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Understanding Digitalization of Education through the Lens of NEP 2020: Prospects and Challenges

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Abstract: *The modern period is witnessing a profound digital revolution in human life, often referred to as an explosion of information. This digitalization trend is revolutionizing various aspects of society, notably the education sector. The advent of sophisticated technologies for information storage, processing, and dissemination has revolutionized learning paradigms. Digital platforms have democratized education, providing enhanced accessibility and personalized learning experiences. Interactive and engaging content delivery methods have redefined traditional pedagogical approaches, fostering increased engagement among learners in diverse educational settings. The integration of digital technologies has empowered students, educators, and researchers to actively participate in educational programs and access hands-on learning opportunities. While digitalization promises to enhance the quality and effectiveness of educational resources, it also presents challenges such as technology disparities, security concerns, inadequate training, and adoption hurdles. This study aims to delve into the multifaceted dimensions of digitalization in education, exploring its potential benefits and obstacles. By addressing the complex issues faced by stakeholders in the education ecosystem, this conceptual analysis seeks to accelerate the seamless integration of digital technologies into the educational landscape, envisioning a digitally empowered educational system for the nation*

Keywords: Digitalized, Digitalization of Education, Prospects, Challenges, NPE 2020

I. INTRODUCTION

The field of information and communication technology is rapidly advancing in the current era, known as the 'digital age'. Consequently, the digitalization of all aspects of human activity is accelerating. Consequently, the drastic transformation of human life necessitates significant and fundamental changes in the education system and scientific research. Every occupation or profession now integrates technology, with no profession being an exception to this trend. Enhanced proficiency and competency in digital skills, as well as the ability to utilize emerging technologies, are essential for everyone. Therefore, the acquisition of digital skills is essential for everyone.

Digital technology integration in education has gained popularity in recent years, particularly in the post-covid era, leading to a paradigm shift in the dissemination, acquisition, and sharing of knowledge (al husseiny & munna, 2024). The prospects of digital education are extensive, ranging from increased accessibility to personalized learning experiences. Furthermore, in order to maximize the potential benefits of technology, educators need to get training on how to integrate it into their teaching techniques. This includes understanding how to use digital tools to engage students, facilitate collaboration, and personalize learning experiences (mhlongo et al., 2023). Overall, the use of digital and online technologies in the classroom has the potential to entirely transform how we teach and learn. By embracing these tools and understanding their pedagogical affordances, we can create more captivating, interactive, and individualized instruction for students that will better prepare them for success in the digital age. Nep 2020 emphasizes that the use of technology for online and digital education adequately addresses concerns about equity.

Digitalization represents not only a current trend in digital technology but also a potential direction for advancement in a number of areas, including education. Technology advancements undoubtedly are impacting this direction, but their speed may vary according to the situation and area. In this sector, understanding the digitalization of education is a key area to be reformed. Learning is becoming more automated through computerization and digitization of the educational

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process, and this is changing the nature of education as a paradigm in context with new innovations like artificial intelligence, virtual reality, and other edtech trends.

II. OVERVIEW OF NATIONAL EDUCATION POLICY (NEP) 2020

The National Education Policy (NEP) 2020 is a comprehensive roadmap for restructuring India's education system. The goal is to address a rapidly changing society's educational needs and establish an excellent educational system that meets the demands of the 21st century. The NEP 2020 aims to foster inclusion, equity, and quality in education while equipping students with the necessary skills and knowledge to deal with future challenges and grab opportunities. According to the National Education Policy NEP 2020, digital technology and a knowledge-based economy are critical to the comprehensive transformation of the nation into a society. Education will be crucial in this change, but technology will also have a significant impact on enhancing educational procedures and outcomes. Therefore, the interaction between technology and education is mutually influential at all levels.

III. RESEARCH QUESTIONS

The following research questions have prompted the researchers to carry out the study:

- What are the Prospects of Digitalization of Education?
- What are the Recommendations of NEP-2020 regarding Digitalization of Education?
- How does NEP 2020 envision the role of digital technology in transforming Indian education?
- What are the key challenges and opportunities in the digitalization of education in India?

IV. RESEARCH METHODOLOGY

The research methodology of this paper is qualitative approach, which is a research paradigm that focuses on understanding and interpreting human experiences, behaviours, and cultural phenomena with respect to digitalization of education and NEP 2020. The secondary data sources used for this study are -online books, research journals, newspaper articles, all these were used for obtaining a diverse and rich variety of information.

V. PROSPECTS OF DIGITALIZATION OF EDUCATION

When used correctly, digital technologies accelerate the learning process. The integration of digital technologies in education has the potential to transform the learning process and enhance learners' educational experiences. By leveraging the benefits of digital tools, educators have the ability to design dynamic and captivating environments for learning that encourage innovation, critical thinking, and lifelong learning. The digitalization of education has numerous potentials for providing accessibility, personalized learning environments and spaces, interactive learning tools, flexibility, time-saving, lifelong learning, inclusivity, collaboration, and gamification (Haleem et al., 2022). These are discussed below:

Accessibility

Digitalization of education breaks geographical barriers, allowing students to access educational materials and resources anytime, anywhere (Extramarks, 2024). This inclusivity provides learners access to educational resources regardless of location, thereby opening up opportunities for underprivileged communities and contributing to global knowledge dissemination.

Personalized Learning

Adaptive learning platforms and artificial intelligence have the potential to revolutionize education by offering personalized learning experiences for students. This personalized approach, tailored to individual learning styles and preferences, can significantly enhance student engagement, motivation, and academic performance.

Interactive Learning Tools

Digital tools like virtual simulations and interactive applications enhance engagement and comprehension. These tools create a dynamic learning environment, making complex subjects more accessible and enjoyable.

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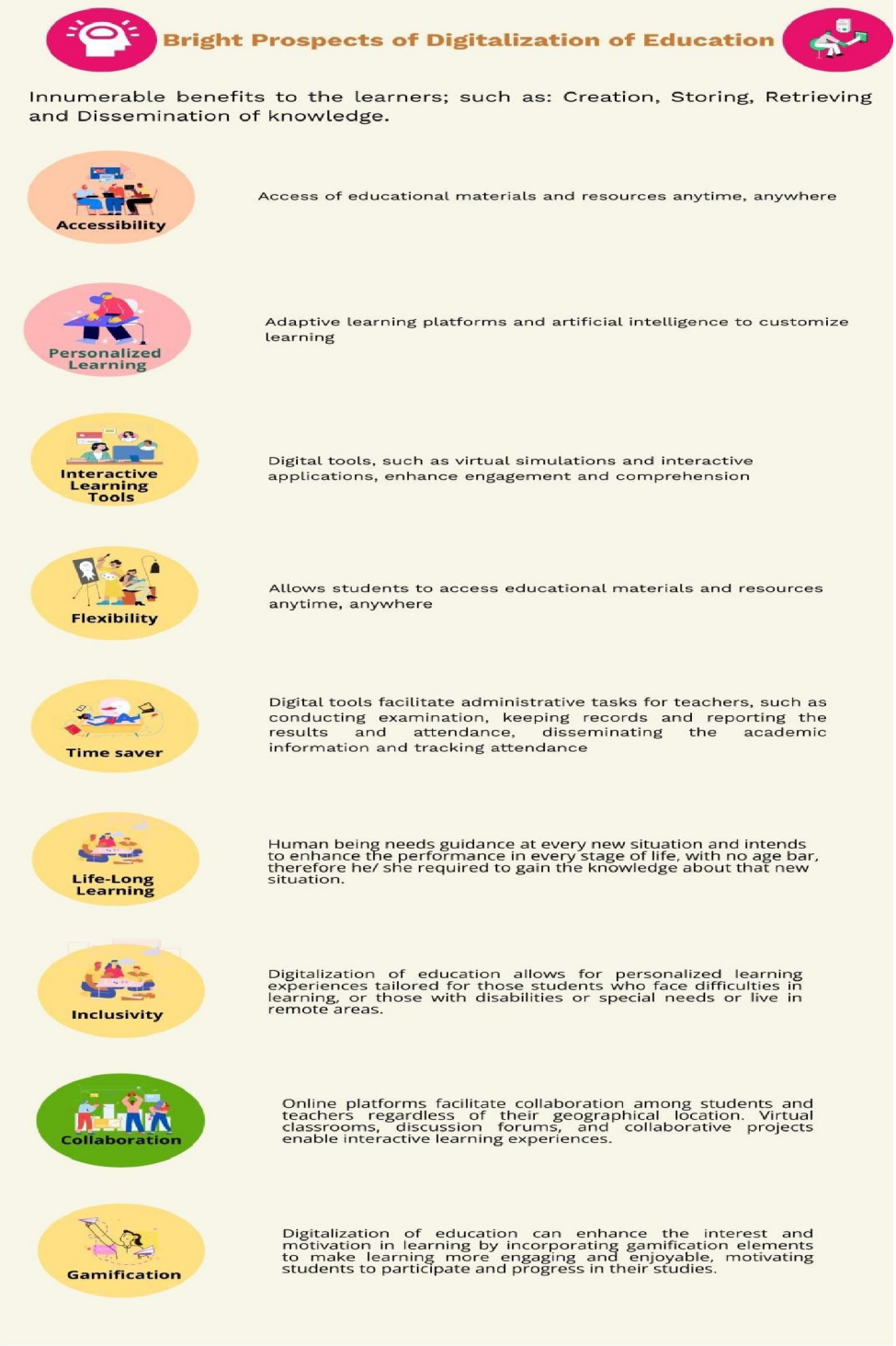

Fig. 1 Bright Prospects of Digitalization of Education
Source: Created by Author

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Flexibility

The digitalization of education allows students to access educational materials and resources anytime and anywhere, making learning more flexible. The digitalization of education has the potential to revolutionize the way we teach and learn, offering flexibility, accessibility, and personalized learning experiences for students worldwide. By embracing digital technologies in education, we can create more inclusive, engaging, and effective learning environments that empower students to reach their full potential. From a faculty perspective, their services are unrestricted, allowing for global hiring.

Time saver

Digital tools simplify administrative tasks for teachers, including conducting examinations, maintaining records, reporting results and attendance, disseminating academic information, and tracking attendance. These tools provide immediate feedback and enable prompt action. In the conventional education system, all these activities consume significant time. Therefore, we can utilize advanced technology in teaching, learning, feedback, and administration to assist the student. Therefore, integrating digital technologies into education allows us to transact content and conduct examinations in real-time from a remote location and receive results and feedback instantly or within a few days, reducing stress and saving significant time.

Lifelong learning

Since humans require guidance in every new situation and aim to improve their performance at every stage of life, regardless of age, they must acquire knowledge about these new situations. Additionally, every individual tends to learn throughout their lives; technology can satisfy their thirst in no time. Digital education may allow individuals to continue learning and enhance their skills throughout life, promoting learning and professional development. Digital platforms provide opportunities for continuous learning beyond traditional classroom settings. Individuals can access various courses and resources to upgrade their knowledge, understanding, and abilities.

Inclusivity

The digitalization of education can prove more inclusive for students who face difficulties in learning, those with disabilities or special needs, or those who live in remote areas, as it can provide alternative formats of learning materials and accommodate diverse learning styles for the differently abled. In other words, it also allows for personalized learning experiences tailored to individual needs.

Collaboration

Online platforms facilitate cooperation between educators and students, regardless of their geographical locations. Virtual classrooms, discussion forums, and collaborative projects enable interactive learning experiences. Thus, digitalizing education may encourage collaboration and communication among students, teachers, administrators, policymakers, and community resources, fostering a sense of community and shared learning experiences.

Gamification

The digitalization of education can enhance interest and motivation in learning by incorporating gamification elements to make learning more engaging and enjoyable, motivating students to participate and progress in their studies. Incorporating gamification elements, such as points, badges, and leaderboards, can enhance engagement and motivation in learning. Gamified activities make learning more interactive, enjoyable, and rewarding for students. Thus, digitalization transforms education by making it more accessible, efficient, and engaging, empowering learners to pursue lifelong learning and achieve their educational goals.

VI. RECOMMENDATION OF NEP-2020 REGARDING DIGITALIZATION OF EDUCATION

The National Education Policy 2020 (NEP-2020) recognizes the importance of digitalization. It emphasizes the transformative potential of digitalization in education. It proposes many transformative strategies to leverage

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technology to improve access, quality, and equity in India's education system. The new education policy recommends the following actions for the digitalization of education:

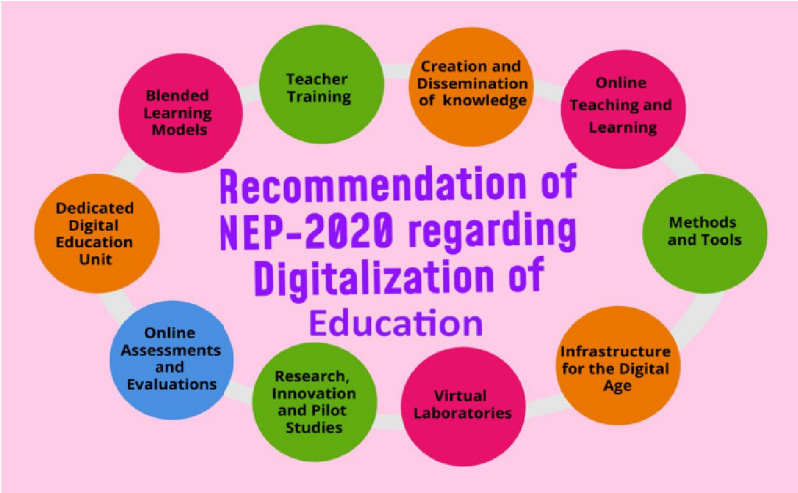

Fig. 2. Recommendation of NEP-2020 regarding Digitalization of Education
Source: Created by Author

Creation and Dissemination of Pedagogical and Content knowledge through Digital Repositories

The NEP-2020 promotes creating and disseminating open educational resources (OER) to support affordable and equitable access to educational materials (Das & Bordoloi, 2023). It encourages collaboration among teachers, teacher-educators, administrators, institutions, and policymakers to develop and share digital content (Vrasidas & Glass, 2007). Tools of gamification and simulation, as well as virtual and augmented reality, may be applied to create and disseminate such knowledge. The user will provide a rating system for the general public to evaluate the quality and effectiveness of the tools and application software. The NEP-2020 suggests fun-based learning tools for disseminating pedagogical and content knowledge. Moreover, implementing a secure backup mechanism will facilitate the distribution of e-content to students.

Online Teaching and Learning

The NEP-2020 encourages the development and promotion of high-quality digital resources for teaching and learning across all levels of education (Roy & Sharma, 2024). It advocates for expanding online education initiatives to reach a wider audience and enhance flexibility in learning.

Methods and Tools

We can enhance e-learning platforms like DIKSHA and SWAYAM to create a more user-friendly interface for students and teachers (Kumari & Tiwari, 2023). We can update learners with interactive capabilities like a two-way audio and video interface to aid class administration and student progress monitoring.

Infrastructure for the Digital Age

The NEP proposes the establishment of a National Educational Technology Forum (NETF) to facilitate the exchange of ideas and best practices for applying technology in education. It also calls for creating digital infrastructure in schools and colleges, including broadband internet connectivity, to ensure access to digital resources, which will entail investing in developing digital infrastructure accessible to the public across various platforms. Planning should ensure that modern technological solutions remain relevant.

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Virtual Laboratories

E-learning platforms like DIKSHA and SWAYAM will be required to provide virtual laboratories where students can apply their theoretical knowledge (Das, 2023). These labs will include equipment that will make experiment-based learning feasible.

Research, Innovation and Pilot Studies in Education Technology

The NEP-2020 emphasizes the importance of leveraging technology in education for research, innovation, and experimental endeavours. The proposal calls for creating digital repositories and research networks that encourage multidisciplinary cooperation and knowledge sharing. We want to request (write full forms followed by abbreviations) NITs, IGNOU, CIET, and NETF to research and optimize the advantages of digital learning.

Online Assessments and Evaluations

NEP-2020 advocates adopting technology-enabled assessment and evaluation tools, techniques, and methods to enhance the evaluation process's effectiveness, objectivity, transparency, and fairness. It also encourages the use of digital tools for formative and summative assessments and monitoring of student progress and learning outcomes. To assess students' performance in line with current digital education requirements, we will establish a framework based on 21st-century technology. Government bodies such as school boards, the NTA, and PARAKH will design this framework.

Creating a Dedicated Digital Education Unit

The Ministry of Education (MoE) exhibits responsibility in this matter. This solution will cater to the digital learning requirements of both schools and colleges. The investigation team will include experts in education, educational technology, administration, e-governance, digital pedagogy, and information technology (Asad et al., 2021). These experts will strive to provide excellent instruction to the students to address their questions and resolve any uncertainties.

Blended Learning Models

To foster the growth of digital learning and education, the NEP-2020 recommends against encouraging traditional modes of learning (Kaur, 2024). We will examine various types of blended learning models and adopt the most appropriate model to replace the traditional learning mode.

Teacher Training

NEP 2020 emphasizes the importance of providing comprehensive training to teachers on effectively using digital tools and technologies (Neogi, 2023). (Ng et al., 2023) suggest enhancing digital literacy and competency among teachers by integrating digital tools and technologies into teacher education programs, preparing them for the digital age.

However, there are certain challenges faced by the educational community while integrating technology into education, which need to be identified and addressed.

VII. CHALLENGES IN THE DIGITALIZATION OF EDUCATION

While the digitalization of education in India offers innumerable benefits, it also poses several challenges and threats, which are as follows:

Lack of Engagement and Motivation

With teachers and peers, some students can maintain their interest, motivation, and involvement in online learning, leading to increased engagement and learning outcomes.

Absence of Real-Time and Hands-on Experiences

Students prefer real, hands-on learning over virtual learning. Science and technology disciplines, for example, require more practical lab sessions, projects, and field trips to support the conceptual components. These elements are uncommon and nearly impossible to provide in online learning environments.

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Suspicious Quality of Content

In this digital age, ensuring the quality and relevance of digital educational content is crucial. The spread of online resources may lead to misinformation; outdated materials or low-quality content may discourage the effectiveness of digital learning experiences.

Problems in Techno-Pedagogical Integration

Digital learning environments require pedagogical adaptation to engage students and promote active learning effectively. Teachers may struggle to integrate digital technology into their teaching methods and design meaningful learning experiences that leverage digital tools. Furthermore, effectively incorporating technology into the curriculum while maintaining pedagogical standards necessitates ongoing professional development for teachers.

Issues in Assessment and Evaluation

Ensuring the integrity and fairness of evaluations in digital education, including the prevention of cheating and plagiarism, may cause more challenges in a digital environment (Surahman & Wang, 2022).

Over-dependence on technology

Over-reliance on digital technology may reduce interpersonal interaction and screen dependency, impacting social and emotional development. Balancing digital and offline learning experiences is essential to foster holistic development among students (Salma, 2024).

Adverse Effects on Learners' Psychological Health

It burdens young children's minds, particularly those between the ages of five and ten, as their periods of concentration are short, and they need physical activities to keep them engaged. However, complaints about this issue have not only come from the younger generation but also from college students.

Restricted Social Interaction

The digitalization of education may limit opportunities for social interaction and physical collaboration among students, negatively affecting their social and emotional development.

Lack of Quality Internet Services

The Internet is the foundational medium that enables all digital learning platforms. According to internet world statistics, global internet penetration is 66.2%, while in India, it is 52.4%, far below (Petrosyan, 2024). In ideal societies, the Internet, an essential driver behind economic growth, significantly influences and improves education.

Lack of Digital Infrastructure

The issue of insufficient digital infrastructure encompasses the partial or complete absence of broadband Internet connections, the required computer hardware and accessories, the right software, and the employees involved in operating these devices (Belessova et al., 2023).

Infrastructural Maintenance

Sustaining digital infrastructure, including hardware, software, and internet connectivity, requires ongoing monitoring and maintenance. Infrastructural challenges may hinder the long-term viability of initiatives taken for education digitalization without adequate funding and support.

Digital Literacy

Teachers and students frequently need more digital literacy skills to use digital resources and navigate online learning platforms. The lack of training and support in digital literacy hinders the successful implementation of digital education initiatives (David-West, 2022).

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Digital Inequality

Digital inequality indicates a disparity in access to and use of modern ICTs in terms of economic and social aspects. Many factors contribute to the digital divide, including a lack of awareness about digital technologies, digital illiteracy, inadequate digital infrastructure, a lack of digital skills, unfavourable geographic location, and economic instability (Srinivasan, 2021). The digital divide intensifies existing educational inequalities, limiting the reach of digital learning initiatives.

Technological Disparities

Despite the potential benefits, a significant digital divide exists, with disparities in internet and technology accessibility (Taylor, 2024), which challenges equitable educational opportunities for all students. Disparities and significant challenges occur regarding sustainable internet connectivity and digital device access, especially in rural and remote areas (Afzal et al., 2023).

Data Privacy and Cyber-security Concerns

Digital education brings forth concerns about data privacy and cybersecurity. Collecting and gathering sensitive data from students raises security and privacy concerns (Piper, 2024). Inadequate safeguards and protocols for data protection may expose students to risks such as data breaches, identity theft, or misuse of personal information (Sule et al., 2021). Protecting students' sensitive information and ensuring a secure online learning environment have become vital in the digital age.

Technical Issues

Technical issues, such as breaks down, pauses in internet connectivity, and issues with software compatibility, can disrupt the smooth functioning of digital education, impacting the quality of the learning experience for students and educators.

Digital Divide

The digital divide has numerous determinants (Menberu, 2024). Among them, the most prominent one is the socioeconomic status of learners. Socioeconomic disparities worsen the digital divide, with marginalized and disadvantaged groups facing more significant barriers to accessing digital education resources (American University School of Education, 2020). These inequalities, such as access inequalities, contribute to the digital divide. Without targeted interventions to address inequities, digitalization may widen existing gaps in educational opportunities.

Addressing these challenges requires a comprehensive approach encompassing infrastructure development, capacity building, policy frameworks, and community engagement (Habib, 2023). By mitigating risks and maximizing opportunities, our country can harness the potential of digitalization to transform education and empower learners across the country. Only then will we realize the dream of digital India.

VIII. DISCUSSION AND CONCLUSION

In order to achieve a balanced and effective integration of technology in education, we must carefully consider both the prospects and challenges of digitalization. One of the main concerns is the potential dehumanization of education, as the reliance on digital tools and platforms may reduce the personal interaction and human connection essential for effective teaching and learning. The growth of digitalization in education requires a thoughtful and strategic approach that considers the potential impacts on students, teachers, and the broader educational community. By addressing the challenges and embracing the opportunities presented by digital technologies, we can build an inclusive and more productive learning environment that prepares students to succeed in the digital era as a closer examination of the challenges reveals that technology disparities are more pronounced in rural versus urban settings, where access to reliable Internet and digital devices is limited. For instance, students might have to travel considerable distances in certain regions to access a computer lab. Educators, policymakers, and stakeholders must collaboratively realize and address such challenges, ensuring equal digital education benefits, regardless of socioeconomic factors.

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Achieving digitalized education may seem difficult but numerous examples have made impossible possible. For instance, a case study (Motteram, 2017) demonstrated the successful integration of technology in a rural school in Bangalore, South India, which has enhanced students' learning. Fazil, a grades 4 to 8 teacher, innovatively integrated technology into his classroom to provide adequate learning experiences. He employed augmented reality and virtual reality using Google Cardboard and Google's Expeditions app and motion sensing with Microsoft Kinect for kinaesthetic math games, which improved student engagement and learning outcomes despite challenges like infrastructure.

Thus, it can be concluded that as we navigate this transformative journey, a thoughtful and inclusive approach is essential in creating an educational landscape that prepares students for the opportunities and challenges of the digital era. While digital education enhances accessibility, concerns arise regarding its impact on student engagement and social interactions. Establishing an appropriate equilibrium between digital and face-to-face teaching-learning is what is significant in today's India.

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