JUPIIS: Jurnal Pendidikan Ilmu-ilmu Sosial, 16 (1) (2024): 14-22 DOI: 10.24114/jupiis.v16i1.55682

**JUPIIS: Jurnal Pendidikan Ilmu-ilmu Sosial**

*Available online http://jurnal.unimed.ac.id/2012/index.php/jupiis*

# INTEGRATION OF TECHNOLOGY IN THE PRE-SERVICE TEACHERS FOR EDUCATIONAL MANAGEMENT; THROUGH CURRICULUM IN GHANA

**Richard Lionel Gorni[1], Udin Syaefudin Saud[2], Sumarto[3], Nurdin Diding[4]**
**Faculty of Sciences Education, Universitas Pendidikan Indonesia, Bandung, Indonesia[1234]**

**lionelrichardgorni@gmail.com[1], usaud@upi.edu[2], soemarto@upi.edu[3], didingnurdin@upi.edu[4]**

Accepted: March, 8th 2024 Published: June, 6th 2024

**Abstract**

This study aims to investigate the integration of technology in the preparation of prospective teachers for educational management through the curriculum in Ghana. Utilizing a qualitative approach, the study analyzes how technology is embedded in learning and how prospective teachers respond to it in the context of education management. The main focus of this research is on the concept and use of technology in the educational process to enhance the understanding and skills of prospective teachers. However, the study found that the curriculum policies, structure, and guidelines for pre-service teachers lack a clear vision for effectively integrating technology. Interviews with policymakers indicated their recognition of the importance of technology integration but also revealed the lack of investment hindered its progress. Drawing on the study's findings and existing research, context-specific recommendations are proposed, focusing on promoting innovative technology-based pedagogical models and developing effective leadership. The study involved participants from a teacher preparation program in Ghana, with data collection conducted through in-depth interviews, classroom observations, and curriculum document analysis. Data were analyzed using an inductive approach to identify common patterns in technology integration and prospective teachers' responses to it. The results of this study are expected to provide insights into the extent to which technology is integrated in the teacher preparation curriculum in Ghana, as well as its impact on teacher candidates' readiness to manage education. The practical implications of this study can provide recommendations for improving the teacher education curriculum, adapting teaching strategies to technological developments, and increasing the effectiveness of teacher preparation in the digital era. The findings can provide valuable guidance for policy makers, educational institutions and educators to ensure that prospective teachers have the relevant and necessary skills to face future educational demands.

**Key words:** *Technology Integration, Preservice Teacher Education, Curriculum*

**How to Cite:** Gorni. L. R., Saud. U. S.,Et.Al. (2024). Integration Of Technology In The Pre-Service Teachers For Educational Management Through Curriculum In Ghana. JUPIIS: Jurnal Pendidikan Ilmu-ilmu Sosial (14-22)

*Corresponding author:
lionelrichardgorni@gmail.com

ISSN 2085-482X (Print)
ISSN 2407-7429 (Online)

## INTRODUCTION

In today's dynamic era, the tandem progress of technology and education is unmistakable. Digital technologies, hailed as potent educational tools in the 21st century (Makuna, 2020), are pivotal for cultivating competitive economies, fostering knowledge-based societies, and innovating educational processes. Notably, the current generation of children is inherently tech-savvy, navigating various digital platforms in their daily lives(Mallan & Singh, 2014). This reality underscores the urgency for pre-service teacher education programs to empower teachers with the skills essential for comprehending, guiding, and instructing these technologically adept students (Le et al., 2023).

Despite the acknowledged significance of technology in education, the integration of technology into pre-service teacher education curricula has fallen short of expectations. Research conducted over a decade ago underscored the prevailing reliance on traditional teaching approaches across teacher education programs globally (Forzani, 2014). Consequently, the effective integration of technology into these programs has become a formidable challenge (Bauer & Kenton, 2005). Scholars aptly recognize the intricacies of technology-based reform, portraying it as a multifaceted and interconnected undertaking.

In light of the complexities surrounding the integration of technology in pre-service teacher education, this study directs its focus towards key issues identified in the literature (Koç, 2005). These issues encompass the pedagogical perspective, emphasizing curriculum design and the associated practices of technology-infused teaching. Simultaneously, the administrative perspective delves into the pivotal role of leadership in bridging the gap between theoretical understanding and practical application. Addressing these intricacies, this study seeks to contribute nuanced insights to the ongoing discourse on technology integration in pre-service teacher education.

The integration of technology into pre-service teacher education has emerged as a pivotal trend in modern pedagogy. It represents a paradigm shift that transcends the boundaries of traditional teaching methods and holds the potential to reshape teacher preparation for the 21st century (Belmonte & Cerny, 2022). This comprehensive literature review delves into the rationale underlying the integration of technology in pre-service teacher education programs. It explores the multifaceted motivations and benefits, drawing upon a wide array of scholarly perspectives to elucidate the compelling case for this transformative shift in teacher training. One of the primary rationales for integrating technology in pre-service teacher education is its capacity to advance pedagogical practices. As (Mishra and Koehler, 2006) argue, technology can serve as a powerful catalyst for the development of Technological Pedagogical Content Knowledge (TPACK). Pre-service teachers who engage with technology-rich learning experiences are better equipped to adapt and employ various technological tools to enhance their teaching methods, thereby fostering more engaging and effective classroom practices (Andreasen, 2022).

Millennials and Generation Z, often referred to as digital natives, have grown up in a digitalized world. As (Prensky & Berry, 2001) contends, educators must adapt their teaching methods to align with the digital fluency of these students. Integrating technology into pre-service teacher education ensures that future educators are well-versed in leveraging technology as a teaching tool, bridging the generational gap and creating a more relatable and dynamic learning environment for students(Irwin, 2021).

The rationale for integrating technology into pre-service teacher education is intrinsically linked to the changing nature of learning in the 21st century. Jonassen, Howland, Moore, and Marra (2003) emphasize the need for teachers to prepare students for a rapidly evolving digital world. To achieve this, pre-service teachers must be exposed to technology-enhanced learning experiences that mirror the kind of learning environments they will later create for their students. Technology has the potential to significantly enhance student engagement in the classroom. The use of multimedia, interactive simulations, and gamified learning experiences can capture students' attention and stimulate active participation (Galloway et al., 2018). By integrating technology into their own education, pre-service teachers can explore innovative ways to create more engaging and interactive lessons.

### 1. The Pedagogical viewpoints

Effectively embedding technology into the curriculum of pre-service teacher education

demands a holistic strategy, enveloping both the curriculum content and the cultivation of practical technology skills (Hodkinson, 2009). Literature underlines the significance of a systematic, efficient, and collaborative infusion of technology across all facets of pre-service teacher education.

In response to this imperative, institutions providing pre-service teacher education should concentrate on instilling three pivotal skills in their students: foundational computer literacy, specialized knowledge pertaining to technology-integrated teaching, and hands-on experiences that seamlessly merge technology with pedagogical approaches (Bataller, 2018). A critical aspect involves augmenting exposure and creating ample opportunities for pre-service teachers to apply technology in authentic educational settings.

Despite the evident necessity for a technology-rich curriculum, the prevailing curriculum standards in pre-service teacher education often lean on antiquated and simplistic instructional methods (Mulder, 2018). Consequently, the literature advocates for an overhaul, urging the incorporation of more intensive technology training within the curriculum. This shift prioritizes not just basic computer literacy but the integration of advanced technology skills. Scholars, such as underscore the urgency of this transition.

In summary, the amalgamation of technology into the pre-service teacher education curriculum necessitates a comprehensive strategy, integrating curriculum development with the cultivation of practical technology skills. A pivotal aspect lies in accentuating robust technology training within the curriculum and affording pre-service teacher opportunities to acquire specific knowledge and hands-on experiences aligned with technology-integrated teaching practices.

### 2. The Administrative Perspective

In the realm of pre-service teacher education, effective leadership emerges as a pivotal force in steering the seamless integration of technology (Rikhotso, 2017). The literature underscores the indispensable role of effective leadership in offering appropriate guidance, instilling values, and formulating strategic plans that facilitate the integration of technology. In practical terms, such leadership entails a commitment to prioritizing technology use, establishing robust technological infrastructure, emphasizing developmental processes, and providing comprehensive training and support for both students and academic staff (Riski & Rino, 2024).

The tangible impact of effective leadership resonates in educational policies advocating for the integration of technology within pre-service teacher education curricula. Policymaking assumes a central role as it delineates the priorities, pedagogical beliefs, and operational practices of educational institutions (Riski et al., n.d.). A critical imperative is the periodic review and enhancement of these policies to effectively bridge the gap between the envisioned integration of technology and its tangible implementation (Cascella et al., 2023).

In succinct terms, effective leadership within pre-service teacher education encompasses the art of guiding technology integration, establishing requisite infrastructure, nurturing developmental processes, and undertaking necessary revisions of educational policies to harmonize with the overarching goals of technology integration.

## METHODOLOGY

In conducting this study, a qualitative research methodology was adopted, consisting of two sequential stages. Firstly, an examination of national and curriculum policies was undertaken using thematic analysis techniques. Following this, semi-structured interviews were conducted with three key policymakers.

Qualitative research serves as a valuable approach to attain a profound understanding of human behavior and the intrinsic motivations propelling such behavior. Its efficacy lies in its ability to capture culturally-specific information and delve into intangible factors encompassing religion, values, norms, emotions, and social practices. Through the utilization of qualitative methods, this study aimed to explore these nuanced aspects, thereby offering comprehensive insights into the focal subject of research.

In testing the validity of the data, the researchers used a triangulation technique. Triangulation is a data validity checking technique that utilizes something other than data, for checking purposes or as a comparison against it. The triangulation used by researchers is source triangulation and technique triangulation. Both aim to test the validity of data related to leadership style, so data

collection and testing is carried out on subordinates and superiors, as well as checking the suitability of the results of interviews and observations made during the research.

After the data is obtained, the next step is to analyze this data using the Miles and Hubberman interactive analysis model. The following is an overview of the interactive analysis model:

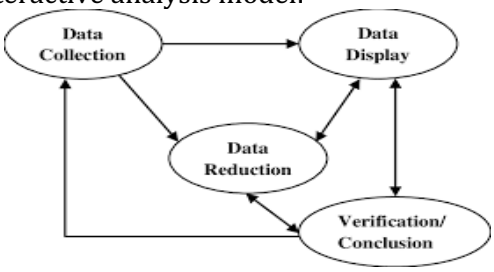


Figure 1. Miles and Huberman's interactive model analysis

Figure 1. This can be described by the following steps: Data collection, where researchers collect research data, directly into the research environment using interviews, observation, and documentation methods. The results of data collection in the form of field notes or observations, interview transcripts, and documents were collected. Data reduction, namely summarizing, selecting the main points, focusing on the things that are important in accordance with the research objectives.

Basically, the purpose of reducing data is to make it easier for researchers to provide a more directed and clear picture by providing codes or categorization on certain aspects based on the research focus that has been prepared beforehand, because the purpose of qualitative research is findings. Data display is the presentation of data in the form of descriptions, relationships between categories, narratives and the like. Conclusions drawing, namely drawing conclusions and verifying the data that has been found.

## RESULT AND DISCUSSION

Thematic analysis of national policy documents revealed key themes: the significant role accorded to technology in Ghana's national policies, the integration of technology in the pre-service teacher education curriculum in Ghana, and the intersection of Ghana's Cultural Policy with technology integration

### 1. The important position of technology in Ghana's national policies

The significance attributed to technology in Ghana's national policies has been a notable aspect since the early days of Ghanaian planning, recognizing its pivotal role. A case in point is the Educational Policy of the Republic of Ghana, released by the Ministry of Education in the early 1970s, acknowledging the fundamental role of technology in the country's advancement, aligned with science. Specifically, the initial section, outlining key principles, underscores the importance of "harmonious coordination with science and technology" as the primary means for cultural, social, economic, and physical development. This coordination is seen as imperative to elevate the country's and nation's standards and fulfill their role in global cultural progress. Additionally, one of the objectives of Ghana's higher education is framed around playing a constructive role in scientific research, contributing to global progress in arts, sciences, inventions, and providing robust solutions for the demands of advanced life and technological trends.

### a. Ministry of Finance and Economy and Planning

Illustratively, the Digital Transformation Agenda by the Ministry of Finance and Economic Planning underscores a recognition of the pivotal role of digital transformation in propelling economic growth and efficiency. Through dedicated policies and programs, the Ministry aims to facilitate the widespread adoption of digital technologies across diverse sectors, encompassing education, healthcare, agriculture, and governance. Enshrined in the Ghana National Digital Transformation Policy (2020-2024), these initiatives are geared towards harnessing technology to enhance service delivery and foster economic development. The policy accentuates four crucial imperatives: enhancing and extending the existing technology infrastructure, expanding online content, narrowing the digital divide across all segments of the nation, and implementing electronic governance.

### b. Ministry of Communications and Information Technology

Furthermore, the Ministry of Communications and Information has taken proactive measures by crafting and executing the National Information Technology Policy (NITP). Launched with a vision and strategic

framework for the development of the information technology sector, this policy underscores the government's commitment to advancing the realm of information technology. Key focal points include the promotion of IT infrastructure, elevation of ICT literacy, and the cultivation of a digitally-driven economy. The NITP outlines a forward-looking vision aimed at transitioning Ghana into an information society, with the overarching goal of enhancing productivity by providing technology services across all sectors of the nation (Ministry of Education, 2018).

### c. Ghana Educational Sector

Concerning the educational landscape in Ghana, the Ministry of Education (MoE) unveiled its National ICT in Education Policy (2019). This policy, introduced to facilitate the integration of information and communication technology (ICT) across all educational levels, strives to elevate digital literacy among both educators and students. Emphasizing e-learning initiatives and optimizing technology for administrative purposes, the policy envisions a technologically enriched educational environment.

Another noteworthy initiative from the MoE is the Ghana Teacher Education Program (GTEP). Specifically designed modules within GTEP focus on equipping pre-service teachers with vital digital skills. These modules underscore the importance of integrating technology into teaching methodologies, ensuring that future educators possess proficiency in utilizing technology within their classrooms.

Furthermore, the government, acting through the MoE, has established the Interactive Distance Learning (IDL) program. This innovative program utilizes technology to deliver educational content to remote and underserved areas. By employing interactive virtual classrooms and digital resources, IDL facilitates access to quality education for students in distant regions.

Integral to these initiatives is a recognition of industrial and technological changes that have transformed societal needs and the labor market. In response, the MoE has outlined concrete goals and objectives, including the development of necessary infrastructure to enhance technology implementation in education. The overarching aim is to establish an integrated system for the application of information and communication technologies in schools, thereby fostering a seamless integration between technology and the education system.

## 2. Technology integration in Ghana's pre-service teacher education curriculum

Ghana's dedication to incorporating technology into pre-service teacher education is evident across policy, program, and institutional realms.

**a. Policy Level:**

At the policy level, Ghana's government exhibits a forward-thinking approach to technology integration. The Ghana ICT in Education Policy (2015) emphasizes the significance of integrating Information and Communication Technology (ICT) throughout education, including teacher training. The policy prioritizes enhancing teachers' capacity to effectively use technology, aligning with the global acknowledgment of teachers' pivotal role in technology integration (UNESCO, 2011). However, challenges arise in translating policy into practice, as noted by scholars like Adu-Gyamfi et al. (2018), citing issues such as inadequate funding, limited infrastructure, and varying levels of technological literacy among educators.

**b. Program Level:**

At the programmatic level, the structure of pre-service teacher education programs underscores a commitment to technology integration. Courses like Educational Technology, Digital Pedagogy, and ICT in Education are integral parts of the curriculum. The Transforming Teacher Education and Learning (T-TEL) initiative, initiated in 2014, further reinforces this commitment by providing strategic support to enhance teacher education quality, with a focus on technology (Ansah et al., 2018). Studies by ertmer acknowledge the positive impact of these programs but also highlight challenges, particularly in achieving depth in technology integration.

**c. Institutional Level:**

Institutions delivering pre-service teacher education in Ghana play a pivotal role in shaping the technology integration landscape. The institutional level involves creating an environment conducive to technology use, providing resources, and supporting faculty development. Umrani's

research (2020) underscores the crucial role of leadership at the institutional level in fostering a culture that values and promotes technology integration. Challenges such as limited funding and insufficient support structures, however, can impede institutions from fully realizing technology integration goals.

**d. Challenges and Opportunities:**

While the commitment to technology integration is evident, challenges persist, including insufficient funding, inadequate infrastructure, and varying technological literacy levels among educators (Hew & Brush, 2007). The urban-rural digital divide exacerbates these challenges, impacting equitable technology access. Opportunities for improvement lie in strategic infrastructure investments, targeted professional development for educators, and collaborative efforts among government bodies, institutions, and international partners. The literature advocates for a shift from a quantity-focused approach to a nuanced one emphasizing the quality of technology integration, aligning with global best practices (Mishra & Koehler, 2006).

The study has unveiled several significant findings, shedding light on the landscape of technology integration in Ghana's pre-service teacher education. These findings encompass key aspects ranging from the importance of technology to the influence of cultural conservatism and the role of leadership.

1) The Significance of Technology Integration:

The study underscores the importance of integrating technology into Ghana's pre-service teacher education. This emphasis aligns with the prevailing demands driving the inclusion of technology in educational systems worldwide. In the era of knowledge-based societies and competitive digital economies, technology plays a pivotal role in shaping the educational landscape. This underscores the necessity for Ghana to embrace technology integration to prepare its teachers adequately.

2) The Curriculum Challenge:

A critical observation pertains to the structure of Ghana's pre-service teacher education curriculum, along with its guidelines, goals, and objectives. The study highlights a lack of a clear vision for effective technology integration within the curriculum. Instead, pre-service teachers receive education technology preparation through traditional courses that may not align with their future pedagogical approaches. The curriculum appears to prioritize standardization and quantity over quality, a trend that conflicts with the literature's recommendations. To meet the needs of pre-service teachers and the challenges of digital societies, a more comprehensive approach is warranted. This includes integrating technology throughout the curriculum, adopting innovative educational models, and updating courses and content to enhance teacher effectiveness.

3) Effective Integration of Technology:

While the study recognizes that policymakers in Ghana prioritize the effective integration of technology, it suggests that this focus may not be fully realized in practice. A positive vision or theory is crucial as the first step toward meaningful technology integration. However, the study implies that the actual implementation may require more attention. To bridge this gap, the study proposes context-appropriate recommendations, primarily centered on enforcing innovative technology-based pedagogical models and developing effective leadership.

4) Cultural Conservatism's Influence:

Cultural conservatism exerts a notable influence on the integration of technology in Ghana's pre-service teacher education. In conservative and traditional settings such as Ghana, there is a discernible reluctance to embrace global trends, especially widespread technology integration. This conservatism, akin to cultural insulation, stems from a desire to safeguard indigenous culture. Such measures often involve limiting interactions with foreign cultures seen as potentially diminishing the value of the native cultural identity. However, the study hints at a potential shift in Ghana's outlook. It suggests that the country might be moving from insulation toward selectivity concerning Western-based cultures. This shift could be attributed to the lasting impact of cultural-

religious norms influenced by international competitiveness. Traditionalism currently prevails as the primary model of education in Ghana, emphasizing the continued reliance on traditional teaching methodologies.

5) The Role of Leadership:

Leadership emerges as a critical factor in addressing the challenges and opportunities associated with technology integration in Ghana's pre-service teacher education. Effective leadership is essential not only for setting a clear vision but also for translating theory into practice. Leaders must address fundamental questions surrounding technology integration, including which technology to use, why it should be used, how it should be used, and when it should be used. Moreover, leadership should foster cooperation and partnerships with advanced international educational organizations. Collaborative efforts can elevate the quality of teacher preparation through knowledge sharing and experience exchange. Cooperation with the private sector is equally crucial to support the provision of expensive technologies, along with the necessary training and support.

## 3. Policymakers' pedagogical perspective

From policymakers' pedagogical perspective, integration of technology into pre-service teacher education is a complex issue that has been the subject of much debate. While he admits that some policymakers believe that the quality of the curriculum is more important than the quantity of the curriculum when it comes to technology integration. They argue that it is more important to ensure that preservice teachers have the skills and knowledge they need to use technology effectively in the classroom, rather than simply providing them with a large number of technology-based resources, others believe that the quantity of the curriculum is also important. They argue that preservice teachers need to be exposed to a wide range of technology-based resources in order to be prepared for the changing needs of the classroom. They also argue that the use of technology can help to make learning more engaging and interactive, which can lead to improved student learning outcomes.

Policy maker B asserts that, the debate over the quality versus quantity curriculum in relation to technology integration is likely to continue. He however, is clear that there is a consensus among policymakers that technology should be integrated into pre-service teacher education in a way that is aligned with the goals of education and that technology should not be used as a substitute for good teaching, but rather as a tool to enhance teaching and learning.

In his view, he believes that the quality of the curriculum is more important than the quantity of the curriculum when it comes to technology integration. This is because technology can be a powerful tool for learning, but it is important to ensure that technology is used in a way that is aligned with the goals of education. Technology should not be used as a way to simply add more content to the curriculum, but rather as a way to enhance the learning experience.

In further discussion, it becomes evident that bridging the gap between policy intentions and practical implementation is pivotal. Policymakers need to address the disconnect between the expressed priority of technology integration and its actual realization. Furthermore, a comprehensive curriculum overhaul is recommended, focusing on innovation, flexibility, and quality to align with the dynamic nature of technology.

Understanding the evolving cultural dynamics in Ghana is equally essential. Strategies should be tailored to balance the preservation of indigenous values with the selective adoption of beneficial global practices. Cultural conservatism, while valuable, should not hinder progress but rather inform strategies that respect and integrate local values within the context of a rapidly evolving technological landscape.

Leadership plays a multifaceted role. It's not only about setting a vision but also about effective execution. Leaders should navigate the complexities of technology integration, engage with international partners, and leverage private-sector collaboration to bridge the technology gap effectively.

The study's findings offer valuable

insights into the challenges and opportunities of integrating technology into pre-service teacher education in Ghana. The recommendations provided encompass various facets of this complex issue, from curriculum reform to cultural considerations and the critical role of leadership. Implementing these recommendations may pave the way for a more effective and culturally sensitive pre-service teacher education system in Ghana that adequately prepares teachers for the demands of the digital age.

In summary, Ghana's pre-service teacher education landscape demonstrates a commitment to integrating technology at policy, program, and institutional levels. While policy frameworks and programmatic initiatives signal a forward-looking vision, challenges persist in translating these aspirations into effective practice. Addressing issues like funding, infrastructure, and teacher preparedness is crucial for ensuring holistic and meaningful technology integration in teacher education. Future efforts should concentrate on building a supportive ecosystem that encourages innovation, collaboration, and a dedication to quality technology integration in preparing the educators of tomorrow.

## CONCLUSION

The examination of Ghana's national policy documents and curriculum structures underscores the acknowledgment of technology's pivotal role in propelling both national development and educational progress. The government's evident emphasis on digital transformation and the infusion of technology into education highlights a dedicated commitment to harnessing technological advancements for economic prosperity and enhanced service delivery.

However, a critical observation reveals a crucial imperative for a more seamless alignment between overarching national policy objectives and the specific goals outlined in the curriculum. To ensure the effective integration of technology in pre-service teacher education, there is a compelling need for policymakers to explicitly incorporate references to technology integration. This should be accompanied by the establishment of clear performance standards delineating the expected levels of technology utilization within classrooms. Such alignment would act as a bridge, facilitating a smoother transition from policy intentions to practical implementation.

Furthermore, the intricate interplay between cultural factors and Ghana's education system emerges as a significant consideration. While preserving cultural heritage remains paramount, policymakers are urged to strike a delicate balance that harmonizes cultural values with the imperatives of technological progress. This nuanced approach becomes pivotal in cultivating an environment where technology becomes an enabler rather than a disruptor.

In conclusion, Ghana's steadfast commitment to technological advancement and the preservation of cultural values within the realm of education lays a promising foundation for future developments. To fortify this foundation, addressing the existing gaps in technology integration and fostering a symbiotic relationship between cultural values and technological innovation are imperative. By doing so, Ghana can position itself to equip pre-service teachers with the competencies needed to adeptly employ technology, fostering inclusive and innovative educational landscapes for the benefit of their students.

## REFERENCES LIST


Andreasen, J. K. (2022). *article Fagfellevurdert Publication P r o fe ss i o nal digi t al c omp e t ence in ini t ial t eac h er educa t i o n : A n e x a m ina t i o n o f difference s in two c oho r ts o f p re -s er v ice t eac h er s*.

Ansah, F., Nudzor, H. P., & Awuku, S. (2018). Rethinking stakeholder engagement in higher education reforms: The case of colleges of education in Ghana. *Ghana Journal of Higher Education*, *4*, 1–18.

Bataller, C. (2018). *Technology integration: A mixed methods study of best practices of technology integration as perceived by expert middle school teachers*.

Bauer, J., & Kenton, J. (2005). Toward technology integration in the schools: Why it isn't happening. *Journal of Technology and Teacher Education*, *13*(4), 519–546.

Belmonte, R., & Cerny, P. G. (2022). Heterarchy : Toward Paradigm Shift in World Politics Heterarchy : Toward Paradigm Shift in World Politics. *Journal of Political Power*, *00*(00), 1–23. https://doi.org/10.1080/2158379X.2021.1879574

Cascella, M., Cascella, A., Monaco, F., & Shariff, M. N. (2023). Envisioning gamification in anesthesia, pain management, and critical care: basic principles, integration of artificial intelligence, and simulation strategies. *Journal of Anesthesia, Analgesia and Critical Care*, *3*(1), 33.

Forzani, F. M. (2014). Understanding "core practices" and "practice-based" teacher education: Learning from the past. *Journal of Teacher Education*, *65*(4), 357–368.

Galloway, L. F., Watson, R. H. B., & Prendeville, H. R. (2018). *Response to joint selection on germination and flowering phenology depends on the direction of selection*. *April*, 7688–7696. https://doi.org/10.1002/ece3.4334

Hew, K. F., & Brush, T. (2007). Integrating technology into K-12 teaching and learning: Current knowledge gaps and recommendations for future research. *Educational Technology Research and Development*, *55*, 223–252.

Hodkinson, A. (2009). Pre-service teacher training and special educational needs in England 1970–2008: is government learning the lessons of the past or is it experiencing a groundhog day? *European Journal of Special Needs Education*, *24*(3), 277–289.

Irwin, J. T. (2021). *College Students ' Perceptions Regarding High School Influences Walden University*.

Koç, M. (2005). Implications of learning theories for effective technology integration and pre-service teacher training: A critical literature review. *Journal of Turkish Science Education*, *2*(1), 2–18.

Le, T.-T., Phuong, H.-Y., Nguyen, A.-T., Pham, T.-T., Huynh Thi, A.-T., & Nguyen, H.-T. (2023). Illuminating the English as a foreign language (EFL) teaching odyssey: Unveiling the professional identities of pre-service teachers. *F1000Research*, *12*, 1086.

Mallan, K., & Singh, P. (2014). CHAPTER SIX TECH-SAVVY YOUTH AND PARTICIPATORY RESEARCH IN 'ISCAPES.' *Changing Landscapes for Childhood and Youth in Europe*, 110.

Mishra and Koehler. (2006). *Technological Pedagogical Content Knowledge : A Framework for Teacher Knowledge*. *108*(6), 1017–1054.

Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. *Teachers College Record*, *108*(6), 1017–1054.

Mulder, D. J. (2018). We Are Just Expected to Know How: Unpacking Pre-Service Teachers' Beliefs about Technology Integration. *Research Highlights in Technology and Teacher Education 2018*, 115.

Prensky, M., & Berry, B. D. (2001). *Immigrants Part 2 : Do They*.

Rikhotso, M. J. (2017). *Pre-service teachers' emerging and changing mental models for using learning technologies in teaching and learning: Implications for teacher practice*. University of Johannesburg (South Africa).

Riski, A., Nurdin, D., & Rahyasih, Y. (n.d.). *Systematic Literature Review: Implementation of Digital Leadership in Education in Several Countries*.

Riski, A., & Rino, R. (2024). The The Effect of Digital Leadership Style, Motivation, and Work Ability on Employee Performance After the Covid-19 Pandemic. *Edunesia: Jurnal Ilmiah Pendidikan*, *5*(1), 424–441.