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Post-Digital Pedagogy: Deconstructing the Role of Technology in Shaping Contemporary Learning Paradigms

Aziizah Kumala Shanti

Universitas Negeri Yogyakarta, Indonesia

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Abstract

This study examines **post-digital pedagogy** as a critical framework for understanding the evolving role of technology in contemporary education. In the post-digital era, technology is no longer viewed as a supplementary tool but as an embedded and complex component that shapes how learning, knowledge, and social interactions occur. This research employs a qualitative approach using a Systematic Literature Review (SLR), analyzing recent peer-reviewed journal articles from databases such as Scopus, Web of Science, and Google Scholar. Data were collected through a rigorous screening process based on relevance and methodological quality, and analyzed using thematic and content analysis to identify key patterns related to pedagogical transformation, technological roles, and socio-cultural dynamics. The findings reveal a paradigm shift from digital integration to pedagogization, where technology is critically examined rather than assumed to be inherently beneficial. Furthermore, learning is increasingly understood as part of a complex socio-technical ecosystem, requiring educators and learners to engage with issues of power, ethics, and digital inequality. The study concludes that post-digital pedagogy necessitates a reconfiguration of educational practices that integrates critical thinking, ethical awareness, and inclusive design to ensure meaningful and transformative learning in contemporary contexts.

Keywords: *Post-Digital Pedagogy, Educational Technology, Learning Ecology, Critical Pedagogy, Digital Transformation*

Corresponding author :
Email Address : aziizahkss@gmail.com
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Introduction

The rapid evolution of digital technologies over the past two decades has significantly transformed educational practices, shifting from a phase of technological adoption toward a more complex and entangled condition often described as the **post-digital era**. In this context, technology is no longer perceived as an external tool to be integrated into teaching and learning processes, but rather as an intrinsic and inseparable component of educational ecosystems. Contemporary research emphasizes that digital technologies are deeply embedded within social, material, economic, and political dimensions of education, forming complex networks that shape how knowledge is produced, accessed, and experienced. This transformation signals a paradigmatic shift from the traditional focus

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on "digital integration" toward a broader understanding of post-digital complexity, where learning environments are constituted through dynamic interactions among technologies, human actors, institutional policies, and cultural contexts (Pischetola, 2021; Fawns, 2022).

The phenomenon of **post-digital complexity** reflects a growing recognition that educational practices cannot be adequately understood through binary distinctions such as online versus offline or digital versus non-digital. Instead, learning is increasingly conceptualized as a hybrid and relational process that emerges from the interplay of multiple elements, including infrastructure, platforms, pedagogical strategies, and socio-cultural conditions. Pischetola (2021) and Fawns (2022) argue that the traditional notion of integrating technology into pre-existing educational frameworks is insufficient, as it fails to account for the ways in which technology reshapes the very structure of learning environments. Similarly, Nichols and Dixon-Román (2024), Timotheou et al. (2022), and Li et al. (2022) highlight that educational ecosystems are characterized by complex interdependencies, where technological systems, institutional policies, and human practices co-evolve. This perspective challenges the assumption that technology can be treated as a neutral or supplementary component of education, instead emphasizing its role as an active agent in shaping learning processes.

Despite these advancements, many educational practices and policies continue to be influenced by **technological determinism and instrumentalism**, which represent significant challenges in the post-digital context. Technological determinism assumes that technology inherently drives educational improvement and innovation, often leading to overly simplistic narratives about the transformative potential of digital tools. Pischetola (2021), Fawns (2022), Shamsudin et al. (2021), and Smith (2022) critique this perspective, arguing that it overlooks the complex socio-cultural and political factors that influence educational outcomes. Similarly, instrumentalism conceptualizes technology as a neutral tool that can be applied to achieve predefined educational goals, placing the responsibility for successful implementation primarily on teachers. This view neglects the broader systemic and contextual factors that shape how technology is used and experienced in educational settings. As a result, there is a persistent gap between the theoretical understanding of post-digital complexity and the practical implementation of technology in education.

Another critical issue in contemporary educational discourse is the role of **platform power and digital inequality**, which further complicates the post-digital landscape. Research in platform studies and computer-assisted language learning (CALL) demonstrates that digital platforms are not neutral spaces but are embedded with specific cultural, linguistic, and economic biases that can reproduce existing inequalities. Nichols and Dixon-Román (2024), Smith (2022), and Nichols and LeBlanc (2021) highlight how dominant platforms and languages shape access to knowledge and participation in learning, often marginalizing alternative perspectives and reinforcing hegemonic structures. This phenomenon underscores the importance of critically examining the socio-political dimensions of technology in education, particularly in relation to issues of equity, inclusion, and epistemic justice.

In response to these challenges, there is an increasing call for a **reframing of pedagogical paradigms** that aligns with the principles of post-digital complexity. Traditional debates that position "pedagogy first" versus "technology first" are increasingly seen as reductive, as they fail to capture the interconnected nature of educational processes. Fawns (2022) and Hoerudin (2025) propose the concept of **entangled pedagogy**, which emphasizes the inseparability of pedagogical goals, technological tools, and contextual factors. This approach recognizes that teaching and learning are shaped by a network of relationships that cannot be reduced to individual components. Similarly, the shift from individual literacy toward an **ecological perspective of learning** highlights the importance of understanding how different actors, tools, and environments interact to support or constrain learning (Manca et al., 2023; Li et al., 2022).

Furthermore, the role of technology in education is being reconceptualized from a mere support mechanism for content delivery to a fundamental component of **learning ecosystem design**. Pischetola (2021), Nichols and Dixon-Román (2024), Timotheou et al. (2022), and Otto et al. (2023) argue that technology should be understood as part of a broader socio-technical system that shapes learning experiences. This perspective emphasizes the need for inclusive and equitable design practices that consider the diverse needs and contexts of learners. It also highlights the importance of integrating ethical considerations into the design and implementation of educational technologies, ensuring that they contribute to the development of socially responsible and critically engaged learners.

Despite the growing body of literature on post-digital education, there remain significant **research gaps** that warrant further investigation. First, much of the existing research focuses on either theoretical

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conceptualizations or specific technological applications, without providing an integrated framework that connects post-digital complexity with pedagogical practice. Second, there is limited empirical exploration of how educators and institutions navigate the tensions between technological innovation and human-centered values in real-world contexts. Third, issues related to power, inequality, and epistemic justice are often addressed in isolation, rather than as integral components of post-digital pedagogy. These gaps highlight the need for a more comprehensive and interdisciplinary approach to understanding the role of technology in contemporary education.

The **novelty of this study** lies in its attempt to synthesize these diverse strands of research into a unified conceptual framework that deconstructs the role of technology in shaping contemporary learning paradigms. By integrating perspectives from post-digital theory, complexity theory, and critical pedagogy, this study offers a holistic understanding of how educational practices are transformed in the post-digital era. Unlike previous studies that focus on specific aspects of technology integration, this research emphasizes the interconnected nature of technological, social, and pedagogical dimensions, providing new insights into the design of learning environments that are both innovative and equitable.

Based on the identified phenomena, research gaps, and theoretical contributions, the primary **objective of this study** is to analyze and reconceptualize the role of technology in education within the framework of post-digital pedagogy, focusing on how complex socio-technical interactions shape contemporary learning paradigms. Specifically, this study aims to develop an integrative understanding of how educational practices can move beyond technological determinism and instrumentalism toward a more nuanced and context-sensitive approach that reflects the realities of post-digital complexity. Through this analysis, the study seeks to contribute to the development of pedagogical models that are responsive to the challenges and opportunities of the post-digital era, ultimately supporting the creation of more inclusive, reflective, and sustainable educational systems.

Methodology

This study adopts a qualitative approach using a **Systematic Literature Review (SLR)** design to examine the transformation of pedagogical paradigms within the framework of post-digital education. The choice of this method aligns with the research objective, which seeks to synthesize theoretical and empirical insights regarding the shift from digital integration to post-digital complexity, as well as the deconstruction of technological determinism in education. Data collection was conducted through a systematic and comprehensive search of reputable academic databases, including Scopus, Web of Science, ScienceDirect, and Google Scholar. The search process employed specific keywords such as “post-digital pedagogy,” “educational technology,” “learning ecology,” “technological determinism,” “digital education,” and “socio-technical systems in education.” The inclusion criteria consisted of (1) peer-reviewed journal articles published between 2021 and 2025, (2) studies focusing on post-digital theory, educational technology, or pedagogical transformation, and (3) articles with clear conceptual or empirical contributions. Meanwhile, exclusion criteria included non-indexed publications, opinion-based articles without academic rigor, and studies not directly related to educational contexts. The data collection procedure followed systematic stages, including identification of relevant studies, screening of titles and abstracts, full-text review, and final selection based on relevance, methodological quality, and alignment with the research focus.

The data analysis employed a **thematic analysis approach** combined with qualitative content analysis to identify patterns, relationships, and emerging themes across the selected literature. Initially, open coding was conducted to extract key concepts related to post-digital complexity (e.g., socio-material entanglement, learning ecology), technological roles (e.g., instrumentalism, determinism, platform influence), and pedagogical transformation (e.g., entangled pedagogy, ecosystem-based learning). These initial codes were then organized into broader thematic categories through axial coding, enabling the identification of interconnections among technological, pedagogical, and socio-cultural dimensions. A constant comparative method was applied to ensure analytical rigor by continuously comparing findings across studies and refining thematic interpretations. The final stage involved narrative synthesis, in which the results were systematically interpreted to construct an integrative conceptual framework explaining how post-digital conditions reshape educational paradigms. This analytical process ensures that the findings are comprehensive, theoretically grounded, and capable of informing future pedagogical design and policy development in post-digital education contexts.

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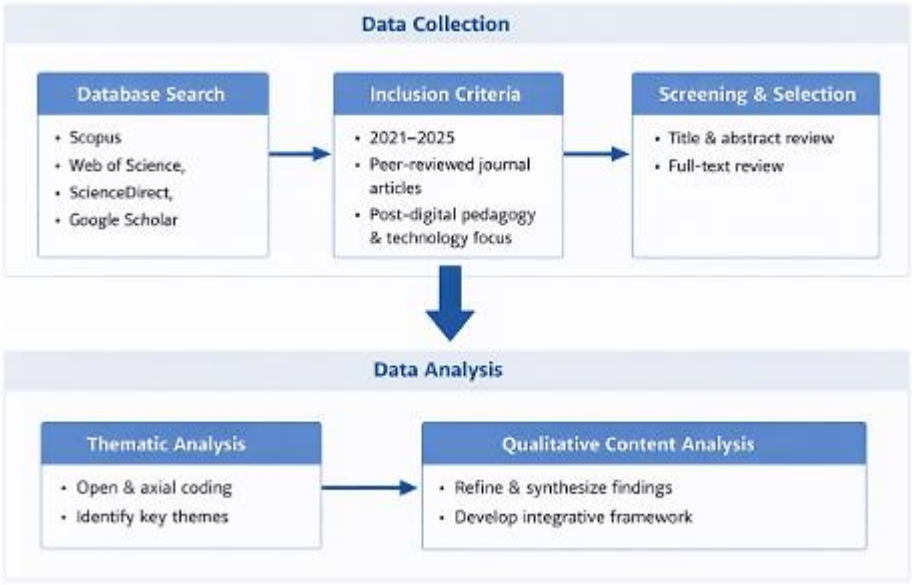

Figure 1. Diagram Conceptual Research

Results and Discussion

Based on the systematic literature review conducted, the findings indicate that **post-digital pedagogy** represents a paradigm shift from viewing technology as a neutral tool toward understanding it as part of a complex socio-technical ecosystem that shapes contemporary learning. This transformation involves changes in how technology is conceptualized, how pedagogical practices are designed, and how power, context, and relationships influence educational processes. The following table presents a synthesized overview of the key dimensions, transformations, impacts, and challenges identified in the literature.

Table 1. Integrated Findings on Post-Digital Pedagogy and Contemporary Learning Paradigms

Dimension	Key Transformation	Impact on Learning	Challenges	Key References
Technological Paradigm	From tool-based integration to socio-technical entanglement	Learning becomes relational, contextual, and ecosystem-based	Complexity in design and implementation	Pischetola (2021); Fawns (2022); Li et al. (2022)
Epistemological Perspective	From binary (online/offline) to hybrid post-digital reality	Blurred boundaries of learning environments; holistic understanding of learning processes	Difficulty in defining clear pedagogical boundaries	Fawns (2022); Nichols & Dixon-Román (2024)
Pedagogical Approach	From "pedagogy vs technology" to entangled pedagogy	Integrated design of goals, methods, tools, and context	Requires new pedagogical competencies	Fawns (2022); Hoerudin (2025)
Role of Technology	From content delivery tool to ecosystem design component	Technology shapes interaction, collaboration, and knowledge construction	Risk of over-reliance and lack of critical engagement	Pischetola (2021); Timotheou et al. (2022)
Power & Platform Influence	From neutral systems to power-laden platforms	Recognition of inequality, bias, and cultural dominance	Digital inequality and epistemic injustice	Nichols & Dixon-Román (2024); Smith (2022)

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Learning Orientation	From individual literacy to ecological and networked learning	Emphasis on interaction among actors, tools, and environments	Complexity in assessment and measurement	Manca et al. (2023); Li et al. (2022)
Curriculum Design	From content-centered to inclusive and context-aware learning ecosystems	More adaptive, equitable, and responsive education	Curriculum redesign challenges	Otto et al. (2023); Nichols & LeBlanc (2021)

The findings presented in Table 1 demonstrate that post-digital pedagogy fundamentally redefines the relationship between technology and education by positioning technology as an integral component of a broader socio-technical system. This shift enables more holistic, adaptive, and context-sensitive learning environments, where knowledge is constructed through dynamic interactions among various actors and elements. However, the complexity of these systems also introduces significant challenges, including difficulties in implementation, the need for new pedagogical competencies, and issues related to power, inequality, and epistemic justice. Furthermore, the transition from individual-centered learning to ecological and networked approaches requires rethinking assessment and curriculum design. Overall, the results suggest that successfully implementing post-digital pedagogy requires a comprehensive and critical approach that integrates technological, pedagogical, and socio-cultural dimensions to create meaningful and equitable learning experiences.

Discussion

The findings of this study, grounded in a systematic literature review and synthesized in Table 1, demonstrate that **post-digital pedagogy** represents a fundamental paradigm shift in how technology is conceptualized within education. In line with the research objective, this discussion examines how technology is no longer positioned merely as a neutral instructional tool but as a **critical space that shapes, constrains, and redefines learning, knowledge production, and social relations**. The results reveal that post-digital pedagogy demands a reorientation from technological adoption toward critical engagement, where educational actors interrogate the socio-technical systems in which learning is embedded.

A central insight emerging from the findings is the transition from **digitalization to pedagogization**, which reflects a critical response to the limitations of technology-driven approaches in education. During the COVID-19 pandemic, emergency remote teaching accelerated the adoption of digital tools; however, this rapid shift often prioritized technological functionality over pedagogical intentionality. Rapanta et al. (2021) and Stojan et al. (2021) highlight that many educational institutions merely transferred traditional teaching practices into digital formats without rethinking their pedagogical foundations. This resulted in superficial digital integration that failed to enhance meaningful learning. In contrast, the concept of pedagogization emphasizes that technology must be subordinated to clearly defined educational goals, rather than being treated as an end in itself. Fataar and Norodien-Fataar (2021) and Thompson and Harris (2025) argue that post-digital pedagogy requires educators to critically evaluate how technology contributes to epistemic engagement, rather than simply measuring its efficiency or novelty. This shift aligns with the findings in Table 1, which indicate that technology is increasingly understood as part of a broader socio-technical ecosystem rather than a standalone tool.

This transformation is closely linked to the **deconstruction of technological determinism**, which has historically dominated educational discourse. Technological determinism assumes that the adoption of advanced technologies will automatically lead to improved educational outcomes. However, the findings and supporting literature challenge this assumption by demonstrating that technology is deeply embedded in social, cultural, and political contexts. Ghory and Ghafory (2021) and Fataar and Norodien-Fataar (2021) emphasize that technological solutions often reproduce existing inequalities and power structures, rather than resolving them. Similarly, Rapanta et al. (2021) argue that the effectiveness of technology in education depends on how it is integrated into pedagogical practices, rather than on the technology itself. This perspective is reflected in the shift identified in Table 1, where technology is reconceptualized as an object of critique and design, rather than a solution. By challenging deterministic

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narratives, post-digital pedagogy encourages educators to critically examine the assumptions underlying technological innovation and to consider its broader implications for learning and society.

Another key dimension of the findings is the recognition of technology as part of a **complex learning ecology**, where multiple elements interact to shape educational experiences. The concept of e-learning ecologies, as discussed by Fataar and Norodien-Fataar (2021), highlights the interconnectedness of technological, social, cultural, and institutional factors in education. In this framework, technology is not an isolated component but part of a dynamic system that includes learners, educators, policies, infrastructures, and cultural practices. This aligns with the post-digital perspective, which views learning as an emergent process arising from the interaction of diverse elements. Thompson and Harris (2025) further argue that effective pedagogy in the post-digital era requires designing learning environments that foster critical epistemic engagement, rather than merely optimizing efficiency. The findings in Table 1 support this view, indicating that learning is increasingly understood as relational and ecosystem-based, rather than individual and linear.

The emergence of **hybrid learning spaces** further illustrates the complexity of post-digital pedagogy. Traditional distinctions between physical and digital classrooms are becoming increasingly blurred, as learning environments expand to include virtual, augmented, and data-driven spaces. Lewis et al. (2024) and Adewojo (2025) describe how smart campuses, virtual reality (VR), and augmented reality (AR) technologies create new forms of interaction that transcend conventional boundaries. Similarly, Boltsi et al. (2024), Stoumpos and Stoumpou (2025), and Kee et al. (2023) highlight the potential of immersive technologies to transform educational experiences by enabling new modes of engagement and knowledge construction. However, these developments also raise critical questions about the nature of learning and the role of technology in shaping it. The findings suggest that post-digital pedagogy must address these questions by critically examining how hybrid environments influence learners' perceptions, interactions, and identities.

A significant contribution of this study is its emphasis on the **critical interrogation of power and normalization within technological systems**. The findings reveal that educational technologies are not neutral but are embedded with specific power dynamics that influence how knowledge is produced and distributed. Research on data colonialism, for example, highlights how learning analytics and AI systems treat educational data as a resource to be extracted and commodified (Kohnke & Foung, 2024; Qolamani & Mohammed, 2023). Adewojo (2025) further argues that these practices create new forms of dependency and control, where educational institutions and learners become subject to the logic of data-driven decision-making. This aligns with broader critiques of EdTech, which emphasize the risks of commercialization, surveillance, and standardization in education (Abimbola et al., 2024; Lei, 2023). The findings in Table 1 reflect these concerns, indicating that technology is increasingly recognized as a site of power that requires critical scrutiny.

In this context, post-digital pedagogy advocates for a process of **"holding technology to account,"** where educators and learners actively question the assumptions, values, and consequences embedded in technological systems. Fataar and Norodien-Fataar (2021) emphasize that this involves challenging the dominant narratives of efficiency, prediction, and optimization that characterize much of contemporary educational technology. Instead, pedagogy should focus on fostering critical awareness and ethical responsibility, enabling learners to understand and navigate the complexities of digital environments. This perspective shifts the focus from technological performance to human agency, emphasizing the importance of reflexivity and critical thinking in education.

The findings also highlight a significant **reconfiguration of the roles of teachers and students** within post-digital learning environments. As indicated in Table 1, the role of the teacher is evolving from that of a knowledge transmitter to a designer of learning ecologies and a critical mediator of technology. Rapanta et al. (2021) and Thompson and Harris (2025) argue that educators must develop new competencies, including the ability to design complex learning environments, facilitate critical discussions, and evaluate the ethical implications of technology. Adewojo (2025) further suggests that teachers must act as curators and critics, guiding students in navigating the complexities of digital knowledge systems. This transformation reflects a broader shift toward learner-centered education, where the focus is on developing critical and reflective capacities rather than transmitting information.

At the same time, the role of students is also undergoing significant change. In post-digital pedagogy, students are positioned as active agents who engage critically with technology, rather than passive recipients of information. Rapanta et al. (2021) and Johinke et al. (2023) emphasize that learners must develop the ability to interpret, negotiate, and sometimes resist the ways in which technology

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shapes knowledge and identity. This involves cultivating critical digital literacy, which includes understanding how algorithms, platforms, and data influence learning processes. Fataar and Norodien-Fataar (2021) argue that such competencies are essential for empowering learners to participate meaningfully in digital societies. The findings suggest that this shift requires a rethinking of educational practices, including assessment and curriculum design, to support the development of these skills.

Furthermore, the discussion highlights the importance of **ethical and inclusive design** in post-digital pedagogy. The findings indicate that technology should be understood as part of a broader effort to create equitable and socially just learning environments. This involves addressing issues such as access, representation, and participation, ensuring that educational technologies do not reinforce existing inequalities. Otto et al. (2023) and Nichols and LeBlanc (2021) emphasize the need for inclusive design practices that consider the diverse needs and contexts of learners. This perspective aligns with the broader goals of post-digital pedagogy, which seeks to integrate technological innovation with human-centered values.

In synthesizing these findings, it becomes evident that post-digital pedagogy represents a **paradigm shift from technological integration to critical engagement with socio-technical systems**. The discussion demonstrates that technology is not merely a tool but a complex and contested space that shapes educational practices and outcomes. By positioning technology as an object of critique, post-digital pedagogy encourages educators and learners to engage with it reflexively and responsibly.

Ultimately, this study contributes to the understanding of how contemporary learning paradigms are reshaped in the post-digital era by providing an integrative framework that connects technological, pedagogical, and socio-cultural dimensions. In line with the research objective, the findings highlight the need for a comprehensive rethinking of educational practices, emphasizing the importance of critical engagement, ethical awareness, and contextual sensitivity. This approach ensures that education remains responsive to the complexities of the post-digital world, fostering learning environments that are not only technologically advanced but also socially meaningful and intellectually transformative.

Conclusion

This study concludes that post-digital pedagogy fundamentally redefines the role of technology in education, shifting it from a neutral instructional tool to a critical, socio-technical space that actively shapes learning, knowledge construction, and social relations. In line with the research objective, the findings demonstrate that contemporary educational paradigms must move beyond technological determinism and instrumentalism toward a more reflective and context-sensitive approach that recognizes the entangled relationships among technology, pedagogy, and socio-cultural dynamics. The transition from digitalization to pedagogization emphasizes that technology only gains meaning when aligned with clear pedagogical purposes and critical epistemic engagement. Furthermore, the emergence of hybrid learning ecologies and platform-driven environments requires educators and learners to develop new competencies, including critical digital literacy, ethical awareness, and the ability to interrogate power structures embedded in technological systems. Therefore, this study affirms that post-digital pedagogy necessitates a comprehensive reconfiguration of educational practices, where technology is critically engaged, pedagogically grounded, and ethically oriented to support inclusive, reflective, and transformative learning experiences.

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