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# Digital Pedagogical Readiness Among Teacher Trainees in the Era of Smart Learning

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## Abstract

Digital technologies are rapidly evolving, and as a result, education has changed, leading to a need for teachers who can effectively use digital technologies in education. The digital pedagogical competency relates to teacher trainees' ability to design, implement and evaluate technology enhanced learning, and it has been identified as a critical competency in the smart learning era. This paper aims to investigate the level of digital pedagogical readiness of teacher trainees and to analyze the factors that influence their readiness to smart learning environments.

The research is descriptive type and data source used are primary and secondary data. Both primary and secondary sources of data were used, with primary data gathered from structured questionnaires, distributed to teacher trainees in teacher education institutions, and secondary data gathered from scholarly articles, policy documents and educational technology reports. It examines different aspects of digital pedagogical readiness such as digital literacy, technological proficiency, online communication skills, instructional design skills, readiness to new technologies, and attitudes towards digital learning.

The results suggest that the overall attitude of teacher trainees in technology integration is positive, and they have satisfactory levels of basic digital competence. Yet there is a lack of knowledge in advanced pedagogical applications, in the creation of digital content and in data-driven teaching, as well as in effective smart learning tools use. Technology infrastructure, which was limited, less practical training, and differences in institutional supports were noted as key challenges to readiness. The study emphasises the need to reinforce the elements of the digital pedagogy in the teacher training curriculum and to offer students continuous professional development.

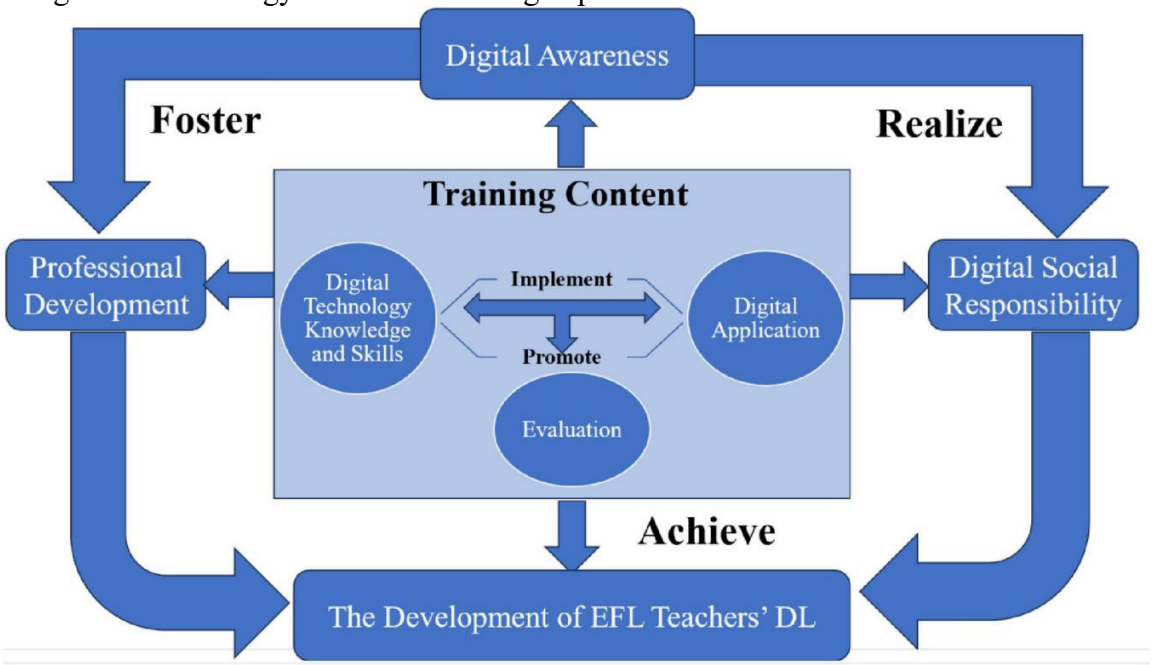
The study demonstrates the need to develop digital pedagogical readiness in order to equip future teachers with the necessary skills to respond to new demands of smart learning ecosystems. Hands-on technological training, innovative pedagogy and the development of digital competency can play a major role in enhancing education quality and developing learner-centered pedagogy in modern classrooms.

**Keywords:** Digital Pedagogical Readiness, Teacher Trainees, Smart Learning, Digital Literacy, Educational Technology, ICT Integration, Technology-Enhanced Learning, Digital Competencies, Teacher Education, E-Learning, Online Teaching, Digital Pedagogy.

## Introduction

Education has been radically changed by the fast development of digital technologies and the emergence of smart learning environments that are flexible, interactive, personalized and technology-intensive. Technology, particularly digital platforms like learning management systems, virtual classrooms, AI applications, educational software, cloud computing, and mobile learning platforms, have become essential parts of today's learning and teaching landscape. As these technologies are increasingly integrated into the educational landscape,

teachers' roles have shifted from that of a knowledge passer to one of facilitator, mentor, and designer of technology-enhanced learning experiences.

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The digital pedagogical readiness is a crucial competency for teacher trainees in this changing context of education. Digital pedagogical readiness involves a set of knowledge, skills, attitudes, and confidence needed to use digital technologies effectively and strategically in teaching to improve student learning outcomes. It includes technological proficiency, instructional design and competencies, digital communication competencies, online assessment competencies, and adaptation of pedagogical competencies for learning environments that are technologically rich. High levels of digital readiness enable teacher trainees to develop engaging, collaborative and learner-centred learning experiences.

With such a focus on smart learning, it is becoming more and more important for teacher education institutions to train the next generation of smart teachers for the digitally-mediated classroom. The pedagogical use of the digital device successfully is different from the personal use, which means that teacher trainees should receive specific training and practice in this use. Various issues like technological resources, institutional support, digital literacy and attitudes towards educational technology play an important role in shaping their preparedness to apply digital pedagogy.

Knowing the digital pedagogical preparedness of teacher trainees is key for designing teacher preparation programs and successful incorporation of technology in education. This study aims to reveal the preparedness of teacher trainees in the era of smart learning and examine what factors help to make their teaching more effective in the use of digital pedagogical practices.

## Background of the study

Digital technologies have revolutionised the world of education. Over the last few years, the concept of smart learning environments has reshaped the way education is conducted, by embedding Information and Communication Technology (ICT), Artificial Intelligence (AI), cloud computing, learning management systems, mobile applications and interactive digital tools into the learning process. The use of technology in pedagogy is gaining importance in educational institutions as a way to increase engagement with the learning process, enable personalized learning experiences and boost education outcomes. Consequently, the teacher's role has shifted from being a transmitter of knowledge to a facilitator, mentor and digital learning experience designer.

The idea of digital pedagogical readiness has become a highly relevant concept in the field of teacher education today. Digital pedagogical readiness is defined as teachers and teacher trainees' readiness to effectively use digital technologies in instruction while maintaining the integrity of good pedagogical practices. It includes the technological knowledge, digital competencies, skills as an instructional designer, technological adaptability, and knowledge of inclusive and engaging learning environments. The 21st century is a smart learning century and teacher trainees are expected not only to have subject knowledge but to also be proficient in the use of digital tools to cater for various learning needs.

Digital technologies have become equally important in the field of teaching and learning, as the COVID-19 pandemic also pushed for their use in the learning process and underscored the need to equip teachers with the skills to adapt to the online or blended learning paradigm. The abrupt transition to virtual classrooms revealed discrepancies in technology preparedness of teachers and the requirement of extensive digital training in teacher education. Education policymakers, education institutions and the accreditation bodies have thus paid more and more attention to improving digital literacy skills of future teachers for educational continuity and quality learning experiences.

The National Education Policy (NEP) 2020 has sought to bring technology into the teaching and learning process in India. The policy promotes the implementation of the digital platforms, virtual laboratories, on-line assessment tools and the pedagogical practices enhanced by the use of technology, to enhance the accessibility and effectiveness of education. The changes have led teacher education institutions to take on a greater role in teaching teacher trainees to become effective in learning environments that are rich with technology. The changes have made the role of teacher education institutions more complex, and the need to prepare teacher trainees for effectiveness in technology-rich learning environments has grown.

While investment in educational technology and digital infrastructure has increased, such investments do not ensure digital readiness of all teacher trainees. Investment in educational technology and digital infrastructure has increased, but there are still differences in degree of digital readiness between teacher trainees. Their preparedness for the smart learning environments is affected by various factors such as access to technological resources, digital literacy, institutional support, training opportunities, attitudes towards technology and previous experiences with digital tools. This is why it is crucial to know how prepared teacher trainees are for digital pedagogy so as to recognise strengths, weaknesses and where interventions are needed.

In the context of this background, the present study aims to investigate the digital pedagogical preparedness of the teacher trainees of the smart learning era. The study is designed to identify their technological capabilities, attitudes towards the application of technology in teaching and learning, and attitudes towards adapting to the technological requirements of teaching and learning. The results will help to design robust teacher training initiatives, improve digital competency frameworks and facilitate the successful implementation of smart learning initiatives in educational institutions.

## Justification

Digital technologies have rapidly developed and revolutionized education, creating smart learning environments, which have become an integral component of the teaching and learning process. Teacher trainees are the next generation of education professionals, and it is essential that they not only have pedagogical knowledge but also the digital skills needed to use technology in ways that enhance teaching and learning in classrooms. With the introduction of smart learning tools, artificial intelligence, learning management systems, virtual classrooms and interactive educational applications, educators' function has shifted from that of knowledge transmitters to facilitators of technology enhanced learning. Thus, it is imperative to evaluate digital pedagogical readiness of teacher trainees to foster and empower the successful development of technology-based education.

The study is justified as there are still challenges being faced by many teacher education institutions in the area of technological infrastructure, Digital skill development, and Effective incorporation of ICT in teacher training programmes. At the same time, teacher training programs are increasingly focusing on digital literacy and the use of technology in teaching, but it is not clear how well teacher trainees are prepared to use digital tools to plan lessons, assess student learning, collaborate with colleagues, or engage students. The knowledge of the students' readiness will be useful for discovering previous challenges on digital skills and pedagogical practices.

Moreover, the growing integration of educational environments of the future into smart learning environments requires teachers to adjust to new educational technologies while creating innovative learning experiences. Assessing digital pedagogical readiness can offer valuable information for curriculum developers, teacher educators, policy makers and educational institutions when planning effective training programmes and teacher professional development. The results of this study can support the development of teacher education in terms of fostering digital competence in teachers, improving the effectiveness of teaching, and preparing teachers for the challenges of the twenty-first century. Thus, this research is timely and relevant in preparing education for a technologically competent, and pedagogically competent teaching workforce.

## Objectives of the Study

1. To assess the digital pedagogical readiness of teacher trainees for integrating ICT tools and smart learning technologies into classroom instruction.
2. To evaluate the technological competencies of teacher trainees in using digital platforms, educational applications, and online teaching resources.
3. To examine the awareness and preparedness of teacher trainees regarding smart learning environments and emerging educational technologies.

4. To identify the factors influencing digital pedagogical readiness, including access to technology, digital literacy, training opportunities, and institutional support.
5. To analyze the attitudes and perceptions of teacher trainees toward the adoption of digital teaching methodologies and innovative learning practices.

## Literature Review

The speed of the integration of digital technologies in education has changed the way teachers work and teach, which implies high level digital pedagogical preparedness of Teacher trainees. Digital pedagogical readiness is the capacity of future teachers to be effective, successful and flexible learners and educators in digital learning and to use digital tools to support student learning.

Initial research on the use of technology in education highlighted the need for technological competence of teachers. Mishra and Koehler (2006) proposed a framework called Technological Pedagogical Content Knowledge (TPACK) that suggested that technology integration must be a balance of technology, pedagogy and content area knowledge. They pointed to the need for teachers to have both technological skills and pedagogical knowledge to be able to employ technology in meaningful ways in an educational context.

Likewise, Koehler and Mishra (2009) expanded the TPACK model, stressing the importance of teacher preparation programs to build TPACK structures to inform digital teaching. The results indicate that there is a positive correlation between the technological and pedagogical training received by the teacher trainers and their confidence level in using the digital tools to teach.

Digital competence has become a great focus in recent years. Digital competence, as defined by Ferrari (2013), includes knowledge, skills, attitudes and ethical issues that facilitate the successful application of technology. The study emphasized the importance of digital literacy for teachers' education institutions to ensure that the next generation of educators is equipped to teach in classrooms filled with technology.

In 2017, Instefjord and Munthe studied teacher education courses and found that a number of teacher institutions are not yet successful in systematically incorporating digital competence into their programs. Their study found that teachers' trainees' overall technological competence is present but they do not have the pedagogical competence needed to use digital tools in teaching and learning processes.

Self-efficacy has been studied in detail regarding technology adoption. The study by Tondeur et al. (2018) showed that the more technologically self-efficacious the teacher trainees, the more likely they are to use digital tools in the classroom. The research also indicated that experiences with technology enhanced classrooms are a positive influence on pedagogical readiness.

The beliefs and attitudes of teachers are important to technology integration practices (Ertmer & Ottenbreit-Leftwich, 2010). Based on their findings, they concluded that positive attitudes to e-learning facilitate more experimentation and innovation in teaching. Therefore, a student's positive attitude should be developed along with skills in teacher preparation programs.

With the advent of smart learning environments, digital pedagogy has been broadened even more. Zhu, Yu, and Riezebos (2016) described smart learning as a technology-assisted learning process that is adaptive and personalized, allowing learning to be interactive. They highlighted the need for teachers to acquire skills in digital communication, data-informed teaching and cooperative technologies.

A study by Sang et al. (2010) revealed that teacher training attitudes, perceived usefulness of the technology and institutional support are significant factors that affect the intentions of the teacher trainees to use educational technology. The research underlined the significance of supportive learning environments in increasing digital readiness of future teachers.

Furthermore, Scherer, Siddiq and Tondeur (2019) studied the factors that affect the readiness of pre-service teachers for technology integration, and they found that technological knowledge, pedagogical understanding, and having positive attitudes are the determining factors. They found that digital pedagogical readiness is a multidimensional concept.

The pandemic COVID-19 has speeded up the use and implementation of digital learning platforms globally. The abrupt switch to online learning revealed a lot of unpreparedness within teachers for online teaching by Trust and Whalen (2020). The research highlighted the importance of enhancing the digital pedagogical training of teacher education students to meet new educational challenges.

Bond, Buntins, Bedenlier, Zawacki-Richter, and Kerres (2021) pointed out that digital involvement, virtual cooperation, and learning analytics are gaining in significance within the framework of a smart learning environment. Their study proposed that teacher trainees need to build skills relating to digital learning ecosystems management and engagement of students with technology-enhanced pedagogies.

Moreover, Redecker (2017) introduced the European Framework for Digital Competence of Educators (DigCompEdu) which offers a comprehensive framework for measuring and training the digital competencies of teachers. The framework outlines the following dimensions of teacher readiness: professional engagement, digital resources, assessment, learner empowerment, and facilitating learners' digital competence.

In recent years, Cabero-Almenara, Barroso-Osuna and Palacios-Rodríguez (2021) have highlighted the importance of on-going professional development and the need for digital skill development for pre-service teachers. They have found that being digital ready is not a fixed quality or capability, but a learning process and an adaptation that is continuous.

The literature overall shows that many factors, such as technological competences, pedagogical knowledge, self-efficacy, attitude towards technology, institutional support, and exposure to smart learning environments, affect the digital pedagogical readiness of teacher trainees. Past research has consistently shown that digital pedagogy must be integrated into teacher education programs so that teachers can be equipped to successfully navigate the new technology-based learning environments. While there has been a lot of progress, there is still much more research to consider contextual factors of digital readiness and to come up with appropriate strategies to forge teacher trainees' readiness for the smart learning era.

## Material and Methodology

### Research Design:

This study used descriptive research to analyze the level of digital pedagogical readiness of teacher trainees in the context of smart learning environments. The research objective was to determine the readiness of the trainees to apply digital technologies, online teaching materials, and innovative teaching methods in the teaching process. Both quantitative and qualitative methods were used to delve into the issue comprehensively, in order to understand the digital competencies, attitudes towards digital education and perceived barriers to smart education of the participants. It was judged that the descriptive design was suitable because it allowed the systematic gathering and analysis of data on the current state of digital readiness of prospective teachers.

### Data Collection Methods:

Both primary and secondary sources of data were used for the study. The primary data was generated by a structured questionnaire for teacher trainees in the teacher education institutes. A series of questions concerning digital literacy, technological literacy, readiness for online teaching, familiarity with educational applications and attitudes towards smart learning technologies was included in the questionnaire. Unstructured and informal discussions and feedback sessions were also held to gain deeper insights into participants' experiences of digital learning environments. Secondary data was collected from scholarly journals, books, government reports, policy documents, conference proceedings and published research studies that specifically focus on digital pedagogy, teacher education, educational technology and smart learning systems. These were used as theoretical and empirical supports for the study.

### Inclusion and Exclusion Criteria:

The study was conducted with the teacher trainees who are enrolled in the appropriate teacher education programs like B.Ed., M.Ed., and similar professional training programs. Those who experienced any type of digital learning platforms, educational technologies or online teaching practices in their training were included. The respondents for this study were trainees who agreed to be involved in the study. Respondents who did not finish the questionnaire or gave incomplete or inconsistent answers were not included, however, in the study, as were individuals not enrolled in teacher education programs, in-service teachers, and administrative staff. This criterion resulted in the data collected being relevant and reliable.

### Ethical Considerations:

Ethical considerations were always observed during the research process. All respondents volunteered to take part in the study and gave informed consent prior to participating. The aim and objective of the study was explained and the participants were assured that any information given will be utilised only for academic and research purposes. The confidentiality and anonymity of the respondents was preserved in the data analysis and reporting process by not disclosing any personal identifiers. During the study respondents were free to drop out at any time without penalty. In addition, all information gathered was used and treated responsibly and ethically within accepted guidelines for educational research.

## Results and Discussion

### Results:

This study focused on the digital pedagogical readiness of teacher students in smart learning environments. The respondents were 200 teacher trainees from teacher education institutions. The analysis was carried out in four areas: digital competency, skills in technology integration, attitudes towards smart learning, and perceived challenges.

**Table 1: Demographic Profile of Respondents (N = 200)**

| Variable | Category | Frequency | Percentage (%) |
|---|---|---|---|
| Gender | Male | 82 | 41.0 |
| | Female | 118 | 59.0 |
| Age | Below 22 Years | 95 | 47.5 |
| | 22–25 Years | 78 | 39.0 |
| | Above 25 Years | 27 | 13.5 |
| Qualification | Undergraduate | 124 | 62.0 |
| | Postgraduate | 76 | 38.0 |

### Interpretation

Females (59%) and those under 22 years old (47.5%) dominated the respondents. The majority of teacher trainees (62%) had undergraduate qualifications. The demographic profile reveals that the sample was mainly composed of young people who are pursuing teaching professions in the context of digital transformation in education.

**Table 2: Level of Digital Competency Among Teacher Trainees**

| Competency Area | Mean Score | Standard Deviation |
|---|---|---|
| Basic Computer Skills | 4.32 | 0.58 |
| Internet Navigation | 4.41 | 0.54 |
| Educational Software Usage | 3.89 | 0.71 |
| Online Assessment Tools | 3.67 | 0.82 |
| Learning Management Systems | 3.54 | 0.76 |
| Digital Content Creation | 3.48 | 0.79 |

*(Scale: 1 = Very Low, 5 = Very High)*

**Interpretation**

The mean scores of teacher trainees for basic computer operation and internet usage is more than 4.0 and indicated good competence. Relatively, however, lower scores were measured with regard to digital content creation and learning management systems. This indicates that, although trainees are not intimidated by technology, they need further development of their pedagogically oriented digital tools.

**Table 3: Readiness for Technology Integration in Teaching**

| Statement | Mean Score |
|---|---|
| I am confident in using digital tools during teaching | 4.18 |
| I can integrate multimedia resources into lessons | 4.05 |
| I can conduct online classes effectively | 3.81 |
| I can design technology-supported learning activities | 3.76 |
| I can evaluate students using digital platforms | 3.63 |

**Interpretation**

The results suggest a positive overall attitude toward technology integration. There were a high level of confidence in the use of digital tools and multimedia resources. The level of readiness was quite low, however, in designing training activities that use technology, and in using digital assessment, in order to indicate what still needs to be developed in terms of pedagogical support.

**Table 4: Attitudes Toward Smart Learning Environments**

| Attitude Statement | Agree (%) | Neutral (%) | Disagree (%) |
|---|---|---|---|
| Smart learning improves student engagement | 84.0 | 11.0 | 5.0 |
| Digital technologies enhance teaching effectiveness | 81.5 | 13.0 | 5.5 |
| Smart classrooms promote collaborative learning | 78.0 | 16.5 | 5.5 |
| Technology should be integrated into all teacher training programmes | 87.0 | 8.0 | 5.0 |

**Interpretation**

Most of the respondents were positive about smart learning environments. Over 80% agreed that using digital technologies makes teaching more effective and helps to engage students.

These results indicate that the future educators have a high degree of acceptance of technology-based learning in the field of education.

**Table 5: Challenges Faced in Developing Digital Pedagogical Readiness**

| Challenge | Frequency | Percentage (%) |
|---|---|---|
| Limited Practical Training | 148 | 74.0 |
| Inadequate Infrastructure | 136 | 68.0 |
| Poor Internet Connectivity | 121 | 60.5 |
| Lack of Advanced Digital Skills | 114 | 57.0 |
| Insufficient Technical Support | 103 | 51.5 |

**Interpretation**

The greatest challenge was limited practical training with 74% reporting this as a challenge. Other significant barriers identified were problems with the infrastructure and with Internet connectivity. The results underscore the importance of institutional investment into the digital infrastructure and in hands-on technology training.

**Table 6: Overall Digital Pedagogical Readiness Levels**

| Readiness Level | Frequency | Percentage (%) |
|---|---|---|
| High | 88 | 44.0 |
| Moderate | 92 | 46.0 |
| Low | 20 | 10.0 |

**Interpretation**

Almost half of the respondents (46%) showed moderate digital pedagogical readiness, and 44% showed high readiness. Only 10% reported low readiness. The findings indicate that most teacher trainees already have the basic digital skills but can still be developed to be able to carry out their roles in smart learning environments.

**Discussion:**

The results indicate that, generally, teacher trainees are digitally pedagogically prepared with positive scores, which indicates the increasing impact of the use of technology in teacher training. High digital skills and application competency scores mean that teacher trainees with technological training today know about digital technologies and Internet-based applications. The relative weakness in the areas of digital content creation, learning

management systems and online assessment tools, however, indicate that technological knowledge is not necessarily pedagogical expertise.
A positive attitude towards smart learning environments is reflected in the attitudes of the participants. Teacher trainees understand the importance of using digital technologies to enhance engagement, collaboration, and effectiveness in teaching. These attitudes are crucial for the future classroom to be successful when integrating technology.

Though these positive results, there are some obstacles to overcome. There remains a lack of exposure in practice, infrastructure and technical support to advance digital pedagogical competences. These challenges highlight the importance of the redesign of teacher-education programmes, with an increased focus on experiential approaches, digital lesson planning, virtual classroom management, educational software applications and assessment practices using technology.

The overall results of the study show that the teacher trainees are making progress in becoming digital ready, but systematic institutional support, ongoing professional growth, and access to modern educational technologies are needed to equip future teachers for the challenges of smart learning environment. The effective incorporation of digital pedagogy in teacher education programmes will significantly help to enhance the quality, availability and effectiveness of education in the digital age.

## Limitations of the study

There are some restrictions that should be taken into account when interpreting the results of the present study. First, the study has been conducted mostly with teacher trainees from the selected teacher education institutions which may restrict the generalizability of the findings to all trainee teachers from other regions and educational environments. Second, the analysis of digital pedagogical readiness is largely reliant on self-reported answers, which may be subject to personal perception, social desirability and interpretation of digital competencies. Thirdly, the results might not be applicable to the long term, because smart learning technologies and digital educational tools are constantly changing, changing the way the education is handled. Further, institutional infrastructure, Internet connectivity, socioeconomic status, and previous exposure to digital technologies were not explored in depth, but could have a key impact on digital readiness. Last, the study uses a cross sectional methodology, focusing on perceptions at one unique moment in time, and not on change in readiness over a long time. Longitudinal intervention studies with larger samples could be used in future to gain a more complete picture of how digitally prepared teacher trainees are across various educational contexts.

## Future Scope

The research on Digital Pedagogical Readiness among Teacher Trainees in the Era of Smart Learning leaves room for further research and academic investigation. Teacher preparation institutions are also integrating smart learning technologies more and more into their curriculum, so it is important to analyze teacher trainees' adaptation to changing digital learning environments. Longitudinal research on digital pedagogical readiness can focus on future studies to gain a better understanding of the development of competencies over time and how competencies influence professional teaching practice. These investigations may offer useful information regarding the sustainability of teacher education programs' digital skills.

The future scope of the study could focus on the use of new technologies like Artificial Intelligence (AI), Virtual Reality (VR), Augmented Reality (AR), Internet of Things (IoT), learning analytics in teacher education programs. An effective use of these technologies in the classroom requires teacher trainees' readiness to use them effectively, which can be explored. Comparative studies with other educational institutions, regions and countries can also be useful to find out differences in digital readiness and in teacher preparation best practices.

Another area for research is how digital pedagogical readiness is related to student learning outcomes. Future studies should be conducted to see if digitally competent teachers can better improve students' learning achievement, collaboration, creativity, and engagement in a technology-enabled learning environment. Furthermore, research studies can explore how institutional support, digital infrastructure, policy frameworks and professional development programs can contribute to enhancing the digital readiness of teacher training students.

Another possible aspect of research involves issues concerning awareness of cybersecurity, digital ethics, data privacy, and responsible use of technology in smart learning environments. As educational technologies evolve and increase in sophistication and data-driven, it will be even more vital that teachers understand how teacher trainees think about and react to these concerns.

Furthermore, future research can use mixed method and experimental research designs to develop an understanding of the effectiveness of digital pedagogical training interventions. Crafting and developing more in-depth assessment tools and competency models to measure digital pedagogical readiness can further enrich the field. Future studies could help to enhance teacher training programs and ensure that all teacher educators are prepared to respond to the challenges of a changing digital learning landscape by focusing on these areas.

## Conclusion

The study on Digital Pedagogical Readiness Among Teacher Trainees in the Era of Smart Learning highlights the growing importance of digital competencies in contemporary teacher education. As educational institutions increasingly adopt smart learning technologies, teacher trainees are expected to possess not only subject knowledge and pedagogical skills but also the ability to effectively integrate digital tools into teaching and learning processes. The findings indicate that digital pedagogical readiness is a multidimensional construct encompassing technological proficiency, instructional design skills, digital communication abilities, and positive attitudes toward technology-enhanced learning.

The study reveals that while many teacher trainees demonstrate a basic level of digital literacy and familiarity with educational technologies, gaps remain in the effective pedagogical application of these tools. Factors such as access to digital resources, institutional support, training opportunities, and prior exposure to technology significantly influence their readiness levels. Continuous professional development and hands-on experiences with digital teaching platforms are therefore essential to strengthen their confidence and competence.

In the context of smart learning environments, teacher education programmes must move beyond traditional teaching approaches and emphasize innovative pedagogical practices that promote collaboration, creativity, critical thinking, and personalized learning. Integrating

digital pedagogy into curriculum design and teacher preparation programmes can enhance the capacity of future educators to respond to evolving educational demands.

Overall, digital pedagogical readiness is a critical requirement for effective teaching in the twenty-first century. Strengthening the digital capabilities of teacher trainees will not only improve classroom practices but also contribute to the development of adaptive, inclusive, and technology-driven learning ecosystems. Educational institutions, policymakers, and teacher educators must work collaboratively to ensure that future teachers are adequately prepared to navigate and lead the transformation of education in the era of smart learning.

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