Transforming education: Perceptions and challenges of technology-enabled teacher education programmes

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Abstract

The education landscape is undergoing a significant transformation due to technological advancements and shifting pedagogical paradigms. Technology-enabled teacher education programs are embracing digital tools to enhance pedagogy, provide adaptive learning experiences, foster global connectivity, and promote data-driven decision-making. These programs prepare educators for 21st-century classrooms, equipping them with the skills needed for 21st-century classrooms. However, concerns about overreliance on technology persist, emphasizing the importance of striking a balance between digital tools and traditional teaching methods. Unequal access to technology and the digital divide poses significant challenges, necessitating infrastructure development and equitable access initiatives. Ensuring technological literacy among educators and students is crucial, as these programs demand a certain level of digital proficiency. Balancing theory with practice in these programs is essential for their continued success. Understanding learner perceptions and addressing challenges is key in shaping the evolution of teacher education programs that effectively prepare educators for the dynamic demands of modern classrooms. Balancing theory and practice are essential for the success of these programs.

Keywords: Technology-enabled; Perceptions; Challenges; Pedagogy; Adaptive learning; Digital classroom

1. Introduction

Due to changes in pedagogical methods and technological breakthroughs, the subject of education is continually changing. Technology has become an essential component of education in our digital age, changing static instruction into more engaging, interactive lessons. Technology-enabled teacher education programs, which aim to equip future educators with the abilities and knowledge to successfully incorporate technology into their classrooms, are one notable breakthrough. In order to shed light on their advantages, difficulties, and the contribution of technology to the future of education, this study investigates how learners, in particular aspiring teachers, perceive technology-enabled teacher education programs. Both historically and now, information and communication technologies (ICTs) have had a considerable impact on the teaching and learning process. Richards acknowledged this influence in 2005 and underlined the importance of well-designed tasks and digital resources for enticing young learners to use digital platforms. In order to equip students with the skills they will need for the 21st century, educational institutions are currently under pressure to integrate ICTs into their curricula. There are many advantages to utilizing ICTs in schooling. In addition to improving motivation, self-confidence, and academic performance, they also make it easier for students to get accurate information, understand abstract topics, and create collaborative online activities for teachers. While some ICT gadgets, such as iPads and tablets, are still in the early stages of adoption, they have a lot of potential, especially for children with special needs, to improve fundamental skills and boost participation in the classroom. The adoption and integration of ICTs into the teaching-learning process is mostly the responsibility of teachers. However, a number of elements, such as historical events, organizational characteristics, personal attitudes toward technology, and other contextual factors, influence this integration.

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2. Review of the literature

It is crucial to comprehend how teacher educators feel about technology-enhanced learning (TEL) and what their attitudes are. These teachers are crucial to successfully utilizing technology as a teaching tool and assisting students in gaining networking and TEL skills (Kirkwood & Price, 2011). These educators' support and attitudes are crucial to the adoption of TEL and subsequent modification of educational practices (Kusano et al., 2013; Rana, 2012). It is well acknowledged that teachers' positive attitudes are a key indicator of effective teaching strategies. Technology can be easily incorporated into the teaching-learning process by educators when they do it with enthusiasm (Birkollu et al., 2017; Buabeng-Andoh, 2012). The emergence of the TEL environment, primarily driven by the COVID-19 pandemic, disrupted the traditional face-to-face (F2F) mode of education and may return to its original format once the pandemic's adverse effects subside. Therefore, assessing the opinions and attitudes of teacher educators toward TEL could significantly influence and determine their actual adoption of technology in teaching and learning post-pandemic (Chandwani et al., 2021). Previous research has generally reported very positive attitudes and acceptance of technology's use in the teaching-learning process (Cüre & Özgören, 2008; Karagiorgi & Charalambous, 2006). Past studies exploring educators' attitudes have delved into various dimensions, including demographic characteristics such as gender (Dong & Zhang, 2011), age (Xhaferi et al., 2021), personal characteristics like teaching experience (Onasanya et al., 2010), and contextual factors toward like technology access, technical support, and institutional support, especially during the COVID-19 pandemic (Karasesh et al., 2021). Studies conducted in developing countries, even those with low technology-intensive conditions (Mow et al., 2020), and research conducted in India (Beri & Sharma, 2019; Mukherjee & Maity, 2019), have yielded mixed results. While most studies concluded that teacher educators held favorable attitudes toward TEL, they often failed to exhibit an equally positive attitude toward integrating technology into the traditional curriculum. Constraints included limited exposure and training in TEL, inadequate technical infrastructure, and insufficient institutional support in terms of budget allocation for advanced technologies, as well as a lack of clarity and direction. TEL is essential in the context of distance education because it helps students get beyond the obstacles posed by distance. High levels of learner interaction are encouraged, interpersonal communication between teachers and students is facilitated, and a comprehensive learning management system that includes collaboration tools, virtual classrooms, content authoring and capturing tools, and digital repository systems can be used are all made possible. Additionally, TEL has proven to be more effective than distance learning programs that rely solely on printed materials (Addah et al., 2012; Almarshdeh & Alsmadi, 2016). Faculty attitudes are crucial in facilitating the shift from conventional remote education delivery to technology-enabled teaching and training within distance learning Teacher Education Programs (TEPs) (Panda & Mishra, 2007). The research on teachers' beliefs, attitudes, and how these convictions show in their teaching practices is still scantly despite the abundance of studies on teachers' use of technology (Kirkwood & Price, 2016). There are many studies on how teachers use technology, but little research has been done on their attitudes and beliefs, or how these attitudes affect their teaching practices. This gap highlights the need for further research in this area to better understand and support teacher educators in harnessing the potential of TEL.

2.1. The Significance of Technology-Enabled Teacher Education Programs

Understanding the significance of technology-enabled teacher education programs in the current educational landscape is crucial before digging into learners' opinions. These programs are unavoidable because of the numerous benefits they provide.

2.1.1. Improved Pedagogy

Technology makes it possible for a variety of interesting teaching techniques, including multimedia presentations, computer simulations, and interactive learning environments. These tools are included in teacher education programs to help educators improve their ability to impart knowledge and promote learning. Enhanced pedagogy in technology-enabled teacher education programs represents a fundamental change in how educators are being prepared for the twenty-first century. These ground-breaking initiatives make use of the potential of online learning environments and digital tools to build engaging learning environments that prioritize student participation, individualized education, and the acquisition of vital digital literacy skills. Teacher education is made more accessible and efficient by incorporating technologies like virtual reality, interactive simulations, and data analytics. This enables aspiring teachers to gain practical experience, collaborate with colleagues around the world, and adapt to the constantly changing educational landscape. Additionally, these programs enable instructors to develop into tech-savvy facilitators who can use digital resources to improve student learning outcomes and build inclusive, student-centered classrooms where innovation, critical thinking, and problem-solving thrive. Essentially, improved pedagogy in technology-enabled teacher education programs holds the promise of growing a new generation of educators outfitted with the abilities and mentality required to shape the future of education in a world that is becoming more and more digital.
2.1.2. Adaptive Learning

With the use of technology, learning experiences may be tailored to the needs and learning preferences of each individual student. Future educators who complete technology-enhanced programs will be better prepared to modify their lessons for a variety of classes. A game-changing paradigm change in the field of pedagogical training is represented by adaptive learning in technology-enabled teacher education programs. These programs optimize teacher candidates’ professional development journeys by utilizing the power of cutting-edge technology like artificial intelligence and customizable algorithms to create learning experiences that are tailored to each candidate’s needs. Adaptive learning platforms detect strengths and weaknesses through continuous assessment and real-time feedback, enabling educators-in-training to concentrate on areas needing improvement and encouraging self-directed learning. This innovative strategy improves the efficacy of teacher preparation while also empowering educators to address the wide range of requirements of their future students, ultimately resulting in more effective and responsive teaching strategies in the quickly changing educational environment of today.

2.1.3. Global Connectivity

Online teacher education programs connect students and experts from all over the world by removing geographic obstacles. The educational experience is enhanced by this exposure to various viewpoints and pedagogies. The way educators are prepared for the challenges of the twenty-first century is revolutionized by global connectedness through programs for teacher education that are supported by technology. These initiatives cross international borders by seamlessly integrating digital tools and online platforms, encouraging cooperation and knowledge sharing between educators and institutions everywhere. This interconnection not only improves access to other viewpoints and information, but it also fosters cultural sensitivity and the sharing of cutting-edge instructional techniques. Additionally, it enables educators to keep up with the most recent developments in education and research, ensuring they are better prepared to address the changing demands of their students in a world that is becoming more interconnected. Global connectedness serves as a crucial pillar in the landscape of teacher education as technology continues to change it. It enables a dynamic and inclusive approach to pedagogy and professional development.

2.1.4. Efficiency and Accessibility

Technology-enabled programs frequently offer flexible timetables, increasing access to education for people with busy schedules or geographic limitations. The ability to balance their academics with work or family obligations might be extremely helpful for future teachers. Modern teacher education programs that use technology prioritize efficiency and accessibility. These programs expedite the learning process by utilizing digital tools and platforms, giving aspiring teachers unmatched access to top-notch resources, peer collaboration, and hands-on learning opportunities. Teacher education is made more effective by utilizing online courses, virtual classrooms, and interactive learning materials, which may accommodate different schedules and learning preferences. Technology also offers accessibility for people from different backgrounds, removing geographic obstacles and encouraging diversity in teacher preparation. The incorporation of effectiveness and usability in technology-driven teacher education programs ultimately equips the next generation of educators to flourish in their positions, which is advantageous to both students and the educational system as a whole.

2.1.5. Data-driven decision-making

Tools for gathering and analyzing data on student performance are made available by technology. Teachers who have completed these programs can use data to personalize their lessons and pinpoint areas where students might require more assistance. With the help of data analytics and technology integration, data-driven decision-making in technology-enabled teacher education programs can significantly improve the efficacy and efficiency of teacher preparation. Educators and administrators can make well-informed decisions that result in more customized and responsive teaching tactics by methodically gathering and analyzing data on student performance, program outcomes, and instructional methods. This strategy not only enables educators to pinpoint areas for growth but also allows for the personalization of learning opportunities to cater to the needs of each individual student, thus generating a more flexible and effective ecosystem for teacher education. Data-driven decision-making is emerging as a key tool in ensuring the continuous evolution and optimization of teacher preparation programs, providing educators with the skills and insights required to excel in today’s dynamic classroom environments. This is especially true in an era where technology is playing an increasingly important role in education.
2.2. Learner’s Perceptions of Technology-Enabled Teacher Education Programs

2.2.1. Positive Attitudes

Many students enrolled in teacher education programs see technology as an important tool for their personal and professional growth. They understand that technology may enhance their instructional tactics, classroom management, and teaching abilities. For modern pedagogy to advance, positive views toward technology-enhanced teacher education programs are crucial. These initiatives equip teachers with the knowledge and skills necessary to successfully navigate the digital world, encouraging flexibility and innovation in the classroom. Adopting technology improves the effectiveness of teacher preparation while also providing aspiring teachers with the digital literacy abilities necessary for the 21st-century classroom. Additionally, it encourages collaborative learning environments, enabling teachers to connect and exchange information globally, enhancing their instructional strategies. A more dynamic, learner-centric, and forward-thinking educational environment will result from incorporating a positive attitude toward technology into educational programs, which will eventually benefit students and society as a whole.

2.2.2. Enhanced Engagement

Learners frequently express greater involvement in programs that use technology. The learning process becomes more engaging and pleasant with the use of interactive multimedia tools, online debates, and team projects. The study “Enhanced Engagement of Learners Perceptions of Technology-Enabled Teacher Education Programs” denotes a significant transformation in the field of education, where technology serves as a catalyst to change teacher education. This innovative program uses cutting-edge technological resources and cutting-edge pedagogical strategies to develop an immersive learning environment. In addition to providing future teachers with the digital literacy needed for today’s classrooms, the seamless integration of technology into teacher education programs encourages a deeper and more meaningful engagement with the educational process. With the ability to adapt to changing educational environments and effectively inspire and educate the next generation of learners, this paradigm shift has the potential to transform how instructors are educated.

2.2.3. Flexibility and Convenience

Learner's value the flexibility that blended or online teacher preparation programs provide. They may work at their own pace, which is crucial for individuals trying to balance coursework with other obligations. The attitudes of students of technology-enabled teacher preparation programs are significantly influenced by flexibility and convenience. These programs give aspiring instructors the flexibility to adapt their learning experiences to their own needs and schedules in the dynamic educational environment of today, where traditional limits are continuously changing. Utilizing technology’s capabilities makes teacher education more accessible than ever, enabling students to easily fit coursework into their daily lives. This adaptability encourages a greater level of engagement and retention in addition to fostering a sense of ownership over one's learning experience. Fundamentally, convenience and flexibility act as the pillars of contemporary teacher education, ushering in a time when teachers are prepared to fulfill the varied requirements of their pupils while juggling the demands of their own professional development.

2.2.4. Preparation for the Digital Classroom

Future educators are aware of the value of being technologically proficient in today's increasingly digital society. They feel that programs supported by technology effectively equip them for the difficulties of teaching in the twenty-first century. Through the eyes of the students, it examines the vital nexus between technology and teacher preparation. In order to provide light on their experiences, difficulties, and opportunities in the context of the digital classroom, this study explores the perceptions of prospective educators as they interact with technology-enabled teacher education programs. This research aims to inform the ongoing evolution of teacher preparation programs by gaining an understanding of how learners perceive these cutting-edge pedagogical approaches. By doing so, it will be possible to make sure that educators are adequately prepared for success in the rapidly changing world of digital education.

2.2.5. Concerns about Overreliance

Some students express worries about an excessive reliance on technology, worried that it can supplant crucial interpersonal relationships and creative expression in the classroom. It’s still up for dispute how to balance using technology and conventional teaching techniques. Concerns against overly relying on students' opinions of technology-enhanced teacher education programs center on the potential negative effects of giving digital tools and platforms an excessive amount of weight in comparison to conventional pedagogical approaches. Although technology unquestionably improves teacher preparation, a focus on technology alone may unintentionally overlook other elements of good teaching, such as interpersonal abilities, classroom management, and subtle instructional strategies.
This over-dependence on technology runs the risk of generating teachers who are adept at using it but lacking in the crucial human-centric traits that promote meaningful student-teacher connections and engaging learning environments. To ensure that teacher education programs remain comprehensive and responsive to the complex requirements of contemporary education, it is crucial to strike a balance between utilizing the advantages of technology and maintaining the fundamentals of teaching.

2.3. Challenges and Considerations

While technology-enabled teacher education programs offer numerous benefits, they are not without challenges:

2.3.1. Access to Technology

Unfair access to technology and dependable internet connections, especially in underprivileged areas, is a major barrier. This digital divide can make it very difficult for students to participate in online courses, resulting in unequal access to resources and educational opportunities. To guarantee that prospective teachers from all backgrounds may benefit from technology-enhanced teacher training programs, this gap must be closed through infrastructure development and actions for fair access.

2.3.2. Technological Literacy

Making sure educators and students are technologically literate is one of the main problems in teacher education programs that use technology. While these programs have many benefits, such as improved accessibility, flexibility, and cutting-edge learning techniques, they also necessitate a certain amount of digital competency from participants. To effectively teach their students, instructors must be skilled in using a variety of educational technologies, platforms, and tools, and students themselves must have the essential digital abilities to traverse these digital environments. To ensure that educators and students can fully take advantage of the potential benefits of technology in education, it is essential to bridge the digital gap and provide enough training and assistance to improve technological literacy.

2.3.3. Quality of Online Instruction

Technology-enhanced programs' efficacy is greatly influenced by the caliber of instruction and course structure. It's crucial to maintain good standards for online education. The caliber of online training is one of the most important factors. It can be difficult to guarantee that instructors receive thorough and efficient training in a virtual setting. In an online environment, it may be more difficult to maintain engagement, encourage interactive learning, and monitor student progress. In addition, certain aspiring teachers may be disproportionately affected by the digital divide and lack of access to technology, thus keeping them out of these programs. To fully realize the potential of technology-enabled teacher education, it is essential to develop and implement high-quality online coursework that addresses these issues.

2.3.4. Balancing Theory and Practice

Theoretical knowledge and useful classroom abilities need to be balanced in teacher preparation programs. It might be difficult to integrate technology effortlessly into the curriculum. The delicate balance between theory and practice is one of the main factors to be taken into account. Technology integration in teacher education programs shouldn’t take precedence over the value of practical classroom practice. To guarantee that future educators not only gain pedagogical information but also develop the practical skills required to successfully traverse various classroom contexts, it is crucial to strike the correct balance. In order to successfully bridge the gap between theory and practice, tackling this difficulty also calls for creative curriculum design, mentorship programs, and chances for student instructors to participate in authentic teaching experiences.

3. Conclusion

This paper highlights the transformative effects of technology-enhanced teacher preparation programs on the constantly developing field of education in its conclusion. It highlights how crucial it is to comprehend how both students and teacher educators view these initiatives. Technology-enabled teacher education programs are significant because they can improve pedagogy, offer adaptive learning experiences, create global connectivity, provide efficiency and accessibility, and encourage data-driven decision-making. These programs empower educators with the skills necessary to function in the digital era, enabling them to fulfill the varied requirements of students and quickly adjust to the sector of education that is undergoing rapid change. The majority of learners have positive opinions of these programs, and they particularly value the increased engagement, adaptability, and preparation for the digital classroom that they provide. However, worries about an over reliance on technology serve as a reminder of the value of maintaining a balance between technological resources and conventional teaching strategies. Although these programs
have many advantages, they also have problems with access to technology, technological literacy, the caliber of online training, and the need to balance theory with practice. In order for technology-enabled teacher education programs to develop and successfully educate the upcoming generation of educators for the demands of the 21st-century classroom, it will be imperative to address these problems. Programs for teacher preparation that use technology present a possible way to influence the direction of education. They offer learners innovative and interesting educational experiences while also equipping instructors with the knowledge and mindset necessary to succeed in a digital environment. Addressing the issues and concerns outlined in this assessment will help to create a teacher education environment that is more inclusive, flexible, and successful, allowing us to fully realize their potential. The perceptions of students will be crucial in guiding the growth of teacher preparation programs as technology continues to alter the future of education.

Compliance with ethical standards

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References


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