Journal of Innovations in Educations and Social Sciences
Leruse Newsy Associates
Volume 3. Issue 1 https://jiess.org ISSN:3006-6603

Assessing the Challenges Faced by Prospective Teachers in Adopting Educational Technologies for Modern Classrooms

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ABSTRACT

The incorporation of technology has become an integral part of the teaching learning process, but the challenges being faced by prospective teachers regarding the effective use of technology for teaching learning purposes are creating difficulties for them. The research aims to identify the major challenges being faced by prospective teachers regarding the effective adoption of technology for teaching learning purposes. Moreover, the research aims to explore the role of digital pedagogical competence, institutional, and social factors in the effective adoption of technology for teaching learning purposes. A qualitative research design was adopted for this research, as it helps the researcher to gain an in-depth knowledge of the participants' perceptions regarding the effective implementation of technology for teaching learning purposes. A sample of 25 prospective teachers from teacher education programs at five public and private universities of the Gujranwala Division of Punjab, Pakistan, was selected for the research. The participants for the study were recruited through the use of purposive sampling, which ensured that the participants had previous exposure to technology during their coursework or teaching practice. The data collection method for the research was the use of semi-structured interviews, which allowed the participants to provide detailed information regarding the use of technology. After the data collection, it was analyzed using Braun and Clarke's six-phase thematic analysis. The research revealed that the challenges facing the participants fell into four major categories, namely technological challenges, pedagogical challenges, institutional challenges, and personal challenges. Based on the research, it is clear that there is a need for teacher training, institutional support, and technological infrastructure to ensure the effective use of technology in the classroom.

Keywords: Educational Technologies, Technology Adoption, Teacher Training, Classroom Integration, Pedagogical Challenges, Institutional Support

Introduction

The high rate of change in educational technology has greatly transformed the nature of teacher design, delivery and assessment of learning, and thus the need to integrate technology has emerged as a critical competence among current teaching professionals (Mhlongo et al., 2023). As the importance of digital competence grows, education systems around the world are becoming consistent with new digital ecosystems (Uzorka et al., 2023). Yet, pre-service teachers have to endure numerous difficulties with being introduced to such technological advances (Sharma and Srivastava, 2020). Technological proficiency, pedagogical adaptability, and willingness to embrace new technologies are the relationships that are studied using such frameworks as the Technology Acceptance Model (TAM) and Technological Pedagogical Content Knowledge (TPACK) model (Kearney et al., 2018). According to these models, the motivation, ease of use, and institutional support affect the technology adoption behaviors of the teachers (Li et al., 2016). However, these international structures are not very sensitive to socio-economic, infrastructural, and cultural differences, especially in underdeveloped countries such as Pakistan. Teacher educators are becoming aware that the digital transformation in education is not merely a technical change but a pedagogical and cultural change that re-invents the training roles and the instructional design (Chew et al., 2018). The key to successful integration is not just the access to technology, however, the teacher self-efficacy, institutional preparedness, and policy fit with the digital innovation (Mhlongo et al., 2023). There is the need to build technological proficiency, as well as a critical pedagogical awareness among the prospective teachers, in order to support learner-centered, inclusive digital settings. The challenges regarding education digitalization still exist even in the context of the educational institutions located all over the world because of the lack of training, the obsolete curriculum, and reluctance to shift to pedagogical innovations (Uzorka et al., 2023). The COVID-19 pandemic also revealed the importance of technological preparedness and showed vulnerabilities in digital infrastructure, teacher training programs (Sharma and Srivastava, 2020). This interference highlighted the importance of pre-service teachers to be flexible to uncertainty in digital mediation learning settings.

Researchers have reported that there is a dynamic association between the use of technology and professional identity in future educationalists. Teacher professionalism and employability are now viewed as inseparable, and digital competence is a mandatory part (Uzorka et al., 2023). Nevertheless, as developed countries enrolled digital literacy in the curriculum, numerous developing countries, including Pakistan, continue to experience such challenges as the unequal distribution of devices, the unreliability of internet, and lack of culturally relevant digital pedagogy (Mhlongo et al., 2023). The use of educational technology in such situations, therefore, is not merely a technical ability but a transformative one that will shape the ways in which future educators will conceptualize the teaching and learning process. It is essential to know what

potential teachers encounter, which allows transforming teacher preparation programs both on the global and local levels (Kearney et al., 2018). The current study is specialized in the socio-educational environment of Pakistan, in which the process of teacher education being aligned with the global digital education agenda is still underway.

The change in the approach to teaching, where the use of technology replaced traditional teaching, has shifted the requirements to the future teachers, as they need a greater degree of technological skills and greater pedagogic flexibility (Uzorka et al., 2023). Although education technologies are supported by policies, their use is still not even, and institutional, technical, and motivational factors restrict the adoption of educational technologies (Mhlongo et al., 2023). The practical challenges digital competence development is often not prioritized in many teacher education programs, and prospective teachers are not ready to use digital tools efficiently (Sharma and Srivastava, 2020). The intention to use digital tools is strongly predictable by technological self-efficacy of a teacher (Li et al., 2016). Technology is less popular among prospective teachers who find it convenient and beneficial to innovate with it (Kearney et al., 2018). Nevertheless, it is avoided by low-confidenced or fearful individuals with technological complexity, which only contributes to the disconnection between policy ambitions and practice in the classroom (Chew et al., 2018).

Digital divide has been a very critical issue in the adoption of technologies in teacher learning programs in most developing nations including South Asia. Poor infrastructure, insufficient access to the devices, and poor internet connectivity are challenges to the large-scale integration of technologies (Mhlongo et al., 2023). Pre-service teachers usually do not get assistance on how to match digital tools with curricula and pedagogical systems even in the presence of hardware (Uzorka et al., 2023). Such dislocation threatens to diminish the idea of integrating technology to the view of using the tools instead of developing meaningful digital pedagogy. Furthermore, digital tools may also be perceived as a danger to teaching power, which is one of the patterns of technology adoption that are affected by cultures (Sharma and Srivastava, 2020). Senior educators are the agents of these perceptions and might not be digitally competent themselves, which creates a self-perpetuating challenge to integration of technologies (Kearney et al., 2018).

COVID-19 served as a stress test to any educational system across the globe by revealing deficits in digital preparedness (Mhlongo et al., 2023). Especially pre-service teachers were not able to cope with the switch to online teaching and their inability to do it indicated their lack of both technological skills and digital pedagogical practices (Uzorka et al., 2023). Nevertheless, it was also the pandemic that boosted the investment into the e-learning platforms, teacher development, and digital curriculum development (Sharma and Srivastava, 2020). Recent indications indicate that the digital transformation should be implemented as an ecology, and it implies that the policy-practice correspondence, leadership support, and sufficient funding must

be provided (Mhlongo et al., 2023). With the emergence of fast-evolving educational technologies, teacher education institutions have to make sure that not only digitally savvy pre-service educators are prepared to operate in the realm of educational technologies but also critically literate individuals who can evaluate the pedagogical worthiness and ethical consequences of the technologies (Uzorka et al., 2023).

Educational technology has been regarded in developing countries as a developmental issue as opposed to a pedagogic innovation. Universities and policymakers focus on infrastructure rather than on the acquisition of instructional design skills in teacher trainees (Mhlongo et al., 2023). Subsequently, pre-service teachers are exposed to few frameworks such as TPACK or constructivist technology integration, which diminish their self-confidence to become innovators in technology-saturated settings (Chew et al., 2018). This shows that there is a need to employ contextualized approaches that can facilitate the development of technological skills and transformation of pedagogies. The systemic issue in the digital technology integration of teachers education in Pakistan is still observed even after many reforms (Uzorka et al., 2023). The challenges that pre-service teachers still encounter include inadequate access to digital materials and a lack of institutional support (Mhlongo et al., 2023). This national policy-classroom practice disjunction hampers the creation of digitally competent teachers capable of meeting the needs of learners in the 21 st century.

Although teaching education has been modernized in Pakistan, most of the programs there are based on subject knowledge and general pedagogy, with little regard to the adoption of technology (Sharma and Srivastava, 2020). The digital literacy courses and ICT labs are accessible, but are mostly limited by the outdated curriculum, the absence of highly qualified trainers, and an unreliable availability of internet-enabled classrooms (Kearney et al., 2018). This restricts the pre-service teachers in their knowledge on the best way of integrating the educational technologies in their teaching. Moreover, there are socio-economic inequalities in urban and rural areas, and urban trainees have more resources and mentorship compared to rural-based ones (Mhlongo et al., 2023). Such inequalities are wider global tendencies in which teacher education digital differences are the reflections of social and economic differences (Uzorka et al., 2023).

Even teacher educators do not tend to be digitally trained which restricts their options to emulate useful technology integration behaviors (Chew et al., 2018). Pre-service teachers lack digitally confident teachers with whom they can apply theoretical knowledge of technology integration to practice. This gap serves as an emphasis on the significance of professional development programs among teacher trainees, as well as teachers in Pakistan (Li et al., 2016). Although the policy framework of Pakistan on digital education acknowledges the potential of technology to improve the quality of learning, it still has inconsistency in implementation especially in the rural

regions (Mhlongo et al., 2023). Absence of strong monitoring and evaluation systems has slowed down institutionalization of technology integration (Uzorka et al., 2023). This gap needs to be addressed in order to synchronize the system of teacher education in Pakistan with the international agenda of digital competencies. This research seeks to examine the issue of challenges to the adoption of educational technologies among prospective teachers in Pakistan and, as part of the global discussion of the digital transformation of the educational process, provides practical information to policymakers and teachers in Pakistan.

Literature Review

Recent works have pointed out the numerous problems facing potential teachers who endeavor to incorporate the educational technologies in their pedagogical process. These challenges are multidimensional because they relate to technological, pedagogical, institutional, and personal aspects, which in combination do not allow digital tools to be meaningfully addressed in teacher education (Hasim & Bakar, 2025). Although the world has called out to the increased digitization of education, the situation is associated with patchy usage and severe challenges (Padilla-Escorcia and García-Rodríguez, 2025). One systematic review revealed that most future teachers are familiar with the theoretical aspects of using digital tools, but they have a gap in the skills to apply these tools into the lesson plan and classroom delivery (Hasim and Bakar, 2025). The pedagogical gap that is present in the education programs of teachers is one of the main impediments, which were discovered. The education curriculum and programmes do not focus on digital pedagogy enough, and pre-service teachers are thus left without connecting the theories taught to them and the practical, which is needed to apply technology in teaching (Dockendorff and Zaccarelli, 2025). The existing gap in the pedagogical preparation is also increased by the reality that in most teacher education programs, the emphasis remains on the traditional and non-digital methods of teaching, which prepares a teacher inadequately to meet the requirements of the classroom (Anwar, Musa, and Salleh, 2025). An enduring gap between the conceptual knowledge of technology and its actual application in the classroom still remains ineffective in integrating technology (Anwar, Musa, and Salleh, 2025).

It is also important to highlight the institutional and policy-related challenges that would confront the potential teacher. Poor institutional structures and uneven digital policies tend to limit the fact that teachers can model and use technology (Al-Motrif, Alfayez, and Almalhy, 2025). Organizations that are not supportive enough in terms of training, facilities, and resources are not likely to create the environment in which the successful implementation of technology is possible (Hidi, Ab Jalil, and Ismail, 2025). Such difficulties are especially intense in resource-constrained and rural regions, where technological constraints and institutional backing are more likely to be more intense (Hidi, Ab Jalil, and Ismail, 2025). The necessity to implement the context-sensitive approach, targeting the specific challenges associated with the diverse

educational settings, is acute (Al-Motrif, Alfayez, and Almalhy, 2025). Technological self-efficacy and motivation are critical personal factors influencing the adoption of educational technologies. The confidence of pre-service teachers in using emerging tools such as virtual reality plays a significant role in shaping their readiness and willingness to integrate these technologies into classroom practice, as VR environments provide opportunities to enhance teaching competence, engagement, and instructional confidence (Van der Want & Visscher, 2024). Low self-efficacy or teachers who have not been properly introduced to immersive technologies are frequently unwilling to adopt new digital technologies (Griffiths and Goddard, 2015). Resistance to change tends to compound this individual challenges since most would-be teachers are more at home with traditional ways of teaching (Basak and Govender, 2015). In the absence of specific intervention strategies that help to instill confidence and offer emotional and professional assistance, teachers will probably continue with their reluctance to embrace technology in the classroom (Basak and Govender, 2015).

Educational technologies integration therefore demands holistic thinking that takes into account the interaction between the technological, pedagogical, institutional and personal aspects. Other theories like the technology acceptance model (tam) shed some light into what factors determine technology adoption where the perceived usefulness and ease of use are major factors which determine whether or not potential teachers will adopt technology (davis, 1989). On the same note, technological pedagogical content knowledge (tpack) model also emphasizes the fact that in order to successfully incorporate technology in the lessons, the teachers must include not only knowledge of technology, but they must also have pedagogical and content knowledge (mishra and koehler, 2006). Such models offer theoretical knowledge of how such challenges of technology integration in teacher education can be overcome (mishra and koehler, 2006; davis, 1989).

Institutional challenges are also conceptualized through institutional theory and unified theory of acceptance and use of technology (UTAUT) which underscores the role of organizational culture and resources available in influencing the success of technology adoption (Venkatesh et al., 2003; Scott, 2008). The likelihood of popularization in the event that the institutions cannot deliver that required infrastructure, resources, or policy support (Reid, 2014; Schneckenberg, 2009). At the individual level, the social cognitive theory and the concerns-based adoption model (CBAM) argue that positive perceptions about the potential of using technology and their attitude towards change are major factors that will make or break the adoption of new digital tools by prospective teachers (Bandura, 1986; Hall and Hord, 1987). The effectiveness of teachers who do not have self-efficacy or are emotionally resistant to technology is less likely to adopt technology in their teaching environment (Griffiths and Goddard, 2015).

To sum up, the problem of introducing educational technologies into teacher training is a complicated and multifaceted issue. The current literature demonstrates that a need to adopt a comprehensive, integrated methodology to enable prospective teachers to overcome the technological, pedagogical, institutional, and personal challenges is present (Hasim and Bakar, 2025; Padilla-Escorcia and Garcacia-Rodriguez, 2025). A better approach will be not just to enhance access to technology but also to offer institutional support, specific professional development opportunities, and an adequate framework of policies to steer the adoption of technology (Dockendorff and Zaccarelli, 2025; Al-Motrif, Alfayez, and Almalhy, 2025). A multi-theoretical approach that is holistic would be more efficient because it allows the researchers and educators to comprehend the challenges involved in the play and work towards the establishment of environments where the potential teachers can be empowered to effectively integrate technology in their teaching practices (Mishra and Koehler, 2006).

Research Objectives

i. To identify the key challenges faced by prospective teachers in adopting and integrating educational technologies in modern classrooms.
ii. To examine how digital pedagogical competence, institutional support, and social factors influence prospective teachers' intention and ability to adopt educational technologies.

Research Questions

i. What are the major technological, pedagogical, and institutional challenges that affect prospective teachers' adoption of educational technologies in modern classrooms?

How do digital pedagogical competence, institutional readiness, and social support influence prospective teachers' intention and actual use of educational technologies?

Methodology

This study adopted a qualitative research design to explore the challenges faced by prospective teachers in adopting educational technologies in modern classrooms. A qualitative approach was chosen to gain an in-depth understanding of participants' lived experiences and perceptions within their natural educational contexts, as qualitative research is particularly suited for interpreting complex social realities through participants' voices (Creswell & Poth, 2018). The researcher aimed to examine how prospective teachers navigate technological, pedagogical, institutional, and personal challenges to integrating digital tools into their teaching practices, which has been shown to be critical in determining the success of technology adoption in

education (Mhlongo et al., 2023). This design allowed for the identification of challenges faced by future educators, along with their strategies for overcoming these challenges, within the context of a developing country such as Pakistan, where educational technology adoption remains a challenge (Uzorka et al., 2023).

The participants were selected using purposive sampling, a technique that is well-suited for qualitative research because it focuses on selecting individuals who can provide rich, relevant, and diverse insights into the research phenomenon (Etikan et al., 2016). The target population consisted of prospective teachers enrolled in teacher education programs at both public and private universities in the Gujranwala Division of Punjab, Pakistan. Out of the nine universities in the region, five universities were selected based on accessibility and the representation of both public and private sectors. From each selected university, five prospective teachers were chosen, resulting in a total of 25 participants. All participants were enrolled in BS programs and had prior exposure to educational technologies through coursework or teaching practicum experiences. The sample ensured diversity in terms of institutional context, gender, and technological exposure, enhancing the credibility and transferability of the findings (Lincoln & Guba, 1985). The participants were able to provide insights into how their experiences with educational technologies shaped their perceptions and practices, which aligns with the goal of capturing varied perspectives on technology adoption (Mhlongo et al., 2023).

Data were collected using semi-structured interviews, a method that allowed participants to share detailed insights while also providing the researcher with the flexibility to probe further into relevant themes. This approach enabled a deeper exploration of each participant's individual experiences and perceptions, ensuring that the collected data reflected the complexities of the challenges faced by prospective teachers in integrating digital tools (Braun & Clarke, 2016). The interview guide consisted of five open-ended questions that explored the following main domains: technological challenges, pedagogical challenges, institutional challenges, personal challenges, and strategies for overcoming these challenges. Each interview lasted approximately 30 to 35 minutes and was conducted in person, providing an opportunity for the researcher to establish rapport and ensure that participants felt comfortable sharing their thoughts. All interviews were recorded through google form with participants' consent, and with the help of open ended questions that were transcribed verbatim to ensure the accuracy of the data (Sharma & Srivastava, 2020). This method of data collection provided rich, detailed descriptions of participants' experiences with educational technologies, allowing the researcher to explore the nuances of their perceptions and challenges.

Thematic analysis (Braun & Clarke, 2016) was employed to analyze the data, as it is a flexible method suitable for identifying and analyzing patterns (themes) within qualitative data. This approach allowed the researcher to systematically organize and interpret participants' responses

while ensuring that the identified themes accurately reflected their lived experiences. The analysis followed the six-phase process outlined by Braun and Clarke: familiarization with the data through repeated reading of transcripts, generating initial codes to capture meaningful data units, searching for themes by grouping related codes, reviewing themes to ensure coherence, defining and naming themes, and producing the final report. The data analysis process was inductive and data-driven, meaning that the themes were generated from the data itself rather than from preconceived ideas or theories. This ensured that the findings were grounded in participants' actual experiences (Braun & Clarke, 2016).

Trustworthiness was a critical concern in this qualitative study, and the researcher followed Lincoln and Guba's (1985) four criteria to ensure the validity and reliability of the findings. Credibility was achieved through member checking, where participants were provided with summaries of their responses for verification, allowing them to confirm or clarify the accuracy of the interpretations. Transferability was ensured by providing rich, detailed descriptions of the research context and participants, allowing readers to assess whether the findings might apply to other settings (Mhlongo et al., 2023). Dependability was maintained through an audit trail, documenting all methodological steps and ensuring that the research process was transparent and consistent. Confirmability was supported through reflexive journaling, where the researcher reflected on their role in the research process and ensured objectivity in the interpretation of the data. This process minimized researcher bias and ensured that the findings were grounded in the data (Lincoln & Guba, 1985). Ethical approval was obtained from the university's ethics committee, and participants provided informed consent. Confidentiality was ensured through pseudonyms and secures handling of data, following AERA ethical guidelines (2011).

This methodological approach allowed for a comprehensive exploration of the challenges faced by prospective teachers in adopting educational technologies. By using qualitative methods, the study provided valuable insights into the perceptions, experiences, and strategies of teacher candidates, contributing to the understanding of technology adoption in teacher education in Pakistan and similar contexts. The findings of this study may inform the development of more effective teacher preparation programs and professional development initiatives aimed at supporting the integration of educational technologies into teacher training (Sharma & Srivastava, 2020).

Results

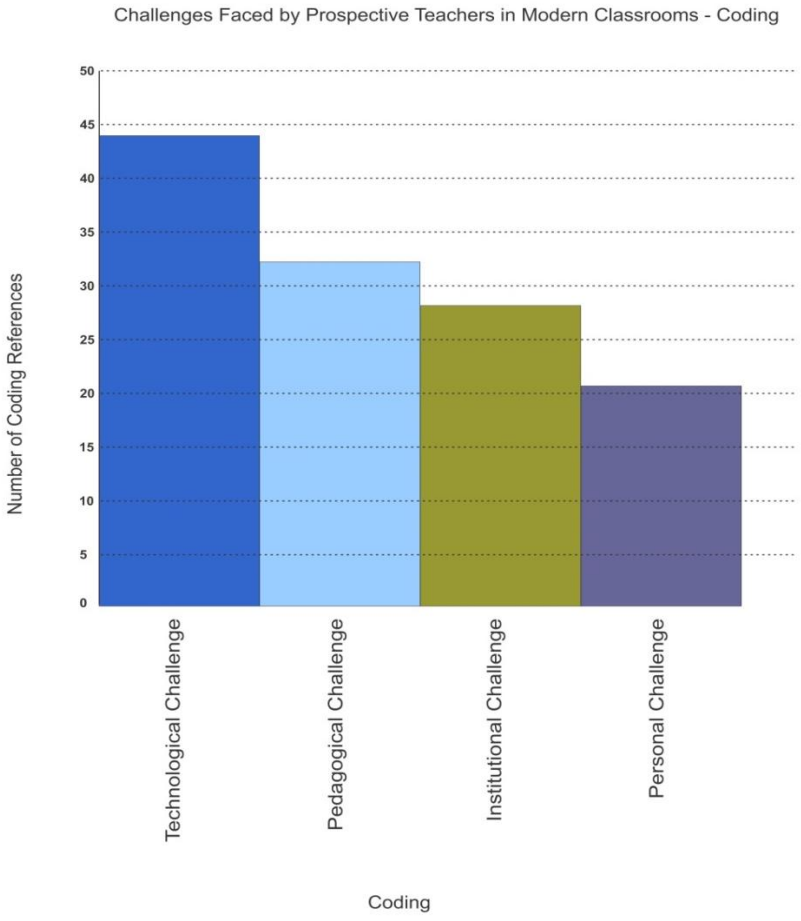
The data analysis performed with the help of NVivo software has offered interesting results as to the challenges beginning teachers encounter when embracing educational technologies to use in a contemporary classroom. The term cloud shows the most common terms discussed which are technology, tools and training. All these keywords emphasize the importance of technological

integration, confidence of the teacher, and the necessity of correct training and materials. The bar chart that shows the number of references in the coding of each theme shows the relative significance of the four major challenges that are identified: technological, pedagogical, institutional, and personal challenges. The most references were to technological challenges, as they are common among the potential teachers in their challenges with connectivity and limitations of the devices they use, as well as the inability to access the latest tools. Pedagogical challenges like the lack of proper training and also the inability to integrate technology with curriculum goals were also addressed given due attention. The challenges of the institutions such as inadequate resources, obsolete equipment's and poor institutional support were perceived to form a major challenge towards the adoption of educational technologies in teacher education programs. Finally, personal challenges, especially the problem of confidence and the fear of adopting new technologies, were also quite often brought up, which indicated that the attitudes of teachers and their self-efficacy have a strong impact on their readiness to use digital tools in their work effectively. The findings are in line with the current research acknowledging technological challenges of poor internet access and limitations in the use of devices, and institutional and pedagogical challenges to effective integration of technology. The prevalence of personal challenges is also consistent with the research that indicates lack of confidence and fear of failure are significant challenges that influence the readiness of potential teachers to adopt new technologies in the classroom. Let's talk about the figure 1. To analyze the first objective, Nvivo world cloud of whole data gathered during interview was used.

Word Cloud represents Challenges faced by Teachers in Modern Classrooms

The term cloud is a visual symbol of most commonly used words regarding the issue of using educational technologies. The most prevalent words in the cloud are technology, tools, and training, which emphasize the primary importance of digital tools and sufficient training and

materials of teachers. The frequency of the words is represented by their size, which means that the access to technology, internet connectivity, and incorporating digital tools into lessons were the primary challenges of interest to the participants. These results suggest that access to technology should be enhanced and that training teachers to utilize these tools must be implemented. Figure 2. will explain the primary themes of this study and the number of references used in coding.



The bar chart is used to show how many references to the coding were used in each of the four key challenges found in the study: technological, pedagogical, institutional, and personal. The largest number of references was to technological challenges and this indicates the importance of the problems like poor internet connectivity and limited access to devices. Pedagogical challenges, including the inability to combine technology with the curriculum and insufficient training were also a common type of concern. The challenges identified in the use of technology were institutional challenges such as lack of resources and use of old equipment. The personal challenges, which were mostly connected with the teachers' confidence and fear of using new technologies, were also important but were referred to lesser than the other challenges. This chart

gives a clear visual image of the relative significance of all the challenges in the light of the implementation of educational technologies in the contemporary classrooms. To respond to the second research aim, I classified the key aspects in four dimensions one of which is displayed in Figure 3. The first dimension examines the technological challenges of the potential teachers. This aspect played a central role in grasping the most important challenges that affect the intention and capability of teachers to implement educational technologies in their classrooms. Under this dimension, two sub-themes were found: "Connection Problems" and "Limitations of the devices used".

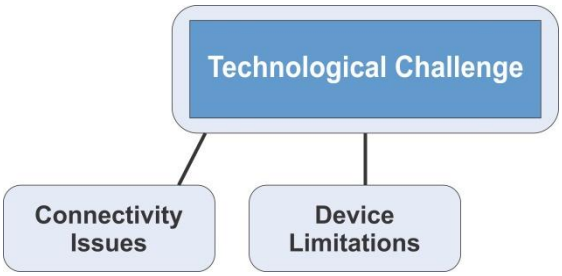


Figure 3. Technological challenges Faced by Teachers in modern classrooms

These technological problems including connectivity and device restrictions were observed to have a negative impact on the ability of the prospective teachers to embrace the educational technologies. The inadequate infrastructure and availability of proper technology existed as big challenges that created a challenge to their preparedness and trust in utilizing digital means in the classroom. It is necessary to address these challenges that would help prospective teachers to become fully involved in educational technologies and improve their teaching in the contemporary classes.

The main technological problem facing the potential teachers was connectivity. A lot of respondents claimed that they had poor internet connectivity with the internet being unreliable, particularly in rural or remote locations. This non-static connectivity was one of the challenges in their successful use of online resources, participation in virtual training, or implementation of digital tools in their teaching practice. In other instances, educators complained about slow or intermittent connections that interrupted classes and made them unable to take full advantage of technology in the classroom. These challenges resulted in discouragement as they created the perception of education technologies as inapplicable to daily practice. The second sub-theme, Device Limitations, also demonstrated the technological limitations that had to be faced by potential teachers. Most teachers complained that the available devices to them either personal or institutionally supplied were old or not possessing the required specifications to run the advanced educational software or applications. This was especially observed when there was an attempt to incorporate multimedia materials, i.e. videos or interactive simulation into lessons. Moreover, the

fact that the student population of an institution lacked devices to utilize was also a challenge to developing a technology-based classroom. In others, the educators added that they were not only slow but also incompatible with some of the most vital educational tools, which aggravated their problems.

To discuss the second phenomenon that studies pedagogical challenges, figure 4 depicts the two sub-themes that were produced in the identified dimension: training deficiency and curriculum conflict. Such pedagogical considerations were major challenges to the use of educational technologies by future teachers.

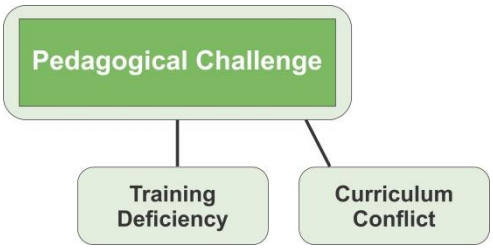


Figure 4. Pedagogical challenges Faced by Teachers in modern classrooms

The lack of proper training and the opposition to conservative curricula were some of these pedagogical challenges that significantly contributed to the inability of the potential teachers to integrate educational technologies. It also indicated that the educational system needs to be redesigned to enable continuous professional growth and flexible curriculum development to help facilitate the implementation of technology in the teaching methods.

The first sub-theme found under the pedagogical challenges was training deficiency. Most of the would-be teachers said that they did not have proper training on how to use educational technologies. Although there were respondents with minimal exposure to the digital tools, they said that minimal exposure was not enough to gain the necessary pedagogical learning to make use of technology in meaningful ways in teaching. The teachers did not feel ready to introduce the new technologies in their educational strategies without having extensive training courses that would pay attention to the practical and theoretical elements of digital pedagogy. Some of the teachers observed that they required specialized training, which was practical in order to acquire confidence and competence to utilize digital tools in the classroom. The curriculum conflict was the second sub- theme that was also outlined as a major pedagogical problem by the participants. Future teachers reported that there was in congruency between technology and curriculum they were to be teaching. The inflexible nature of traditional curricula that did not offer flexibility in most cases, made it difficult to be able to present the technology based methods of instruction that would match up with the standardized content. According to many teachers, the curriculum was not modified to match the current technological changes which contributed to the conflict between the demands of the curriculum and the dynamism of educational technology. Consequently, educators had a challenge of adjusting their teaching

methods to accommodate the use of current digital technology and at the same time achieve the set educational standards.

In order to deal with the third dimension of institutional challenges, figure 5 reveals the two sub-themes which were developed in this dimension: outdated equipment and support gaps. The said challenges had a direct impact on the ability of prospective teachers to implement educational technologies successfully into their instructional work.

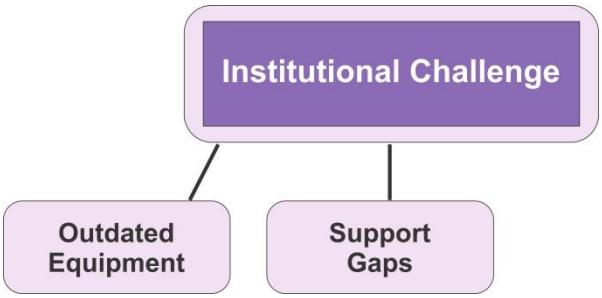


Figure 5. Institutional challenges Faced by Teachers in modern classrooms

All these institutional challenges especially the obsolete equipment's and absence of support systems posed significant challenges to the successful adoption of educational technologies by the potential teachers. These challenges would have to be solved by making financial investments in equipment's modernization as well as ensuring an obligation to build strong support mechanisms to enable the teachers to use and embrace technology without fear.

The first sub-theme that was selected under institutional challenges is outdated equipment. Most of the future teachers cited this as a major problem as their institutions did not have the most current and updated technological equipment. This problem involved older computers, the projectors and other classroom technologies and all the technologies were either functioning poorly or could not meet the requirements of the modern educational technology. The absence of the modern technology implied that the teachers could not apply the latest software, applications, or digital material in their classrooms. Some of the individuals were frustrated because they were not able to give lessons that had interactive or multimedia features which they believed are essential in capturing the interests of the students and improving the learning experiences. This institutional constraint provided a hindrance towards the adoption of digital tools and technologies in teaching. Another important institutional challenge that was identified under the second sub-theme, support gaps. A good number of the teachers stated that their organizations did not have support systems to enable them to adopt and effectively utilize educational technologies. This assistance might take the form of special technical help, professional growth probabilities, provision of technology mentors who may instruct teachers on how to overcome technological difficulties. The absence of institutional support implied that teachers were not

always given appropriate training or problem-solving materials, which meant that they had to work out the challenges in technology by themselves. Consequently, this made a lot of potential teachers feel overwhelmed and confused as to how they may integrate technology in their instructions and thus the unwillingness to use new tools and techniques.

To resolve the fourth aspect that looks at personal challenges, figure 6 illustrates the two sub-themes that are determined, namely confidence lack and technology fear. These individual struggles have a major effect in determining the intention and capacity of the prospective teachers to adopt educational technologies..

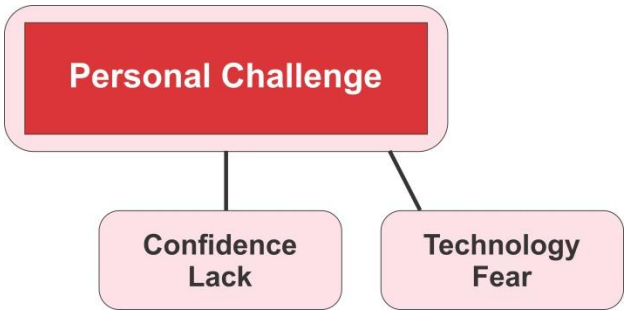


Figure 6. Personal challenges Faced by Teachers in modern classrooms

These individual challenges, especially, the lack of confidence and the fear of technology, posed major challenges to the use of educational technologies by potential teachers. It is important to overcome these personal challenges with the help of specific professional growth, confidence-building techniques, and support networks, so that teachers would be motivated to adopt technology in their classrooms.

The initial sub-theme that was pointed out under personal challenges was confidence lack. Numerous potential educators have claimed that they had low confidence in their capability to conduct and make use of educational technologies efficiently in the classroom. Although the teachers were available with digital tools, they were not comfortable with their technical abilities thus most teachers declined to use digital tools in their classes. This was especially the case with those teachers that had to work with unknown digital platforms or complicated software that they did not feel they were well-prepared to use. The issue of not wanting to appear in front of students and make mistakes made by teachers also added to their reluctance to integrate technology into the teaching process. This was one of the challenges to the use of educational technologies since confidence is essential to the effective use of new technologies.

Technology fear was the second sub-theme that came out with as another challenge facing the potential teachers. Most of the participants said that they feared and were anxious about utilizing

technology in teaching. The roots of this fear were many, why in technical breakdowns during classes, the abundance of the constantly changing digital tools, and the seeming complexity of some educational technologies. One of the most often cited by teachers is that they are afraid they would be unable to troubleshoot technical problems on the spot which would interrupt the lesson flow and have an adverse impact on student engagement. This fear also kept them away in adopting the technological aspects of education since they wanted to be in the mechanisms that they are most comfortable with.

The map below (figure 7) reflects the overall conceptual model of this study that introduces the major challenges confronting aspiring teachers in the implementation of educational technologies in the contemporary classes. These challenges are divided into four major dimensions, which are technological challenges, pedagogical challenges, institutional challenges, and personal challenges. All these challenges are intertwined, which emphasizes the complexity of the process of technology integration of the teaching and learning setting.

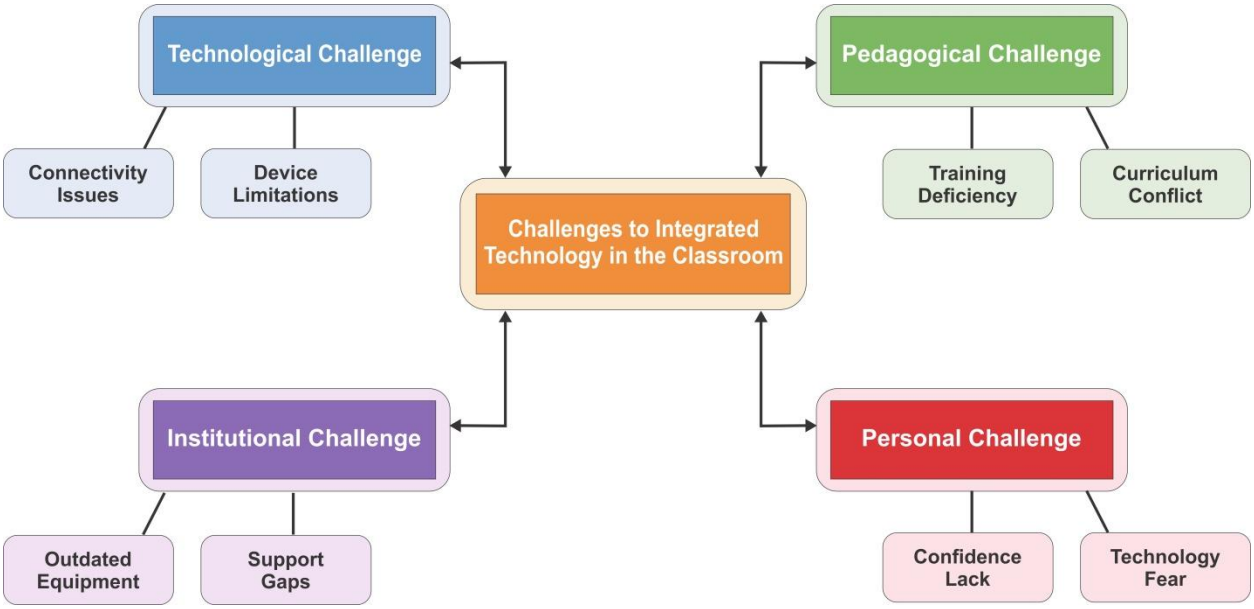


Figure 7. Model of Challenges to Integrated Technology in the Classroom

In the study, there were four major factors to the adoption of educational technologies among the potential teachers as challenges, including technological challenges, pedagogical challenges, institutional challenges, and personal challenges. Connectivity problems and device restriction are examples of technological challenges, and training deficiency and curriculum conflict are examples of pedagogical challenges that restrict the ability of teachers to include technology in their teaching practices. The institutional factors such as old equipment and support gaps also limit the use of technology by teachers. There are also personal challenges like confidence lack

and technology fear which do not allow the teachers to use technology in the classroom properly. All these challenges are interrelated and need a holistic approach which involves upgrading the infrastructure, training the teachers, revising the curriculums and providing them with constant support to overcome these challenges and use technology to enhance their learning processes better.

Conclusion

This paper set out to review the challenges surrounding the adoption of educational technologies by future educators into classrooms. After conducting a thorough research on many of its dimensions including technological challenges, pedagogical challenges, institutional challenges and personal challenges a comprehensive conceptual model was created in order to indicate the major challenges concerning the successful application of technology in education. According to it, there are such critical challenges as connectivity challenges, device limitations, training deficiency, curriculum conflict, outdated equipment, support gaps, confidence lack, and technology fear, which hamper the adoption of educational technologies among teachers. The investigation is a useful conceptual model and by considering these challenges comprehensively, the study can be of benefit since it does not only give theoretical background but also practical advice on how to overcome these challenges. This may be a helpful tool to be used by educators, policy-makers, and institutions that want to promote the use of educational technologies and enhance the teaching process. Finally, this research adds to the discipline by noting that the integration of technology in classrooms can be enhanced with relative ease by providing infrastructure, teacher training, and personal development opportunities to the potential educators in the teaching profession.

Recommendations

Based on the findings of this study, the following recommendations are proposed to enhance the adoption of educational technologies in classrooms and address the challenges faced by prospective teachers:

i. Teacher Training and Professional Development

In order to overcome the training deficiency and improve the capacity of prospective teachers to use educational technologies, special teacher trainings programs are to be created. These programs should be based not only on technical skills that are needed to operate educational technologies, but also on the pedagogical approaches that can help to implement technology into the classroom instruction. The teaching education programs, both pre-service and in-service, must incorporate practical workshops, during which teachers will get to know how to utilize

different digital resources available like learning management systems, multi-media tools, and interactive educational programs. Moreover, it can be possible to create a peer mentoring system whereby more veteran teachers can mentor less confident teachers to help them plan lessons and share technology. Also, interactive workshops and role-played classrooms ought to be used to strengthen the belief of teachers and guarantee proficiency in integrating digital tools in their classes.

ii. Institutional Support and Infrastructure Improvement

In order to address support gaps and outdated equipment, the institutions should spearhead improvement of the technological infrastructure and offer on-go support to teachers to effectively utilize technologies in the learning process. This entails updating of the gadgets, improving internet connectivity, and quality technical support. Organizations ought to invest in buying of modern equipment that includes computers, tablets, and interactive white boards, and also have high-speed internet connectivity throughout all the classrooms. The technical support team must be formed with a special focus on helping customers address technical problems with their device or connectivity concerns. Also, it is necessary to maintain and update technological equipment regularly, and the policy of replacing outdated tools should be clear and definite in ensuring that teachers have access to the resources.

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