



A PHENOMENOLOGICAL STUDY OF THE INTEGRATION OF CONTEMPORARY TECHNOLOGIES IN SHAPING PROSPECTIVE TEACHERS' TEACHING MINDSET

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Abstract

This research paper examines how incorporation of modern technologies can change the professional teaching attitude of the teachers. The data was gathered using a qualitative phenomenological design, semi-structured interviews with 26 pre-service teachers of public and private universities were used. Colaizzi's method of analysis was used to examine the lived experiences of the participants. The results have shown that technological integration improves digital competence, facilitates learner-centered pedagogical methods, reinforces research-based thinking, and creates professional confidence in future teachers. A number of obstacles were observed, such as absence of training, resources, technical, and institutional barriers. A significant difference was found between public and private institutions, with private institutions demonstrating better access to and availability of technological facilities, while public institutions faced constraints in resources and infrastructure for effective technology integration. The participants from private universities demonstrated greater exposure, confidence, and access to technological resources, while those from public institutions relied more on self-directed learning and less facilitated than private universities. This research finds that successful implementation of technology involves organized training, provisions of resources, and institutional encouragement. It highlights that technology is a disruptive element in the construction of contemporary teaching experience and teaching identity. Findings of the study recommends the strengthening professional development programs and improving specific contemporary facilities for technological use to promote the meaningful and equitable integration of technology in teacher education.

Keywords

Technology Integration, Teaching Mindset, Prospective Teachers, Digital Competence, Teacher Education, Phenomenology

Introduction

The adoption of modern technologies in learning has greatly changed the face of teaching and learning, especially in teacher education courses. Currently, future educators are supposed to work with digital tools including learning management systems, multimedia tools and online collaborating platforms as a component of professional preparation. These technologies are not only instructional aids but they are transforming how contemporary classrooms are accessing and constructing and delivering knowledge. As UNESCO says, digital transformation in education is an indispensable part of creating inclusive and future-oriented systems of teaching education, and technological skills in teachers are important (UNESCO, 2022).

In addition to technical abilities, technology integration has significant importance in influencing the pre-service teachers teaching attitude. Teaching mindset is a set of beliefs, attitudes, and perceptions that affects the way teachers are teaching and interacting with the students. When exposed to digital worlds, it is common to see future teachers being influenced to take up more learner-centered and interactive methods of teaching and leave behind the traditional lecture-based teaching methods. The current research indicates that technology-

based environments are capable of favorably affecting the teacher beliefs and encouraging new teaching practices that can increase the student participation (Yilmaz-Na & Sönmez, 2023).

Background of the Study

The idea of digital competence has been positioned at the center of the contemporary education system, with the need to ensure that teachers are capable of successfully incorporating technology into their teaching methods. The framework of DigComp 2.2 proposed by the European Commission includes information literacy, communication, collaboration, and digital content creation as the key competencies that should be possessed by a potential teacher in modern classrooms (Vuorikari et al., 2022).

Besides general digital skills, the application of digital research tools has become a necessary requirement in the development of evidence-based teaching practices among future teachers. Online academic databases, electronic libraries, and research sites provide pre-service teachers with an opportunity to work with academic knowledge and enhance their instructional planning. Researchers have shown that the use of digital tools in higher education improves engagement and critical thinking as well as independent learning among students (Consoli et al., 2024).

Nonetheless, technological inclusion in teacher education is usually surrounded by various issues. These are deficiency in training, lack of confidence and institutional support which may hamper effective implementation. Studies have pointed out that despite the numerous opportunities that technology has brought on the teaching practice, obstacles like infrastructure constraints and resistance to change still influence its usage in the learning institutions (None Dr. Ranbir, 2024).

Moreover, institutional differences are very critical in determining the way in which technology is incorporated into teacher education programs. Public and private universities are usually different in their resources, infrastructure, and access to digital tools, and it impacts the experience of future teachers. Research has established that context and institutional influences have a great influence on the capacity of teachers to incorporate technology and attain favorable attitudes towards its application (Alptekin & Taneri, 2025).

Furthermore, a successful technology integration depends largely on the professional development and training. Studies have shown that structured training programs founded on models like TPACK (Technological Pedagogical Content Knowledge) can positively impact teachers in regards to their confidence, skills and instructional practices as they utilise technology (Şefika Sümeyye Çam & Gürcü Koç, 2024).

In the contemporary educational landscape, the integration of technology is no longer optional but essential for effective teaching and learning. Teachers are expected not only to possess subject knowledge but also to demonstrate digital competence and the ability to create interactive, student-centered learning environments. Despite the increasing emphasis on technology in education, there remains a gap in understanding how this integration shapes the teaching mindset of prospective teachers, particularly within different institutional contexts. Moreover, differences in access to technological resources, training opportunities, and institutional support between public and private universities may lead to variations in how future educators perceive and adopt technology in their teaching practices. Therefore, this study is significant as it explores the transformative role of contemporary technologies in shaping beliefs, attitudes, and professional identity, while also identifying barriers and enabling factors that influence effective integration (Niyaz Panakaje et al., 2024).

General Objective

To investigate the role of incorporating modern technologies in the professional teaching attitude among future educators in teacher education programs.

Research Objectives

1. To examine the influence of contemporary technologies on the beliefs, attitudes, as well as professional identity of prospective teachers.
2. To analyze the role of digital tools in shaping instructional thinking along with teaching strategies in teacher education programs.
3. To identify barriers that affect the effective integration of technology-based pedagogies in teacher education programs.
4. To explore enabling factors such as training, institutional support, along with resource availability that facilitate technology integration.

Research Questions

1. How does the integration of contemporary technologies influence the beliefs, attitudes, as well as professional identity of prospective teachers?
2. How do digital tools shape instructional thinking along with teaching strategies in teacher education programs?
3. What barriers limit the effective integration of technology-based pedagogies in teacher education programs?
4. What enabling factors support the successful integration of technology-based pedagogies in teacher education programs?

Delimitations of the Study

This study was delimited to prospective teachers enrolled in teacher education programs at University of Punjab and the University of Lahore.

Literature Review

The adoption of modern technologies in education has greatly changed the way teaching and learning is conducted, especially among the teacher education programs. Traditional instructional methods are being outclassed by digital technologies that are more interactive, flexible, and student-centered, creating learning environments. It has been shown that the use of technology improves engagement, collaboration and efficiency in learning, hence redefining the teacher as the facilitator and not the knowledge-giver (Nagel & Amdam, 2025).

One of the major ideas of such a change is the concept of digital competence, which is now a necessity among future educators. Digital competence is defined as the capacity to use technology well in communication, content development and solving of problems in education. Research has also indicated that with the changing nature of education systems, teachers are being forced to keep on acquiring digital competence in order to keep up with the requirements of the dynamic classroom (Bueno-Baquero et al., 2026).

Digital competence and appropriateness of technology are connected further according to the frameworks like TPACK (Technological Pedagogical Content Knowledge). The studies demonstrate that digital competence is positively correlated with TPACK, which means that teachers with a higher level of digital skills can implement technology into the teaching process more effectively. (Çebi et al., 2022).

Furthermore, the integration of technology is significant in determining the way of teaching and enhancing 21 st century learning. It promotes the growth of such skills as critical thinking, creativity, collaboration, and communication. Teachers and students both recognize that supportive interactions are essential for fostering a safe learning environment in which students feel at ease seeking assistance when required. Additionally, their shared experiences and



challenges illustrate the ongoing transformation of education in Society 5.0, where integrated pedagogies and technological innovations are increasingly prioritized. Both STEM teachers and students also indicated a strong willingness to learn about and effectively integrate technology into classroom instruction (Amjad et al., 2025).

Research indicates that when technology is utilized effectively it enables the teacher to create meaningful learning experiences that are both active learners and help to promote independent learning among learners (Nurhidayat et al., 2024).

Influencing the teaching practices, technology also helps to develop the professional identity and mentality of the teachers. According to research, educators who have an active use of digital tools have a higher tendency to implement learner-oriented pedagogies and new teaching methods. This change is indicative of a more radical change in the beliefs and attitudes towards teaching and learning (Rashidovna, 2025).

Research on educational practices in Gilgit-Baltistan highlights that institutional context significantly influences teaching approaches and professional behavior. A study found clear differences in leadership styles across public and private school systems, where public school leaders were more inclined toward traditional, autocratic practices, while private school leaders demonstrated more flexible and participatory approaches. Additionally, female leaders were found to adopt more democratic styles compared to their male counterparts (in et al., 2021).

However, the adoption of technology in teacher education has been affected by various impediments in spite of its advantages. Lack of proper training and professional development opportunity is one of the biggest challenges. Research underlines that in the absence of training, teachers can hardly use technology efficiently, so it can have a minimal effect on learning and teaching (Rapanta et al., 2021).

Access to technological resources and infrastructure is also another key obstacle. According to research, it is not only the access to digital tools that are important, but also the institutional support and access to quality infrastructure that are central to the successful integration of technology (Dioquino & Paglinawan, 2024).

Moreover, the contribution of institutional context should not be disregarded. The variations in the educational environments more so the differences between the public and the private institutions can determine the level of adoption of technology in teaching. Research indicates that institutional policies, leadership support and resource availability are important in influencing the attitude of teachers towards the adoption of technology (Salehi et al., 2025).

The use of e-books and mobile learning enhances students' engagement and academic performance by providing flexible and accessible learning opportunities. Digital tools support more interactive and self-directed learning, which can influence teaching practices. These findings highlight the role of technology in shaping educators' attitudes and promoting a shift toward modern, technology-based teaching approaches (Amjad et al., 2024).

Educational institutions often face challenges such as limited digital skills, lack of resources, and resistance to change, which can hinder the effective use of technology. These challenges influence teaching practices and affect how educators adopt modern methods. As a result, institutional conditions play an important role in shaping teachers' mindset toward technology-based teaching (Alvi et al., 2021).

Conversely, there are a number of facilitative conditions that favor the effective use of technology in teacher education. Training workshops, professional development programs, and the opportunities of continuous learning have been found to be the major factors in the improvement of the digital competence and confidence of teachers. Such efforts would close the divide between technology-related knowledge and pedagogy (Sousa Ferreira, 2024).

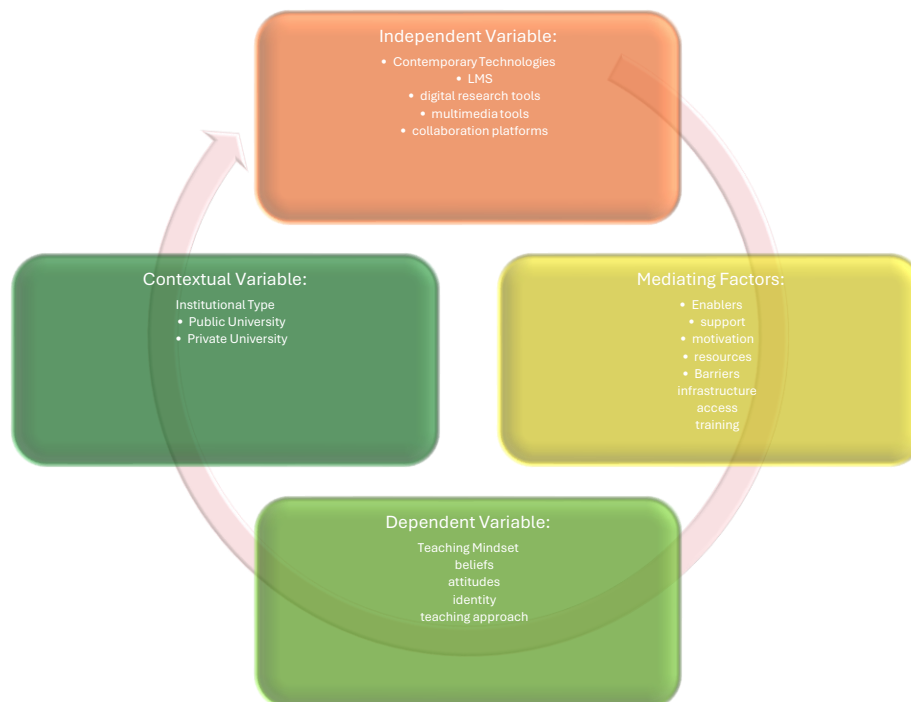
Conceptual Framework

This study is based on the idea that the use of modern technologies in teacher education can shape how future teachers think about teaching. Tools such as learning management systems, multimedia resources, online collaboration platforms, and digital research tools expose prospective teachers to new ways of learning and teaching. Through this exposure, their beliefs, attitudes, and understanding of teaching begin to change.

As prospective teachers interact with these technologies, they gradually move away from traditional, lecture-based methods and begin to adopt more interactive and student-centered approaches. This shift also helps them build confidence and develop a stronger sense of professional identity as modern educators.

However, this relationship is not always direct. Factors such as training opportunities, availability of resources, institutional support, and personal motivation play an important role in shaping how effectively technology is used. In addition, the type of institution, whether public or private, influences the level of access to technology, quality of infrastructure, and overall learning experience.

Therefore, the framework suggests that contemporary technologies influence the teaching mindset of prospective teachers, while support systems and institutional context determine how strong and effective this influence becomes.



Methodology

Research Design

The qualitative phenomenological research design applies in this study to examine the experience of prospective teachers. Phenomenology is suitable because it is concerned with the way people experience and interpret their world.



Participants

The sample comprised 26 prospective teachers who were chosen purposely:

Punjab University (public sector) 13.

The University of Lahore (private sector) 13.

The participants were selected according to their exposure to technology in the teacher education programs.

Data Collection

Semi-structured interviews were used to collect data. The open-ended questions enabled the participants to describe:

their experiences with the use of digital tools.

their attitudes towards teaching technology.

the influence on their pedagogical attitude.

Instrument Development Process

The interview guide used in this study was developed carefully to ensure alignment with the research objectives. Initially, relevant literature on technology integration and teaching mindset was reviewed to identify key areas for exploration. Based on this review, a set of open-ended questions was designed to capture participants' experiences, perceptions, and challenges related to the use of digital tools in teacher education.

The development of open-ended interview questions is widely recommended in qualitative research, as it allows participants to express their views in depth and provides rich, detailed data. The questions were structured to guide the discussion while maintaining flexibility, enabling participants to elaborate on their personal experiences.

The instrument was also designed to reflect the phenomenological nature of the study, focusing on lived experiences rather than predetermined responses, which is consistent with qualitative research practices (*Qualitative Inquiry and Research Design*, 2026).

Validation of the Instrument

To ensure the validity and reliability of the instrument, the interview guide was reviewed by experts in the field of education and research methodology. Their feedback helped refine the questions in terms of clarity, relevance, and alignment with the research objectives. Minor revisions were made to improve wording and remove ambiguity.

Expert review is considered an important step in establishing **content validity** in qualitative research, as it ensures that the instrument adequately covers the intended research constructs (Creswell (2014)). Additionally, qualitative researchers emphasize the importance of clarity and relevance in interview questions to enhance the credibility of the data collected (Patton (2015)). Through this process, the final interview guide was validated as suitable for capturing meaningful insights into the experiences of prospective teachers regarding technology integration.

Phenomenological Data Analysis (The Method of Colaizzi)

The research utilized Colaizzi (1978) phenomenological approach to the analysis of qualitative data collected in the form of semi-structured interviews. This approach has been chosen because of its systematic nature in the study of the lived experiences of the participants.

Colaizzi's method is a systematic approach used in phenomenological research to understand and interpret participants' lived experiences. It helps the researcher move from raw interview data to meaningful themes while staying close to what participants actually expressed.

In this study, the process began with reading all interview transcripts several times to become familiar with the participants' experiences. This step allowed the researcher to gain an overall



understanding of how prospective teachers perceived the use of technology in their learning and teaching.

After this, important statements related to technology integration and teaching mindset were identified from each transcript. These statements were then carefully examined to understand their underlying meanings. The researcher ensured that these meanings reflected the participants' original views without distortion.

Next, similar meanings were grouped together to form themes. For example, ideas related to skill development were grouped under digital competence, while those related to teaching approaches were organized under mindset transformation. This step helped in structuring the data into clear and meaningful categories.

Once the themes were developed, a detailed description of the overall experience was written to explain how technology influenced the teaching mindset of prospective teachers. This description brought together all themes into a complete understanding of the phenomenon.

Finally, the findings were shared with some participants to confirm that the interpretations accurately represented their experiences. This step, known as member checking, helped ensure the credibility and trustworthiness of the study.

Data Analysis and Findings

Introduction

The results of the research depending on the research of qualitative data gathered with the help of semi-structured interviews with prospective teachers of Punjab University (public) and the University of Lahore (private). This study aimed at investigating the lived experiences of the participants in the context of integrating recent technologies and its impact on their teaching mentality.

The use of a phenomenological approach was to gain insight into the perceptions, interpretations, and meaning of the ways participants experience the use of digital tools in teacher education. Colaizzi method was used in the analysis, which enabled the identification of important statements, development of meanings, and grouping of themes.

Participant Profile

There were 26 prospective teachers in this research:

Public University (Punjab University): 13 respondents.

University of Lahore (Private): 13 respondents.

The participants were enrolled in teacher education programs and exposed to digital technologies with different intensity including:

Learning Management Systems (LMS).

Multimedia materials (videos, PowerPoint).

Web based group work systems (Zoom, Google Classroom)

Internet-based research tools (online journals, Google Scholar).

Participants are identified as P1, P2, P3 in order to preserve their confidentiality.

Data Analysis Procedure

The data were discussed in terms of Colaizzi phenomenological approach:

Familiarization was done by reading transcripts over and over again.

Important statements were picked out.

Meanings were formulated

Themes and sub themes were created.

An in-depth account of the phenomenon was built.



Major Themes and Finding

Theme 1: Digital Competence Development.

Description

The respondents referred to their experience of learning digital skills as being slow and practical. At the beginning, most people were undecided with their use of technology, but with constant exposure, they gained confidence and competence.

Subthemes

First reluctance and learning process.

Self-directed learning

Practice in improving the skill.

Participant Voices

At first, I was scared of working with technology, and now I am able to operate various tools without any doubts(P4)

I did not learn most things through formal training but by trying them out myself (P11)

Interpretation

Digital competence was not simply the acquisition of technical skills but a transformative event that made participants feel more competent in the future as an educator.

Theme 2: Change of Teaching Mindset

Description

The integration of technology resulted in a change of beliefs of the participants regarding teaching. A large number of them shifted towards a learner-centered approach instead of a teacher-centred one.

Subthemes

Movement to interactive instruction.

Student engagement focus

Constructivist learning orientation

Participant Voices

It is not only about explaining, I now believe that teaching is about engaging students. (P7)

Technology opened my eyes to the fact that students learn better when they are involved. (P15)

Interpretation

The participants had a redefinition of teaching, with learning being interactive, collaborative and student centered.

Theme 3: Strengthening of Research-Oriented Thinking

Description

Online research instruments were instrumental in influencing the academic and instructional minds of the participants.

Subthemes

Online journal usage.

Evidence-based teaching

Critical thinking development

Participant Voices

I began utilizing research articles as opposed to using textbooks alone. (P9)

I now look at various sources when teaching any subject. (P18)

Interpretation

Technology also motivated the participants to embrace reflective and research-based teaching practices.

Theme 4: Building of Professional Identity and Confidence.



Description

The respondents mentioned that they felt more confident about their teaching skills with the use of technologies.

Subthemes

Reliance on delivery of lessons.

Feeling professionally prepared

Reduced teaching anxiety

Participant Voices

I feel more at ease when I use multimedia before the students. (P2)

Technology helps me see myself as a modern teacher. (P20)

Interpretation

Technology helped in creating a good professional identity as qualified and ready teachers.

Theme 5: Obstacles to the introduction of Technology.

Description

Regardless of good experiences, participants cited a number of barriers that make it difficult to use technologies.

Subthemes

Lack of training

Low availability of resources.

Technical issues

Institutional constraints

Participant Voices

They are supposed to use technology, yet they do not provide appropriate training. (P6)

Digital tools are sometimes hard to use due to internet problems. (P13)

Interpretation

The barriers provided some disconnect between the expectations and the actual capability that influenced the confidence and consistency of technology usage among the participants.

Theme 6: Technology Integration Facilitating Factors.

Description

Respondents emphasized the reasons that helped them successfully use technology.

Subthemes

Institutional support

Peer collaboration

Availability of electronic resources.

Personal motivation

Participant Voices

Teacher support enabled me to learn how to use technology in a better way. (P10)

The collaboration with classmates helped to learn new tools easier. (P22)

Interpretation

Effective adoption of technology required external support system and internal motivation.

Theme 7: Experience Differences in the Institutions.

Description

The experiences of participants were affected by the differences between the public and the private universities.

Subthemes

Resource availability

Training opportunities



Infrastructure quality

Participant Voices

Facilities and support are offered in more in private universities. (P17)

“In our university, we mostly learn technology on our own.” (P5)

Interpretation

The institutional context was very influential in the determination of access, confidence, and general experience with technology.

Summary of Findings

The phenomenological review demonstrated that the process of introducing modern technologies can impact the teaching mentality of future teachers immensely. Among the main findings, there are:

Technology improves digital capabilities and confidence.

It encourages learner-based methods of teaching.

It reinforces instructional practices that are based on research.

It leads to professional identity formation.

The lack of training and resources are some of the barriers that restrict effectiveness.

Adoption occurs through enabling factors, which include support and motivation.

The differences in the institutions have an effect on the general experience.

The nature of the phenomenon can be defined as:

The collaboration of modern technologies not only turns the potential educator into an active, thoughtful, and self-assured professional, but also reveals the problems in the system, which determine the evolution of his/her professional path.

Coding Scheme (Themes, Subthemes & Mapping to Research Questions)

| Theme | Subthemes | Description | Related Research Question |
|------------------------------------|---|---|---------------------------|
| Digital Competence Development | Basic digital skills - Advanced tool usage - Self-learning of technology | Growth in ability to use LMS, multimedia, and digital platforms | RQ1 |
| Transformation of Teaching Mindset | Shift to learner-centered approach - Interactive teaching practices - Constructivist thinking | Change in beliefs about teaching and learning due to technology | RQ1 |
| Professional Identity Formation | Confidence in teaching - Perception as modern educator - Readiness for classroom | Technology shaping identity as a future teacher | RQ1 |
| Barriers to Technology Integration | Lack of training - Limited access/resources | Challenges that hinder effective use of technology | RQ2 |



| | | | |
|----------------------------|---|--|-----|
| | <ul style="list-style-type: none"> - Technical issues - Institutional constraints | | |
| Institutional Differences | <ul style="list-style-type: none"> Public vs private resource gap - Infrastructure availability - Policy differences | Impact of institutional context on experience | RQ2 |
| Enabling Factors | <ul style="list-style-type: none"> Institutional support - Training programs - Peer collaboration - Access to tools | Factors facilitating successful integration | RQ3 |
| Motivation and Attitude | <ul style="list-style-type: none"> Personal interest - Perceived usefulness - Ease of use | Internal drivers influencing adoption | RQ3 |
| Research Skill Development | <ul style="list-style-type: none"> Use of digital databases - Evidence-based teaching - Critical thinking | Role of digital research tools in teaching mindset | RQ1 |

The results of this research indicate that modern technologies have a great impact on the professional attitude of future educators. These results are in line with the previous studies that underline the transformative value of digital tools in contemporary education systems.

The researchers concluded that future educators acquired the digital competence over time by exposure, trial, and error. Firstly, most participants were confused and felt insecure, however, with time they got more skilled and familiar with digital tools.

Which emphasizes digital competence as one of the key conditions of modern educators along with communication, collaboration, and content creation skills (Vuorikari et al., 2022).

Moreover, the findings also confirm the results of Consoli et al. (2024), who suggest that the use of digital tools helps students and educators to improve their independent learning and critical thinking.

Transformation of Teaching Mindset

One of the key discoveries in this research was the transformation of the teacher-centered practice to a learner-centered teaching practice. The participants claimed that they started to pay more attention to student engagement, interaction and collaboration.

This change is in line with studies by Nagel and Amdam (2025), which imply that technology reinvents the role of the teacher as a source of knowledge to a facilitator. Besides, Yilmaz-Na & Sönmez (2023) discovered that online classrooms promote new pedagogical approaches and improve student engagement.

Concerning the findings, they also go in line with Nurhidayat et al. (2024) who mention that effective utilization of technology facilitates 21st-century skills, including critical thinking, creativity, and collaboration, and, in support of a constructivist approach to learning.

The research found that the **digital resources**, especially the online journals and research platforms, supported the participants to engage in evidence-based teaching and acquire critical thinking skills.

This result can be corroborated by Consoli et al. (2024), who note that online academic materials improve analytical thinking and self-directed learning. Equally, Rashidovna (2025) established that the integration of technology has been beneficial in enhancing reflective teaching practices and promoting the use of various sources of knowledge by teachers instead of relying on textbooks.

The respondents indicated that their capacity to use digital tools in an effective way made them feel more confident and more like a professional modern educator.

The given finding aligns with Niyaz Panakaje et al. (2024), who point out that the integration of technology does not affect teaching practices only but also the beliefs and professional identity of teachers. Besides, Şefika Sümeyye Çam & Gucu Koç (2024) emphasize that TPACK-based structured training enhances the confidence of teachers, their skills, and instructional effectiveness.

Although the results were positive, the study determined that there were several barriers such as training deficiency, inadequate resources, technical difficulties, and institutional support.

Rapanta et al. (2021) agree with these findings by suggesting that the limitation of proper technology utilization in the educational process is conditioned by the insufficient training. Likewise, Dioquino & Paglinawan (2024) state that the key to technology integration is access to the infrastructure and institutional support.

Moreover, According to None Dr. Ranbir (2024), resistance to change and infrastructural barriers remain the major obstacles to effective digital technologies implementation in educational institutions.

The researchers discovered that institutional support, peer cooperation, availability of resources, and personal motivation have a great impact on boosting technology adoption in potential teachers.

This is consistent with Sousa Ferreira (2024) who points out training programs and professional development as some of the factors used in enhancing digital competence. Moreover, Hazni and Nurhaida (2024) point out that positive attitudes and internal motivation are very important in motivating teachers to use and embrace digital tools.

The results also corroborate the TPACK framework which emphasizes the significance of integrating technological, pedagogical, and content knowledge to successfully teach (Çebi et al., 2022).

The research also found out that there were distinct disparities between the two institutions (public and private) especially in accessibility to resources, trainings and technological infrastructure.

This observation is aligned with that of Alptekin and Taneri (2025) who argue that the institutional context plays a major role in determining the capacity of teachers to adopt technology. On the same note, Salehi et al. (2025) explain that leadership support, policies, and availability of resources are important in influencing the attitude of teachers towards the adoption of technology.

Conclusion

The paper concludes that the incorporation of modern technologies is a transformative factor in the teaching mindset of future teachers. It boosts online proficiency, learner-centered instruction, encourages research based thinking, and fosters professional self-assurance.

Yet, the success of the technology integration process is closely connected with the appropriate training, institutional support, and resource availability. Although technology has huge potential, it is important to resolve the current obstacles in order to achieve the maximum benefits.



Altogether, the integration of technology is not a technologic procedure but a transformative experience that redefines the beliefs and identities of teachers as well as their instructional practices making them ready to work in the contemporary educational setting.

The study recommends that teacher education institutions should introduce structured training programs based on frameworks such as TPACK to enhance both technological and pedagogical skills. There is a need to improve technological infrastructure, particularly in public universities, to ensure equitable access to digital tools. Institutions should also strengthen support systems through mentoring, workshops, and technical assistance. Furthermore, teacher education programs should promote research-based teaching practices and encourage collaboration among students to facilitate knowledge sharing. Addressing institutional disparities and fostering positive attitudes toward technology are essential to ensure effective and meaningful integration.

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