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Digitization and use of AI in teacher education: A qualitative study

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Abstract
This qualitative study investigates the integration of digital technologies and artificial intelligence in teacher education programs at two premier teacher training institutions in Jammu and Kashmir, India. Through in-depth interviews with teacher educators and pre-service teachers, the research explores the current state of digital transformation in teacher education and examines the opportunities and challenges in implementing AI-based teaching-learning approaches. The study was conducted at the Institute of Advanced Studies in Education, Srinagar and Government College of Education, Jammu, with 20 participants. Thematic analysis of interview data revealed significant findings regarding infrastructure readiness, pedagogical adaptation, and stakeholder perspectives on AI integration. The research provides valuable insights for policy makers and teacher education institutions in developing frameworks for technology integration in teacher preparation programs.

Keywords: Digitization, AI, teacher education, qualitative study, digital technologies

Introduction
The digital transformation of education has accelerated dramatically in recent years, with artificial intelligence emerging as a powerful force reshaping teaching and learning practices (Kumar *et al*., 2023). Teacher education programs play a crucial role in preparing future educators to effectively integrate these technologies in their teaching practice. While substantial research exists on technology integration in K-12 and higher education, there is limited understanding of how teacher education programs are adapting to incorporate digital tools and AI-based approaches, particularly in developing regions (Singh & Sharma, 2024).
The state of Jammu and Kashmir presents a unique context for studying this transformation, given its geographical location and ongoing initiatives for educational modernization. This study focuses on understanding the current status and future potential of digitization and AI integration in teacher education programs in this region.

Review of Literature
The integration of digital technologies in teacher education has been widely studied across different contexts. Recent research highlights the growing importance of preparing pre-service teachers for technology-enhanced teaching and learning environments (Anderson & Roberts, 2023) [1]. Studies have shown that exposure to digital tools during teacher preparation significantly influences future classroom practices (Williams, 2024) [9].
The role of AI in education has gained increased attention in recent years. Kumar and Patel (2023) [4] identified several key applications of AI in teacher education, including personalized learning paths, automated assessment systems, and intelligent tutoring systems. However, challenges related to infrastructure, training, and acceptance remain significant barriers to implementation (Thompson *et al*., 2024) [8].
In the Indian context, several studies have examined the digitization of teacher education programs. Shah and Verma (2023) [6] found that while policy frameworks support technology integration, practical implementation faces multiple challenges. Research by Gupta *et al*. (2024) [3] highlighted the need for systematic approaches to building digital competencies among teacher educators.

Research Questions

1. What is the current state of digital infrastructure and AI implementation in teacher education programs at the selected institutions?
2. How do teacher educators and pre-service teachers perceive the role of AI in teacher education?

Objectives

On the basis of the above research questions, the following objectives have been framed:

1. To examine the current status of digitization and AI integration in teacher education programs at selected institutions in Jammu and Kashmir
2. To analyze the perspectives of teacher educators and pre-service teachers regarding the implementation of AI-based teaching-learning approaches.

Methodology

Research Design

This study employed a qualitative research design using semi-structured interviews and document analysis. The qualitative approach was chosen to gain deep insights into participants' experiences and perspectives regarding digitization and AI integration in teacher education.

Sample Selection

The study was conducted at two premier teacher training institutions:

- Institute of Advanced Studies in Education, Srinagar
- Government College of Education, Jammu

Twenty participants were selected using purposive sampling:

- 8 Teacher Educators (4 from each institution)
- 12 Pre-service Teachers (6 from each institution)

Data Collection

Data was collected through:

1. Semi-structured interviews (45-60 minutes each)
2. Document analysis of institutional policies and curricula
3. Observation of digital infrastructure and its utilization

The interviews were conducted over a period of two months in 2024, focusing on participants' experiences, perspectives, and challenges related to digital technology and AI integration.

Data Analysis

The collected data was analyzed using thematic analysis following Braun and Clarke's (2006) six-phase approach:

1. Familiarization with data
2. Initial coding
3. Theme identification
4. Theme review
5. Theme definition
6. Report generation

Analysis and Interpretation

The analysis revealed several significant themes regarding the digitization and AI integration in teacher education programs:

Infrastructure and Resource Availability: The study found varying levels of digital infrastructure across the two institutions. While basic computing facilities were available, advanced AI-based tools and systems were limited. Participants reported:

"We have computer labs and internet connectivity, but we need more advanced tools for AI integration in teaching-learning processes." (Teacher Educator 3)

The analysis revealed that both institutions are in different phases of digital transformation, with significant scope for enhancement in terms of AI-ready infrastructure.

Pedagogical Integration and Practice: The integration of digital tools and AI in pedagogical practices showed interesting patterns. Teacher educators demonstrated varying levels of comfort and expertise in using technology:

"While we understand the importance of AI in education, we need more structured training to effectively integrate these tools in our teaching." (Teacher Educator 6)

Pre-service teachers expressed strong interest in learning about AI applications:

"We want to learn how to use AI tools in our future classrooms, but current exposure is limited." (Pre-service Teacher 8)

Professional Development and Training: Analysis revealed gaps in professional development opportunities related to AI and digital technologies. Both institutions showed efforts to organize training programs, but participants indicated the need for more systematic and continuous professional development.

Institutional Policy and Support: Document analysis and interview data indicated evolving institutional policies regarding technology integration. However, specific guidelines for AI implementation were found to be in nascent stages.

Findings

1. **Infrastructure Readiness:** The study found that while basic digital infrastructure exists, there is a significant gap in AI-ready technologies and tools. Both institutions showed varying levels of infrastructure development, with common challenges in maintenance and upgrading of existing facilities.
2. **Pedagogical Integration:** Teacher educators demonstrated willingness to integrate AI tools but faced challenges in practical implementation. The study revealed a need for structured frameworks for AI integration in teaching-learning processes.
3. **Professional Development Status:** Current professional development programs were found to be inadequate in addressing AI-specific needs. Both institutions showed limited systematic approaches to building AI competencies among faculty.
4. **Student Preparedness:** Pre-service teachers showed high interest in AI-based teaching tools but reported limited exposure and practical experience during their training.
5. **Policy Framework:** Institutional policies regarding AI integration were found to be in early stages, with a need for more comprehensive guidelines and implementation strategies.

Educational Implications

This research carries significant implications for teacher education programs:

1. The need for systematic integration of AI in teacher education curricula has become evident. Institutions must develop comprehensive plans for technology integration that consider local contexts and constraints.
2. Professional development programs require restructuring to include practical, hands-on experience with AI tools alongside theoretical knowledge.
3. Infrastructure development needs to be prioritized, with particular attention to ensuring reliable internet connectivity and maintaining up-to-date hardware and software resources.

Recommendations

Based on the findings, the following recommendations are proposed:

1. Develop comprehensive digital integration strategies that consider local contexts and resources. This should include clear timelines and assessment mechanisms.
2. Enhance professional development programs with focus on practical AI applications in teaching. Regular workshops and training sessions should be conducted with emphasis on hands-on experience.
3. Establish digital resource centers to support continuous learning and experimentation with AI tools in education.
4. Create mechanisms for sharing best practices and experiences among institutions to foster collaborative learning and development.

Conclusion

This study provides valuable insights into the current state of digitization and AI integration in teacher education programs in Jammu and Kashmir. The findings highlight both opportunities and challenges in implementing AI-based approaches in teacher preparation. While there is significant interest and recognition of the importance of AI in education, systematic efforts are needed to build capacity, enhance infrastructure, and develop comprehensive implementation frameworks.

References

1. Anderson K, Roberts S. Digital transformation in teacher education: Emerging trends and challenges. J Teach Educ. 2023;74(2):156-171.
2. Braun V, Clarke V. Using thematic analysis in psychology. Qual Res Psychol. 2006;3(2):77-101.
3. Gupta R, Kumar S, Mehta V. Implementation challenges of digital technologies in Indian teacher education. Int J Educ Technol. 2024;15(1):45-62.
4. Kumar A, Patel R. Artificial intelligence in teacher education: Current practices and future directions. Educ Technol Res Dev. 2023;71(3):278-295.
5. Kumar V, Singh M, Sharma P. The role of artificial intelligence in transforming education: A systematic review. J Educ Technol Syst. 2023;51(4):489-509.
6. Shah M, Verma A. Digital competencies in Indian teacher education: Policy and practice. Asian J Teach Educ. 2023;11(2):78-94.
7. Singh R, Sharma K. Technology integration in teacher education: A case study of developing regions. J Digit Learn Teach Educ. 2024;40(1):12-28.
8. Thompson R, Wilson M, Davis K. Barriers to AI implementation in teacher education programs. Teach Teach Educ. 2024;118:103-118.
9. Williams J. Impact of technology exposure during teacher preparation. J Res Technol Educ. 2024;56(2):185-201.