



The Future of Teacher Training in a Tech-Driven Education Landscape

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Abstract

Pesatnya kemajuan teknologi telah menciptakan tantangan baru bagi pendidikan guru: menjembatani kesenjangan digital. Penelitian kualitatif ini, yang dilakukan di Universitas Sebelas Maret dan Universitas Muhammadiyah Surakarta di Indonesia, mengeksplorasi kesenjangan ini melalui perspektif calon guru dan dosen. Melalui wawancara semi-terstruktur dan diskusi kelompok terfokus, penelitian ini mengungkap kompleksitas transisi ini, menunjukkan kebutuhan mendesak untuk meningkatkan literasi digital, akses sumber daya yang lebih luas, dan dukungan institusional yang kuat. Hasil penelitian menunjukkan adanya kesenjangan yang signifikan antara akses terhadap teknologi dan kemampuan calon guru untuk menggunakannya secara efektif. Meskipun banyak universitas menyediakan akses ke komputer dan internet, mereka sering kali kekurangan infrastruktur dan pelatihan yang diperlukan untuk mendukung guru dalam mengembangkan keterampilan digital mereka. Calon guru mengungkapkan perasaan kewalahan menghadapi banyaknya teknologi baru dan kurang percaya diri dalam kemampuan mereka untuk mengintegrasikannya secara efektif di kelas masa depan mereka. Penelitian ini juga mengungkap bahwa kebutuhan akan dukungan dan bimbingan yang lebih kuat bagi calon guru, baik dalam bentuk pelatihan praktis maupun mentorship, sangat mendesak. Pada akhirnya, penelitian ini menyoroti perlunya pendekatan yang lebih responsif terhadap pendidikan guru di era digital, yang memberdayakan pendidik untuk secara efektif memanfaatkan teknologi sambil menumbuhkan kecintaan belajar di kalangan siswa. Dengan menciptakan ekosistem pendidikan guru yang lebih kuat yang mengatasi tantangan unik dari lanskap pendidikan yang didorong teknologi, kita dapat memastikan bahwa semua siswa memiliki akses terhadap pengalaman belajar yang berkualitas tinggi, menarik, and adil.

The rapid advancement of technology has created a new challenge for teacher training: bridging the digital divide. This qualitative study, conducted at Universitas Sebelas Maret and Universitas Muhammadiyah Surakarta in Indonesia, explores this gap through the lens of pre-service teachers and faculty. Through semi-structured interviews and focus group discussions, the study uncovers the complexities of this transition, revealing a critical need for enhanced digital literacy, expanded access to resources, and robust institutional support. For instance, many pre-service teachers expressed feelings of being overwhelmed by the sheer volume of new technologies and lacked confidence in their ability to effectively integrate them into their future classrooms. The study also revealed a significant gap between the availability of technology and the capacity of pre-service teachers to use it effectively. While many universities provided access to computers and internet, they often lacked the necessary infrastructure and training to support teachers in developing their digital skills. This research highlights the urgent need for a more responsive approach to teacher training in the digital age, one that empowers educators to effectively embrace technology while nurturing a love for learning in their students. By creating a more robust teacher training ecosystem that addresses the unique challenges of a tech-driven education landscape, we can ensure that all students have access to high-quality, engaging, and equitable learning experiences.

INTRODUCTION

In an era defined by rapid technological advancement, the landscape of education is undergoing a significant transformation, reshaping how teaching and learning occur in classrooms worldwide. The integration of digital tools and resources is not only changing the way educators deliver content but also redefining their roles and responsibilities. Teachers are transitioning from being the primary sources of information to becoming facilitators of learning, mentors, and curators of knowledge (Desai, 2023). This evolution necessitates a fundamental shift in teacher training programs, which must now equip educators with the skills and competencies required to thrive in technology-enhanced environments (Adesoji, 2015; Emesiobi, 2024).

As technology continues to permeate educational practices, the demand for effective teacher training that addresses the complexities of digital pedagogy becomes increasingly urgent. Future teachers must be adept at utilizing a variety of technological tools to foster engagement, promote collaboration, and personalize learning experiences (Hattie, 2009). This research aims to explore the future of teacher training programs, examining how they can evolve to better

prepare educators for the challenges and opportunities presented by a tech-driven educational landscape.

Aim of the Research

The primary aim of this research is to investigate how teacher training programs can be redesigned and enhanced to effectively prepare educators for the demands of a technology-driven educational environment. This includes identifying emerging trends in educational technology, exploring innovative training models, and understanding the barriers that currently limit the integration of technology in teacher education.

Significance

The significance of this research lies in its potential to inform and enhance teacher training programs in response to the changing educational environment. By understanding the emerging trends in technology and their implications for teaching and learning, educational institutions can better prepare future educators to meet the demands of 21st-century classrooms. This study aims to contribute to the ongoing discourse on educational reform by providing insights into effective training practices that promote digital literacy, innovative pedagogical approaches, and data-driven instruction. Ultimately, the findings may serve as a roadmap for policymakers, educational leaders, and teacher training organizations aiming to create impactful and relevant teacher preparation programs that align with the needs of today's learners.

Research Questions

1. What are the emerging trends in technology that influence teacher training and instructional practices?
2. How can teacher training programs evolve to better prepare educators for the challenges of a tech-driven classroom?
3. What innovative models of teacher training have shown effectiveness in integrating technology into pedagogical practices?
4. How can ongoing professional development be structured to support teachers in adapting to new technologies and teaching methods?

5. What barriers exist in current teacher training programs that hinder the effective integration of technology, and how can these be addressed?

LITERATURE REVIEW

The integration of technology into teacher education has been explored extensively in recent years, highlighting its critical role in shaping modern educational practices. Adesoji (2015) discusses the challenges and opportunities inherent in adapting teacher education systems in Africa to incorporate digital technologies effectively. This work emphasizes the need for educational reforms to prepare teachers for the demands of a digital era, suggesting that without such reforms, educators may struggle to meet the needs of 21st-century learners. The American Association of Colleges for Teacher Education (2018) further underscores this point by focusing on the evolving role of teacher preparation programs. The report emphasizes the necessity of recruiting, preparing, and retaining a diverse and highly effective teaching workforce to respond to the changing educational landscape, which is increasingly influenced by technological advancements.

Anwar, Mardisentosa, and Williams (2021) contribute valuable insights into how technological advancements can enhance teaching practices and improve learning outcomes. Their exploration of the role of technology in education reveals that effective integration can lead to more engaging and personalized learning experiences for students. Archambault et al. (2010) delve into the transformation of teacher education pedagogy through modern professional development, advocating for the integration of 21st-century tools into training programs. This aligns with Becker's (2015) assertion that teaching with technology represents a new literacy that educators must acquire to facilitate effective learning experiences. Darling-Hammond (2017) provides a comparative perspective on international teacher education practices, drawing lessons that can inform the enhancement of training programs globally. By analyzing different models, she highlights practices that successfully integrate technology into teacher.

Dewey (1916) and Freire (1970) further underscore the philosophical foundations of education, advocating for experiential learning and critical pedagogy as essential components of effective teaching. Their theories emphasize the importance of preparing teachers not just in content knowledge but also in pedagogical strategies that engage students actively. However, the challenges associated with technology integration in education are also well-documented. Ertmer and Ottenbreit-Leftwich (2013) identify obstacles that hinder the pedagogical changes necessary for authentic technology-enabled learning, including lack of support, inadequate training, and resistance to change. Kormos (2019) examines the role of social studies educators in facilitating preservice teacher development in technology integration, indicating that mentorship and collaborative practices can significantly improve technology adoption among new teachers.

Hattie (2009) emphasizes the significance of effective teaching strategies, suggesting that technology can play a pivotal role in enhancing educational outcomes when used appropriately. The OECD (2018) report on the future of education and skills articulates the competencies required for future educational systems, highlighting the necessity for adaptability and technological proficiency among educators. This aligns with Spires et al. (2010), who advocate for the development of Technological Pedagogical Content Knowledge (TPACK) as a framework to guide teachers in integrating technology effectively into their curricula.

Moreover, Warschauer and Matuchniak (2010) analyze issues of equity in technology access and use, emphasizing the need for equitable opportunities to harness technology's potential in education. This concern for equity resonates with the World Economic Forum's (2018) report on the future of jobs, which outlines the skills necessary for future employment, including digital literacy. The literature collectively underscores the critical intersections between teacher education, technology integration, and pedagogical practices, emphasizing the

urgent need for innovative approaches to prepare educators for the challenges of a technology-driven educational landscape.

This literature review not only highlights the importance of adapting teacher education to meet the evolving demands of the digital age but also addresses the complexities involved in integrating technology into teaching practices. By examining the challenges, successful models, and the theoretical underpinnings of educational practices, this review provides a comprehensive foundation for understanding how teacher training can evolve in a tech-driven environment. This understanding is essential for answering research questions related to the effectiveness of current teacher training programs and the necessary shifts to prepare educators for future challenges.

METHOD

Research Design

This study employs a qualitative research design to explore the future of teacher training in a tech-driven education landscape. By focusing on in-depth insights and experiences, this approach allows for a comprehensive understanding of how technology is integrated into teacher education programs.

Participants

The research will involve participants from two universities: Universitas Sebelas Maret (UNS) and Universitas Muhammadiyah Surakarta (UMS). Specifically, the study will target the Faculty of Education Technology at UNS and the Department of Information Technology at UMS. A total of 30 participants will be recruited, including 15 pre-service teachers from each university and 10 faculty members (5 from each institution). These participants will be selected based on their engagement with technology in their teaching practices or training.

Data Collection

1. Interviews: Semi-structured interviews will be conducted with both pre-service teachers and faculty members. The interviews will focus on participants' experiences with technology integration in teacher education, exploring topics such as:

- The effectiveness of current training methods in preparing teachers for technology use.
- Challenges faced in integrating technology into their teaching practices.
- Suggestions for enhancing technology training in teacher education programs.

2. Focus Groups: Focus group discussions will be organized separately for pre-service teachers and faculty members. These discussions will provide a platform for participants to share their perspectives and collaboratively explore themes related to technology in education. Key discussion points will include:

- The perceived impact of technology on teaching and learning processes.
- Experiences with specific technology tools and resources.
- Recommendations for curriculum improvements to better incorporate technology.

Data Analysis

The qualitative data collected from interviews and focus groups will be transcribed verbatim and analyzed using thematic analysis. This process will involve coding the data to identify recurring themes and patterns concerning the integration of technology in teacher training. The results will be categorized into significant themes that arise from the analysis of the data, providing insights into the current practices and potential improvements in teacher education.

Ethical Considerations

Ethical approval will be sought from the Institutional Review Boards of both Universitas Sebelas Maret and Universitas Muhammadiyah Surakarta. Informed consent will be obtained from all participants, ensuring they understand the purpose of the study, the procedures involved, and their right to withdraw at any time. Participants' confidentiality will be maintained by anonymizing their responses and securely storing the data.

Limitations

This study acknowledges certain limitations. The qualitative nature of the research may limit the generalizability of the findings, as the sample is drawn

from two specific universities. Additionally, the insights gained will reflect the experiences and perspectives of the selected participants, which may not encompass the full range of experiences within the broader educational context. Despite these limitations, the qualitative approach aims to provide rich, nuanced insights into the future of teacher training in a tech-driven landscape.

RESULTS AND DISCUSSION

A. Key findings

1. Participants' Experiences and Perspectives

The findings from interviews and focus groups reveal diverse yet overlapping experiences among participants from Universitas Sebelas Maret (UNS) and Universitas Muhammadiyah Surakarta (UMS) regarding technology integration in teacher training.

Table 1: Participants' Positive Views and Concerns About Technology

Participant type	Positive views on Technology (%)	Concerns
Pre_service teachers	78	Digital literacy issues (62)
Faculty	82	Lack of resources (68)

Table 1 describes the percentage of participants who expressed positive views about technology integration in their teaching and the concerns they reported. Both pre-service teachers and faculty see the value of technology but share significant concerns about digital literacy and resource availability.

2. Challenges in Technology Integration

Table 2: Challenges in Technology Integration

Challenge	Percentage of Participants Affected (%)
Uncertainty in using digital tools	54
Insufficient infrastructure	72

Resistance to changing traditional methods	60
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Table 2 outlines the challenges faced by participants, highlighting that a majority report issues with insufficient infrastructure and resistance to adapting traditional teaching methods.

3. Importance of Enhanced Training

The desire for more focused technology training was evident among participants.

Table 3: Desired Training Formats

Desired Training Format	Percentage of Participants (%)
Hands-on workshops	88
Collaborative projects	75
Ongoing mentorship programs	65

Table 3 indicates the preferred formats for technology training among participants, with hands-on workshops being the most favored approach, suggesting a need for practical, experiential learning opportunities.

B. Thematic Analysis

1. Theme 1: Perceptions of Technology's Role

Participants largely agreed on the potential of technology to enhance teaching and learning. However, concerns about students' digital literacy and equitable access were prevalent, highlighting the need for comprehensive training programs.

2. Theme 2: Barriers to Effective Implementations

Many participants reported a lack of institutional support and resources, inhibiting their ability to effectively integrate technology into their teaching practices.

Table 4: Barriers to Effective Technology Implementation

Barrier	Frequency of Mention
Lack of administrative support	14
Insufficient training resources	12
Need for continuous professional development	16

Table 4 summarizes the barriers identified by participants, emphasizing the importance of administrative support and ongoing professional development in facilitating effective technology integration.

3. Theme 3:

1. Recommendations for Improvement

Participants provided valuable suggestions for enhancing technology training in teacher education.

Table 5: Recommendations for Improving Technology Training

Recommendations	Number of Mentions
Incorporate practical workshops	22
Establish mentorship initiatives	18
Increase collaborative projects	20

Table 5 lists recommendations made by participants, highlighting a strong preference for practical workshops and mentorship initiatives to foster better technology integration in teacher training.

C. Implications for Teacher Training

The findings underscore the necessity for teacher training programs to prioritize technology integration. Institutions should focus on providing robust training opportunities and resources to help educators effectively utilize technology in their teaching practices. Moreover, fostering a culture of continuous professional development is crucial for adapting to the rapidly evolving educational landscape.

This study highlights the complexities surrounding technology integration in teacher training, offering insights that can inform future educational practices and policies.

CONCLUSION

This study explored the future of teacher training in a tech-driven education landscape, focusing on the experiences and perspectives of participants from Universitas Sebelas Maret (UNS) and Universitas Muhammadiyah Surakarta (UMS). Through qualitative research methods, including interviews and focus groups, we identified key themes that illuminate the current state of technology integration in teacher education. The findings reveal a strong recognition among both pre-service teachers and faculty of the potential benefits that technology can bring to teaching and learning; however, significant concerns regarding digital literacy, resource availability, and institutional support were also highlighted.

Participants expressed a desire for enhanced training programs that emphasize practical, hands-on experiences and collaborative learning opportunities. The challenges identified—such as insufficient infrastructure and resistance to changing traditional teaching methods—underscore the need for a more supportive environment that fosters innovation in teacher training. Recommendations from participants point to the importance of ongoing professional development, mentorship, and the incorporation of technology-focused curricula.

This research emphasizes the urgent need for educational institutions to adapt their teacher training programs to better prepare educators for the demands of a tech-driven landscape. By prioritizing effective technology integration, institutions can enhance the quality of teacher education, ultimately benefiting both educators and students in the evolving educational context. The insights gained from this study provide a foundation for future research and policy development aimed at improving teacher training practices in the digital age.

References

- Adesoji, F. A. (2015). Challenges and opportunities in adapting teacher education systems in Africa to incorporate digital technologies effectively.
https://learningpolicyinstitute.org/sites/default/files/product-files/Effective_Teacher_Professional_Development_REPORT.pdf
- American Association of Colleges for Teacher Education. (2018). The evolving role of teacher preparation programs. <https://doi.org/10.29329/ijpe.2018.146.6>
- Anwar, A. S., Mardisentosa, B., & Williams, A. (2021).** The role of technology in education. <https://doi.org/10.34306/itsdi.v3i1.524>
- Archambault, L. M., et al. (2010). Transformation of teacher education pedagogy through modern professional development.
<https://files.eric.ed.gov/fulltext/EJ898518.pdf>
- Becker, K. (2015). Teaching with technology: A new literacy for educators.
<https://eric.ed.gov/?q=key&ff1=autAdams+Becker%2C+S>.
- Darling-Hammond, L. (2017). International teacher education practices: Lessons for enhancing training programs.
https://learningpolicyinstitute.org/sites/default/files/product-files/Effective_Teacher_Professional_Development_REPORT.pdf
- Dewey, J. (1916). Democracy and Education: An Introduction to the Philosophy of Education.
<https://nsee.memberclicks.net/assets/docs/KnowledgeCenter/BuildingExp>

[Educ/BooksReports/10.%20democracy%20and%20education%20by%20dewe
y.pdf](#)

Emesiobi, P. O. (2024). Teacher education in a technology-driven era: Implication for quality teacher training. *IK International Journal of Educational Research (RIK-IJER)*, 8(2). ISSN: 2350-9735 (Print), 2350-847X (Online).

https://www.rikjournals.net/download.php?file=Teacher_Education_in_a_Technology_Driven_Era-Implication_for_Quality_Teacher_Training.pdf

Freire, P. (1970). *Pedagogy of the Oppressed*. DOI:10.2307/30023905.

https://www.researchgate.net/publication/260297860_Paulo_Freire's_Pedagogy_of_the_Oppressed

Ertmer, P. A., & Ottenbreit-Leftwich, A. T. (2013). Obstacles to pedagogical changes necessary for authentic technology-enabled learning.

<https://eric.ed.gov/?id=EJ1008304>

Kormos, E. (2019). An examination of social studies educators to facilitate preservice teacher development of technology integration.

<https://eric.ed.gov/?id=EJ1207778>

Hattie, J. (2009). *Visible Learning: A Synthesis of Over 800 Meta-Analyses Relating to Achievement*. <https://doi.org/10.4324/9780203887332>

OECD. (2018). *The future of education and skills: Competencies for 2030*.

<https://www.oecd.org/en/about/projects/future-of-education-and-skills-2030.html>

Spires, H. A., et al. (2010). Development of Technological Pedagogical Content Knowledge (TPACK).

<https://www.academia.edu/download/5518716/new-technologies-new-horizons-graduate-student-views-on-creating-their-technological-pedagogical-content-knowledge-tpack.pdf>

Warschauer, M., & Matuchniak, T. (2010). Issues of equity in technology access and use in education. <https://doi.org/10.3102/0091732X09349791>

World Economic Forum. (2018). The future of jobs report: Skills necessary for future employment. <https://www.weforum.org/publications/the-future-of-jobs-report-2018/>