom session, can lead to increased excitement about learning. The current trend of online research has opened up exciting career opportunities in fields such as Market Research. By assigning students to find difficult-to-locate information online or providing them with a list of items to research before the next class, educators can effectively cultivate anticipation for future lessons. The sense of accomplishment that comes from discovering something unique can be a powerful motivator for students. Additionally, offering rewards or acknowledging their online findings can inspire students to maximize their use of digital resources.

(vii) Creating Communities : The relationship between an educator and a learner is not limited to the confines of a physical classroom. Through an online community, individuals can remain connected virtually, sharing projects, engaging in discussions, and expressing thoughts. Educators have the opportunity to create a space where students can share their thoughts, offer suggestions, and ask questions related to the subject matter, allowing for continuous learning. Embracing online activities of this nature helps students maintain focus beyond traditional school hours, fostering a seamless continuation of the learning journey.

In conclusion, it can be stated that traditional educational tools such as textbooks, homework assignments, classroom notebooks, whiteboards, chalk, and markers have become obsolete. The introduction of smartboards allows educators to manipulate shapes, utilize online calculators, employ augmented reality tools for measurement, and vocalize text for display on the board. Given that students are increasingly adept with technology, how feasible is it to remain disconnected from the digital realm? Educational institutions are now offering complimentary tablets and Kindle-like devices for students to facilitate note-taking. It is essential to integrate teaching methodologies with technology to enhance the vibrancy and engagement of classroom experiences.

VI. FUTURE SCOPES

Online learning services are flourishing in India, with one of the largest demands for these services stemming from the number of students in the country. India ranks as the third largest market for such services, indicating a significant scope for digital learning, particularly among the youth. The advent of digital learning has revolutionized education in India, altering the landscape of educational content delivery. What was once considered a distant dream is now a reality for India's future. Digital learning has successfully addressed challenges such as reaching a diverse audience, the scarcity of qualified teachers in rural areas, and providing rich educational content to previously unreachable individuals. The country boasts numerous potential businesses and clients eagerly awaiting the right platform. Today, even basic education is being imparted in rural villages with the help of a single computer, enabling many children to access primary levels of education. Several universities and colleges have transitioned to online courses, offering certifications through online platforms. Despite being in an experimental stage, the digital learning scenario in India continues to grow. However, the country's education policy has largely overlooked the potential benefits of this technological revolution in education. The scope for digital learning in India is vast, with even greater potential waiting to be tapped into. The reasons why online learning will thrive in India are outlined below:

Adaptable : Numerous individuals are hesitant to attend traditional learning institutions due to issues with time management and travel. E-learning offers a convenient solution to this challenge.

Requirement : Regardless of our preferences, technology is a permanent fixture in our society. It has become integrated into every aspect of our lives, making education a necessity.

Cost-Effective : Training Reduced training expenses for a large number of individuals. Accelerated delivery potential.

Encourages Engaged Learning : Part-time students and full-time employees can benefit from online learning. Online learning encourages active and self-directed learning. It offers a convenient and flexible option, eliminating the need to rely on others.

Online Classes : Interact with others and address any questions through discussion boards and chat. Video instructions for audio and visual learning can be replayed as needed for better understanding.

VII. CHALLENGES IN EDUCATION

Technological advancements present significant opportunities for both educators and students to cultivate impactful learning environments. These technologies facilitate various forms of social interaction, grant immediate access to information, and help mitigate challenges associated with time and space constraints. The futurist Alvin Toffler famously predicted approximately three decades ago that "the illiterate of the 21st century will not be those who cannot read and write, but those who cannot learn, unlearn, and relearn." The integration of technology into teaching and learning necessitates a rethinking of the curriculum and the methodologies employed in education. Despite the initial adoption of technology within the educational framework, India continues to encounter challenges related to the integration of new technologies in education. Some of these challenges include:

1. Insufficient access to computer hardware and software in educational institutions
2. Inadequate time allocated in the school schedule for technology-based projects
3. Limited technical support for educational institutes
4. Few opportunities for teacher training

5. Lack of awareness on how to effectively integrate technology to improve the curriculum

6. Drawbacks associated with the use of new technologies in education

7. Numerous ethical dilemmas and concerns linked to the utilization of cutting-edge technologies in education.

VIII. Conclusion

The integration of technology into education is an ongoing trend that is reshaping the learning landscape. Knowledge is no longer confined to traditional textbooks; instead, various platforms such as websites, applications, videos, and live chats have elevated the educational experience. Numerous educational institutions, including schools and colleges, have adopted technological tools to enhance engagement and interactivity in learning. The sector known as education technology, or 'edtech,' is rapidly expanding. Supportive government policies have contributed to a favorable outlook for the digital education market in India. The government is actively formulating strategies to promote digital literacy and to establish a robust online education delivery framework. The Digital India Initiative, which aims to ensure quality and technology-enhanced education for all, plays a crucial role in advancing online education in the country. This initiative seeks to provide affordable, high-quality internet services nationwide, thereby facilitating the growth of online education. Additionally, the government is collaborating with major corporations such as Qualcomm and Reliance to explore new technologies that can further enhance the Indian education system.

After the COVID-19 pandemic, digital education has significantly contributed to the advancement of the Indian education sector, both in terms of financial investment and innovation. With a large portion of the population having access to the internet, individuals are able to engage in continuous learning. Online education serves as a platform for students to enhance their skills from the comfort of their homes, at no additional cost. Entrepreneurs and financiers continue to seek out opportunities for growth and development within the online education sector, recognizing its potential for expansion and improvement in India.

IX. Suggestions

In order to achieve innovative knowledge education for societal and economic growth, it is imperative to focus on various key aspects:

- Effective teaching and successful learning - Ensuring quality and endorsing knowledge management

- Leveraging the potential of technological advancements

- Improving individual conditions

- Promoting a strong, independent, and diverse cultural sector to sustain intercultural dialogue

- Encouraging scientific research to enhance understanding of the world, improve lives, and drive innovation

- Establishing ambitious goals that drive innovation

- Implementing rigorous evaluation and sharing the performance of new innovations.

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