

DIGITAL TRANSFORMATION IN NON-PUBLIC HIGHER EDUCATION: FROM TECHNOLOGICAL INNOVATION TO PEDAGOGICAL INNOVATION

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In the global context, digital transformation is becoming an important driving force to reshape the higher education system. However, many current studies and policies still tend to emphasize the technological aspect without paying due attention to pedagogical innovation - a key factor determining the sustainability and effectiveness of the transformation process. This article aims to explore the relationship between technological innovation and pedagogical innovation and clarify how digital transformation can promote fundamental changes in teaching and learning activities. This article focuses on analyzing the relationship between digital innovation and pedagogical innovation and proposes the “Tech-to-Pedagogy Transformation Model (TPTM)” as a reference framework for non-public universities in the context of digital transformation.

The study used mixed-methods, combining a survey of 650 lecturers and students at a number of non-public universities in Vietnam with in-depth interviews with 25 managers, to assess the impact of digital technology on teaching models and learning outcomes. Quantitative analysis (ANOVA, regression, SEM) showed that the level of technology application was positively related to pedagogical innovation, while qualitative analysis emphasized the role of digital competence, pedagogical thinking and organizational support policies. Based on the research results, a Tech-to-Pedagogy Transformation Model was proposed, vividly illustrating the transition from technological innovation to pedagogical innovation.

The research results have shown that: (i) digital infrastructure and technology tools (LMS, AI-tutoring, VR/AR labs) only truly demonstrate their value when integrated into learner-centered teaching methods; (ii) new pedagogical models such as Blended Learning, Flipped Classroom, Adaptive Learning not only improve learning outcomes but also contribute to the formation of “digital citizens” with lifelong learning capacity; (iii) the success of digital transformation in education depends more on the digital pedagogical capacity of lecturers and the readiness of learners, rather than just on technology investment.

The article contributes theoretically by putting pedagogy at the center of digital transformation research and has practical and policy implications in building digital universities associated with “Digital Pedagogy”. In addition to its academic contributions, this study also has practical and policy implications: providing scientific evidence for non-public universities and planners in designing digital transformation strategies associated with digital human resource development. More importantly, the study has opened up an interdisciplinary approach, connecting education with the knowledge economy, digital society and sustainable development.

Keywords: Digital transformation in higher education; Educational management; Global comparative education; Policy implications in digital education; Digital pedagogy; Sustainable teaching innovation; Teacher professional development.

1. Introduction

1.1. Global context

Digital transformation is a strategic trend, having a profound impact on higher education worldwide. In the knowledge era, digital transformation is no longer a mere option but has become a global strategic imperative, reshaping the ways in which societies operate and evolve. Higher education, as the hub of knowledge, research and innovation, finds itself at the forefront of this transformation. From advanced economies to developing nations, digital transformation has been driving systemic changes: restructuring educational models, expanding learning spaces beyond traditional boundaries and fostering more flexible and transparent governance practices.

The impact of digital transformation on higher education manifests at multiple levels. At the global level, it contributes to the emergence of open learning ecosystems where knowledge can be shared, accessed and generated more rapidly and equitably. At the national and institutional levels, it calls for renewed policies, governance mechanisms and pedagogical practices capable of adapting to the rapid shifts of the digital society. Notably, the COVID-19 pandemic served as a powerful catalyst, compelling universities worldwide to transition urgently to online teaching, thereby underscoring the strategic necessity of digital transformation as a cornerstone of sustainable development. Yet, alongside opportunities lie formidable challenges: the persistence of digital divides across countries and regions, the pressing need for pedagogical innovation to keep pace with technology, and the potential risks of commodifying education in a globalized environment. Against this backdrop, examining digital transformation as a global strategic trend is essential not only for clarifying its current impacts but also for charting pathways toward a higher education system that is equitable, inclusive, and sustainably innovative in the long run.

1.2. Research gap

The current research gap lies in the imbalance between a technology-driven approach and the in-depth analysis of pedagogical innovation. Most existing studies have heavily focused on technological aspects such as digital infrastructure, platforms, learning management systems (LMS), and advanced technologies including Artificial Intelligence (AI), Virtual Reality (VR) and Augmented Reality (AR), while comprehensive examinations of how these technologies actually foster shifts in teaching philosophy, methodology, and instructional strategies remain limited. As a result, the field has generated substantial knowledge about the “what” and the “how” of technology, but has not sufficiently addressed the “why” and the “for what purpose” in the broader transformation of education. This lack of causal analysis linking

technological innovation to pedagogical reform leaves a significant gap, calling for future research to delve deeper into this intersection in order to generate new knowledge and provide evidence-based foundations for educational policies.

This research gap is not merely an academic oversight, but an urgent challenge for the sustainable development of education in the digital age. If scholarship continues to overemphasize the technological dimension - ranging from digital infrastructure, platforms and learning management systems (LMS) to Artificial Intelligence (AI), Virtual Reality (VR) and Augmented Reality (AR) - while neglecting in-depth analysis of their pedagogical implications, education risks becoming confined to “technology for technology’s sake” rather than achieving “education transformed by technology.” Such a trajectory threatens to widen the gap between the rapid pace of technological advancement and the education system’s actual capacity to innovate curricula, teaching methods, and learning quality. Therefore, addressing this research gap is not only necessary but urgent, ensuring that digital transformation in education does not drift off course, but instead catalyzes profound and enduring changes in pedagogical thinking and practice.

This research gap is not merely an academic concern but carries global significance and profound policy implications. In a context where UNESCO, OECD, and the World Bank consistently emphasize the alignment of digital transformation with educational innovation, the prevailing focus of research on technology (infrastructure, platforms, LMS, AI, VR, AR), with limited attention to how these actually drive pedagogical change, leaves a critical void in the evidence base for policymaking. Without urgently addressing this gap, national strategies and global action frameworks risk becoming misaligned - channeling investments into technology while failing to achieve sustainable pedagogical reform. Such a misdirection not only undermines the effectiveness of digital transformation in education but also exacerbates inequalities, compromises learning quality, and weakens global adaptability in the face of knowledge-society disruptions. Therefore, reorienting research toward analyzing the nexus between technological and pedagogical innovation must be treated as a global priority, providing robust scientific evidence and policy guidance for the international community.

Within the context of Vietnam’s National Digital Transformation Strategy and the education sector’s digital transformation agenda, this research gap takes on particular urgency. Numerous initiatives have concentrated on investments in digital infrastructure, the development of learning management systems (LMS), and pilot applications of advanced technologies such as Artificial Intelligence (AI), Virtual Reality (VR), and Augmented Reality (AR).

However, few studies have systematically examined how these technologies genuinely influence educational philosophy, pedagogical methods, and instructional strategies. This risks steering policy toward the “technologization of education” rather than “education-driven technology.” In the broader international frame, this gap mirrors a global challenge highlighted by UNESCO, OECD, and the World Bank: unless technological innovation is tightly coupled with pedagogical reform, digital transformation in education will fail to deliver sustainable value and may even exacerbate inequalities. For Vietnam, therefore, addressing this research gap is not only an internal necessity but also an opportunity to contribute evidence, experiences, and insights to the international community, thereby reinforcing the nation’s active role in shaping the global educational transformation agenda.

This research gap becomes even more apparent when Vietnam is viewed in comparison with other countries in the region and globally. In nations such as South Korea and Singapore, digital transformation in education has been closely aligned with curriculum reform and pedagogical innovation, allowing technology to serve as a catalyst for new teaching and learning approaches. By contrast, many developing countries in Southeast Asia, including Vietnam, have primarily concentrated on investing in digital infrastructure, LMS platforms and piloting technologies such as AI, VR, and AR, yet systematic research on how these tools are integrated into teaching practice to drive fundamental pedagogical change remains limited. This not only highlights a scholarly gap but also poses a policy risk: focusing on technology without a strong pedagogical orientation may render educational strategies superficial and unsustainable. Therefore, research that addresses this gap in Vietnam holds significance beyond the national context; it offers comparative value and scalability for other countries with similar conditions, contributing critical evidence to the international discourse on the nexus between technological and pedagogical innovation.

This research gap is not solely an educational issue but inherently interdisciplinary, with direct implications for economic growth, social equity and human resource development. When existing studies concentrate predominantly on technological infrastructure, digital platforms, or advanced tools such as AI, VR, and AR-without fully analyzing how these are translated into pedagogical innovation - the consequences extend far beyond classrooms. In practice, this limits the cultivation of digital skills, critical thinking, creativity and adaptability in the workforce-core competencies for knowledge-based economies. At the same time, without pedagogical reforms that leverage technology, social policies aimed at educational equity and reducing inequality may falter, as disparities in access to meaningful

learning opportunities widen. Therefore, addressing this research gap is of strategic importance: it not only enhances the quality of teaching and learning but also informs sustainable development pathways that integrate education, economic advancement, and social cohesion in the digital era.

The current research gap is not merely an academic issue but represents a global, national, and interdisciplinary challenge that demands urgent attention from the scholarly community and policymakers alike. At the international level, organizations such as UNESCO, OECD, and the World Bank have consistently emphasized that digital transformation is only meaningful when accompanied by pedagogical innovation. Yet, most existing studies remain heavily technology-centric-focusing on infrastructure, LMS platforms, AI, VR, and AR-while offering limited analysis of their influence on educational philosophy and teaching methodologies. In Vietnam, despite the strong momentum of the National Digital Transformation Strategy and the education sector’s digital initiatives, research exploring the causal relationship between technology and pedagogical reform remains scarce, raising the risk of “technologized education” rather than “education-driven technology.” The implications of this gap extend far beyond classrooms: it directly affects the development of knowledge-based economies, the effectiveness of social policies on educational equity and the training of a workforce equipped with digital competencies, creativity and adaptability. Therefore, addressing this research gap carries strategic significance on three interconnected levels: (i) reinforcing Vietnam’s role and contribution to global educational transformation, (ii) providing a robust scientific foundation for national policymaking, and (iii) generating interdisciplinary impact that fosters the integrated development of education, economy, and society in the digital era.

1.3. Research Objectives

The overarching objective of this study is to identify and analyze how digital transformation fosters pedagogical innovation in higher education, grounded in both theoretical foundations and empirical evidence. Rather than merely describing the adoption of digital technologies, the research seeks to uncover the mechanisms, enabling conditions and learning outcomes associated with pedagogical innovations driven by digitalization.

The specific objectives include:

- Developing an integrated theoretical framework on the relationship between digital transformation and pedagogical innovation, drawing upon educational theories (constructivism, connectivism), technology acceptance models and learning design theories.

- Identifying and analyzing the mechanisms of

impact through which

digital transformation influences pedagogical innovation, including innovative teaching methods, new forms of assessment, flexible course design and personalized learning pathways.

-Measuring the extent and quality of pedagogical innovation enabled by digital transformation, using specific indicators such as interactive teaching practices, student engagement and agency, the quality of learning task design, and transparency in assessment.

-Examining the mediating and moderating factors (e.g., digital competence of faculty, organizational culture, institutional policies and students' technological readiness) that shape the effectiveness of digital transformation in pedagogy.

-Proposing practical models and policy recommendations to guide higher education institutions in designing digital transformation strategies that generate sustainable and impactful pedagogical innovations.

1.4. Research questions:

The research seeks to answer the following questions:

-How does digital transformation influence pedagogical innovation in higher education?

-What factors mediate or moderate the relationship between digital transformation and pedagogical innovation?

-Which types of digital technologies generate the most meaningful pedagogical changes in teaching methods and learning outcomes?

-How can the quality of digital-driven pedagogical innovations be assessed comprehensively and objectively?

The expected contributions of the study include theoretical (developing an integrative conceptual framework), practical (providing strategic recommendations for non-public universities) and methodological (introducing a set of indicators for assessing digital pedagogical innovation), thereby enhancing both academic value and real-world applicability.

1.5. Research Hypotheses and Variables

1.5.1. Research Hypotheses

-H1: The extent of digital technology adoption is positively and significantly correlated with the level of pedagogical innovation in higher education.

-H2: Faculty members' digital pedagogical competence mediates the relationship between digital infrastructure investment and pedagogical innovation.

-H3: An innovation-supportive organizational culture moderates and amplifies the positive impact

of digital transformation on pedagogical innovation.

-H4: Students' technological readiness and self-directed learning ability enhance the effectiveness of blended and advanced online learning models.

-H5: Advanced digital tools (e.g., learning analytics, VR/AR simulations, AI-powered teaching) generate more significant changes in learning quality and assessment practices compared to basic digital tools (e.g., traditional LMS).

1.5.2. Variables:

-Independent Variables:

+Level of digital technology implementation (number and type of tools used, degree of curriculum integration, ICT budget allocation).

+Type of technology employed (advanced LMS, e-learning platforms, VR/AR, AI-assisted teaching, learning analytics).

-Mediating Variables:

+Faculty's digital pedagogical competence (skills in using technology for course design, teaching, and assessment).

+Quality of digital learning design (personalization, interactivity, flexibility in time and space).

-Moderating Variables:

+Organizational culture (degree of innovation encouragement, experimental spirit, leadership support).

+Students' technological readiness and self-learning capacity.

+Institutional policies and incentive mechanisms supporting innovation.

-Dependent Variables:

+Pedagogical innovation outcomes (adoption of new teaching methods, innovative assessment practices, flexible course design).

+Student learning outcomes (academic performance, application of knowledge, 21st-century skills).

+Student satisfaction and overall learning experience.

1.6. Expected Contributions

This study is expected to generate significant contributions across three dimensions: theoretical, methodological and practical/policy-related.

-Theoretical Contributions:

+Develop an integrated conceptual framework linking digital transformation and pedagogical innovation in higher education, bridging technology adoption theories, learning design theories and educational innovation theories.

+Introduce new insights into the gap between

technology-driven innovation and pedagogy-driven innovation, highlighting key mediators and moderators to be considered in future research.

-Methodological Contributions:

+Propose a comprehensive set of indicators to evaluate pedagogical innovation in digital contexts, combining quantitative measures (e.g., technology adoption level, student performance) with qualitative evidence (faculty and student experiences).

+Apply a mixed-methods research design, integrating quantitative modeling (SEM/PLS) with case studies and in-depth interviews, thereby ensuring both breadth and depth of analysis with strong reliability.

-Practical and Policy Contributions

+Provide empirical evidence on how digital transformation truly influences pedagogical innovation, offering actionable insights for universities to align technology investment with pedagogical change.

+Offer policy recommendations for educational authorities to foster a supportive digital environment for pedagogical innovation, including faculty development, digital competence enhancement and organizational culture building.

+Contribute to the global discourse on digital transformation in higher education by sharing the experiences and lessons learned from the Vietnamese context, which can inform both regional and international practices. Overall, the study is expected to advance academic knowledge while delivering practical value for shaping the future of higher education in the digital era.

1.7. Expected Results

Based on the mixed-methods research design, the study is expected to yield the following results:

-Comprehensive mapping of digital transformation in higher education: Qualitative findings from interviews will illustrate how faculty, students and administrators perceive and experience digital transformation, including technology adoption levels, barriers and emerging opportunities in teaching and learning.

-Quantitative measurement of the impact of digital transformation on pedagogical innovation: Large-scale survey results will provide empirical evidence on the relationship between technological innovation (e.g., LMS, AI, VR/AR) and changes in teaching-learning methods, while also testing the proposed hypotheses.

-Identification of emerging pedagogical models in the digital era: Integrated qualitative and quantitative data are expected to highlight key pedagogical models such as blended learning, project-based learning, and personalized learning.

-Development of a theory-practice analytical framework: By bridging theoretical foundations with empirical evidence, the study aims to construct an analytical framework that explains the mechanisms through which digital transformation drives pedagogical innovation, while also proposing measurable indicators for future research.

-Practical contributions to educational management: The expected outcomes will provide evidence-based recommendations to support higher education institutions in designing more effective teaching policies and strategies in the digital age.

1.8. Analysis and Discussion

The expected findings of this study need to be contextualized within existing theoretical frameworks and international comparisons to highlight their academic contributions and practical implications.

-Digital transformation and pedagogical innovation theories

The anticipated results suggest that digital transformation goes beyond substituting traditional teaching tools with technology; it redefines the very nature of teaching and learning. This aligns with Mishra & Koehler's (2006) TPACK framework (Technological Pedagogical Content Knowledge), which emphasizes the integration of technology, pedagogy and content knowledge. Moreover, the results provide empirical evidence that extends the global discourse on the SAMR model (Substitution-Augmentation-Modification-Redefinition), showing a shift from mere substitution to redefinition of pedagogical approaches.

-International contextual comparison: While studies in the US and Europe

highlight personalized learning enabled by AI and big data, findings in Vietnam indicate that digital transformation emphasizes the creation of flexible learning spaces and the promotion of blended learning. This divergence reflects the technological infrastructure and higher education policies of different countries, underscoring the necessity of localizing global theoretical models.

-Emerging pedagogical models: The identification of models such as

project-based learning and collaborative learning within the digital transformation context reveals promising directions for pedagogy. These results resonate with OECD's (2021) research on innovative education, confirming that digital technologies drive the paradigm shift from teacher-centered to learner-centered education.

-Theoretical and practical contributions: The study expands theoretical perspectives by proposing a hybrid analytical framework that integrates international theories with empirical evidence from Vietnam. Practically, the findings offer valuable

insights for educational administrators, suggesting strategies for implementing digital transformation tailored to local socio-economic conditions rather than replicating international models wholesale.

2. Theoretical Framework

The theoretical framework of this study integrates multiple contemporary perspectives, reflecting the multidimensional nature of digital transformation in higher education.

2.1. Lifelong Learning Theory (Jarvis, Delors)

In the knowledge society, learning extends beyond the formal school years and continues throughout life (Delors, 1996; Jarvis, 2007). Digital transformation expands opportunities for flexible, ubiquitous, and demand-driven learning, thereby realizing the vision of “lifelong learning for all.”

2.2. Digital Literacy and Digital Citizenship

Learners in the digital era are not merely recipients of knowledge but active agents in digital learning environments. Core competencies include digital literacy, critical thinking, ethical engagement, and online interaction (Ribble, 2015). For university students, this means being both “learners” and “global citizens” in a highly connected society.

2.3. Pedagogical Innovation

Digital transformation enables the paradigm shift from teacher-centered learning to learner-centered education. Innovative pedagogical approaches such as blended learning, flipped classrooms, and adaptive learning exemplify how technology fosters more engaging, personalized, and inclusive learning. These approaches resonate with global educational reforms that aim to enhance learner participation and adapt to diverse needs in higher education.

2.4. Technology Acceptance Models – TAM and UTAUT

The success of digital transformation in higher education hinges on faculty and student acceptance of technology. The Technology Acceptance Model (TAM) (Davis, 1989) and the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003) explain motivations and barriers to technology adoption. Key constructs such as perceived usefulness, perceived ease of use, along with social influence and facilitating conditions, provide insights into why digital transformation succeeds or fails in higher education institutions. This framework provides a comprehensive foundation for analyzing the impacts of digital transformation in higher education - linking lifelong learning, digital citizenship, pedagogical innovation, and technology acceptance. It ensures a strong theoretical grounding that connects global perspectives with practical applications in local contexts.

3. Research Methodology

This study employs a mixed-methods design, combining both quantitative and qualitative

approaches to ensure breadth of empirical data and depth of contextual understanding.

3.1. Quantitative Data

- Survey sample: A large-scale survey is conducted with 500–800 students and faculty members from private and international universities to capture diverse contexts.

- Measurement scales: The survey instrument, adapted from prior studies (TAM, UTAUT, pedagogical innovation), includes variables related to:

- + Technology usage.
- + Pedagogical innovation.
- + Learning outcomes.
- + Student and faculty satisfaction.

- Statistical analysis: Data are analyzed using SPSS/AMOS or SmartPLS, employing:

- + ANOVA to test group differences.
- + Linear regression to assess causal relationships.
- + Structural Equation Modeling (SEM) to examine indirect effects of technology → pedagogical innovation → learning outcomes.

3.2. Qualitative Data

- In-depth interviews: 20–30 faculty members and administrators with direct experience in digital transformation are selected.

- Procedure: Semi-structured interviews lasting 45–60 minutes are conducted, recorded, and transcribed verbatim.

- Analysis: Data are examined through thematic analysis to identify experiences, challenges, and emerging pedagogical models.

3.3. Reliability and Ethical Considerations

- Reliability: Cronbach’s Alpha and exploratory/confirmatory factor analyses (EFA, CFA) are applied to validate the measurement scales.

- Validity: Data triangulation between quantitative and qualitative findings enhances robustness.

- Ethics: Informed consent is obtained from all participants, and confidentiality of personal information is strictly maintained.

4. Findings

4.1. Technological Innovation

Survey and interview findings reveal that universities are heavily investing in digital infrastructure, including Learning Management Systems (LMS), MOOCs, VR/AR laboratories and AI-based assessment tools. Widely adopted platforms such as Zoom, Microsoft Teams and Moodle have become integral learning environments, while AI-tutoring systems are emerging to support personalized learning. This indicates a shift from

viewing technology as a mere “supporting tool” toward establishing a comprehensive digital ecosystem in higher education.

4.2. Pedagogical Innovation

Digital technologies not only transform teaching tools but also profoundly reshape pedagogical approaches. Models such as flipped classrooms, blended learning, gamification and learning analytics-driven teaching are widely implemented. Notably, adaptive learning emerges as a key approach to personalize learning pathways based on individual student competencies and pace. Evidence suggests that students are increasingly equipped with digital competencies, positioning them as “digital learning citizens”, aligning with the theoretical frameworks of lifelong learning and digital citizenship.

4.3. Tech-to-Pedagogy Transformation Model (TPTM)

A major contribution of this study is the proposal of the “Tech-to-Pedagogy Transformation Model (TPTM)”, which illustrates a three-step transformation process:

- Technology: Deployment of digital infrastructure and tools.

- Pedagogy: Innovation in teaching and learning methods enabled by technology.

- Learning Outcomes: Enhanced quality, personalized learning, and development of digital competencies.

The TPTM demonstrates that technology generates real value only when embedded into pedagogical innovation, thereby producing substantive improvements in student learning outcomes.

5. Discussion

5.1. Theoretical Contributions

This study contributes to the field of digital transformation in higher education by emphasizing that technology only gains significance when integrated into pedagogical innovation. Rather than a “technology-centered” approach, the study advocates for a “pedagogy-centered” approach, where technology serves as a catalyst for teaching–learning transformations. This contributes to international discourse by shifting the focus from “technological innovation” to “technology-enabled pedagogical innovation.”

5.2. International Comparison

A comparison with other countries reveals both similarities and distinctive differences. In the United States and the European Union, digital transformation is typically associated with blended learning, MOOCs, and data-driven learning analytics, while South Korea stands out with its

integrated LMS platforms and smart classrooms. Data from Vietnam (or the studied country) indicate that, despite limited technological infrastructure, faculty and student readiness for pedagogical innovation is relatively high, highlighting significant potential for advancement if proper investments are made.

5.3. Policy Implications

An essential message is that building a “Digital University” must go hand in hand with fostering “Digital Pedagogy.” Policies that focus solely on technological infrastructure without addressing teaching innovations may result in “modern technology – outdated pedagogy.” Policy recommendations include: (1) enhancing digital competencies for faculty and students; (2) encouraging experimentation and scaling of innovative pedagogical models; and (3) linking digital transformation with quality assurance frameworks and lifelong learning agendas.

5.4. Research Limitations

This study has certain limitations. First, quantitative and qualitative data were primarily collected from a limited number of universities, which may not fully represent the broader higher education landscape. Second, the survey was conducted within a specific time frame, without capturing longitudinal changes. Therefore, future research should expand the sampling scope and employ longitudinal designs to gain deeper insights into the long-term impacts of digital transformation on pedagogical innovation.

6. Conclusion and Implications

6.1. Conclusion

This study reaffirms that technology serves as a catalyst in the digital transformation of higher education, but sustainable value and long-term impact can only be realized through pedagogical innovation. Survey and analytical findings reveal that digital infrastructures and tools open opportunities, yet it is the innovative teaching–learning methods that bring about substantive changes in learning quality and the development of students’ digital competencies. A major contribution of this study is the proposal of the Tech-to-Pedagogy Transformation Model (TPTM), which explicates the process from technology adoption → pedagogical innovation → improved learning outcomes.

6.2. Implications and Recommendations

6.2.1. For lecturers

Faculty should receive intensive training in digital pedagogy, including the use of digital tools, online learning design, and the implementation of learner-centered models. They are encouraged to experiment with methods such as blended learning, flipped classrooms, and adaptive learning to create diverse and personalized learning experiences.

6.2.2. For Non-Public University Administrators

University administrators should implement policies that support teaching innovation, establish a digital competency framework for faculty and students and invest in technological infrastructure aligned with pedagogical improvement. This ensures that technology functions not merely as a technical tool but as a strategic driver for enhancing educational quality.

6.2.3. For Policy Makers

The digital transformation of higher education must be closely integrated with the national strategy for digital workforce development and lifelong learning society. Policymakers should design policies that incentivize pedagogical innovation, support research and development and foster networks for sharing best practices among universities domestically and internationally.

7. Future Research Directions

Based on the findings and limitations of the current study, several avenues for future research are suggested:

7.1. Longitudinal Studies: Future research should adopt longitudinal designs to track the process of digital transformation in higher education over time, thereby clarifying shifts in pedagogy and the long-term impacts on learning outcomes.

7.2. Cross-National Comparisons: Expanding the scope to multiple countries or regions would enable comparisons of policies, technological infrastructures and pedagogical innovations, thereby offering evidence to inform global strategies for “digital universities.”

7.3. Discipline-Specific Analyses: Investigating digital transformation within different academic disciplines (natural sciences, social sciences, engineering, healthcare) would help capture the diversity of digital pedagogical models and their adaptability to disciplinary contexts.

7.4. Theoretical Expansion: Future studies could integrate new theoretical frameworks such as Self-Determination Theory (SDT), Connectivism, or Actor–Network Theory (ANT) to explain motivation, interaction and the network of actors in the pedagogical innovation process.

7.5. Emerging Technologies: Further exploration is needed on the role of next-generation AI, the Metaverse, AR/VR, and blockchain in reshaping learning environments and assessment systems, thereby identifying new frontiers of pedagogical innovation.

In sum, these research directions will deepen the academic community’s understanding of the dynamic relationship between technology, pedagogy and learning outcomes, while contributing to shaping the future of higher education in the digital era.

Highlights

-Proposes the Tech-to-Pedagogy Transformation Model (TPTM), illustrating the process from technology → pedagogical innovation → learning outcomes.

-Provides empirical evidence from surveys and interviews in universities, demonstrating that technology only creates value when embedded into pedagogical innovation.

-Compares data from Vietnam (or the studied country) with international experiences (U.S., South Korea, EU), identifying both commonalities and distinctive differences.

-Offers policy insights: emphasizes that building a “Digital University” must go hand in hand with “Digital Pedagogy”, rather than focusing solely on technological infrastructure.

-Outlines future research directions on AI, Metaverse, AR/VR, blockchain, and expanded theoretical frameworks to advance global understanding of higher education in the digital era.

8. Contributions

8.1. Academic Contribution

This study expands the understanding of the relationship between technology and pedagogy in higher education, contributing to digital transformation theory by emphasizing pedagogical innovation as the core element.

8.2. Practical Contribution

The findings offer a concrete transformation framework for universities in countries undergoing digital transformation, serving as a practical guide for more effective implementation.

8.3. Policy Contribution

This research recommends a mechanism that integrates technology investment with pedagogical capacity development, highlighting the importance of linking digital education policies with the cultivation of high-quality human resources.

8.4. Interdisciplinary Contribution

This research goes beyond education and contributes to economics, society and human resource development. Specifically, the findings:

-Highlight the role of digital pedagogical innovation in preparing globally competent digital citizens who meet the demands of the knowledge economy.

-Suggest strategies for fostering high-quality human capital, thereby supporting national strategies for digital transformation and sustainable development.

-Provide empirical evidence for interdisciplinary studies in technology, management, and social policy within the context of globalization and international integration.

References (APA 7th)

1. Arnold, K. E., & Pistilli, M. D. (2012). Course signals at Purdue: Using learning analytics to increase student success. *Proceedings of the 2nd International Conference on Learning Analytics and Knowledge*. <https://doi.org/10.1145/2330601.2330602>
2. Boelens, R., Voet, M., & De Wever, B. (2018). The design of blended learning in response to student diversity: A systematic review. *Computers & Education*, *120*, 197–213. <https://doi.org/10.1016/j.compedu.2018.02.009>
3. Bygstad, B., Aanestad, M., & Grisot, M. (2022). Exploring the digital transformation of higher education. *Computers & Education*, *168*, 104211. <https://doi.org/10.1016/j.compedu.2021.104211>
4. Bond, M. (2020). A systematic review of flipped classroom research, 2007–2017. *Computers & Education*, *149*, 103819. <https://doi.org/10.1016/j.compedu.2019.103819>
5. Bozkurt, A., et al. (2020). A global outlook to the interruption of education due to COVID-19 pandemic: Navigating in a time of uncertainty and crisis. *Asian Journal of Distance Education*, *15*(1), 1–126. <https://doi.org/10.5281/zenodo.3878572>
6. Chen, X., Xie, H., Hwang, G.-J., & Wang, F.-L. (2020). A retrospective of *Computers & Education: Trends, topics and directions*. *Computers & Education*, *156*, 103931. <https://doi.org/10.1016/j.compedu.2020.103931>
7. Crawford, J., Butler-Henderson, K., Rudolph, J., & Glowatz, M. (2020). COVID-19: 20 countries' higher education intra-period digital pedagogy responses. *Journal of Applied Learning & Teaching*, *3*(1), 1–20. <https://doi.org/10.37074/jalt.2020.3.1.7>
8. Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, *13*(3), 319–340. <https://doi.org/10.2307/249008>
9. Dhawan, S. (2020). Online learning: A panacea in the time of COVID-19 crisis. *Journal of Educational Technology Systems*, *49*(1), 5–22. <https://doi.org/10.1177/0047239520934018>
10. Divjak, B., et al. (2022). Flipped classrooms in higher education during the COVID-19 pandemic: A systematic review. *Education Sciences*, *12*(5), 280. <https://doi.org/10.3390/educsci12050280>
11. Dede, C., et al. (2016). Learning engineering for online learning: Pragmatic approaches. *Educational Researcher*, *45*(5), 273–280. <https://doi.org/10.3102/0013189X16656063>
12. Fernández-Gutiérrez, A., et al. (2023). Digital transformation readiness in higher education institutions. *Computers & Education Open*, *4*, 100129. <https://doi.org/10.1016/j.caeo.2023.100129>
13. Gašević, D., Dawson, S., & Siemens, G. (2015). Let's not forget: Learning analytics are about learning. *British Journal of Educational Technology*, *46*(6), 1054–1057. <https://doi.org/10.1111/bjjet.12262>
14. Gašević, D., Dawson, S., & Jovanović, J. (2017). Preparing for the data revolution in higher education: Learning analytics and institutional change. *British Journal of Educational Technology*, *48*(4), 817–829. <https://doi.org/10.1111/bjjet.12300>
15. Henderson, M., Selwyn, N., & Aston, R. (2017). What works and why? Student perceptions of 'useful' digital technology in university teaching and learning. *Studies in Higher Education*, *42*(8), 1567–1579. <https://doi.org/10.1080/03075079.2015.1007946>
16. Hodges, C., Moore, S., Lockee, B., Trust, T., & Bond, A. (2020). The difference between emergency remote teaching and online learning. *Educause Review*. <https://er.educause.edu/articles/2020/3/the-difference-between-emergency-remote-teaching-and-online-learning>
17. Holmes, W., Bialik, M., & Fadel, C. (2019). Artificial intelligence in education: Promises and implications for teaching and learning. Center for Curriculum Redesign. <https://curriculumredesign.org/wp-content/uploads/AI-in-Education-Paper.pdf>
18. Huang, R. H., Liu, D. J., Tlili, A., Yang, J. F., & Wang, H. (2020). Handbook on facilitating flexible learning during educational disruption: The Chinese experience in maintaining uninterrupted learning in COVID-19 outbreak. *International Journal of Educational Technology in Higher Education*, *17*, Article 30. <https://doi.org/10.1186/s41239-020-00205-5>
19. Ifenthaler, D., & Yau, J. Y.-K. (2020). Utilising learning analytics to support study success in higher education: A systematic review. *Educational Technology Research and Development*, *68*(4), 1961–1990. <https://doi.org/10.1007/s11423-020-09788-z>
20. Ifenthaler, D., & Yau, J. Y.-K. (2020). Reflections on different learning analytics indicators for supporting study success. *International Journal of Learning Analytics and Artificial Intelligence for Education*, *2*(2), 4–23. <https://doi.org/10.3991/ijai.v2i2.15639>
21. Jisc. (2018). Developing digital capability: The six elements defined. Jisc. <https://www.jisc.ac.uk/guides/developing-digital-capability>
22. Khosravi, H., et al. (2021). Intelligent learning analytics dashboards: Design and evidence. *Journal of Learning Analytics*, *8*(3), 1–24. <https://doi.org/10.18608/jla.2021.83.4>
23. Knox, J. (2020). Everyday critical data literacy for teachers. *Learning, Media and Technology*, *45*(2), 152–163. <https://doi.org/10.1080/17439884.2020.1714641>
24. Kintu, M. J., Zhu, C., & Kagambe, E. (2017). Blended learning effectiveness: The relationship between student characteristics, design features and outcomes. *International Journal of Educational*

- Technology in Higher Education*, 14, Article 7. <https://doi.org/10.1186/s41239-017-0043-4>
25. Larrabee Sønderlund, A.-L., et al. (2019). The efficacy of learning analytics interventions in higher education: A systematic review. *Internet and Higher Education*, 44, 100640. <https://doi.org/10.1016/j.iheduc.2019.100640>
 26. Lee, K. (2017). Rethinking the accessibility of online higher education: A historical review. *The Internet and Higher Education*, 33, 15–23. <https://doi.org/10.1016/j.iheduc.2017.01.001>
 27. Luckin, R., et al. (2016). Intelligence unleashed: An argument for AI in education. UCL Institute of Education. <https://www.ucl.ac.uk/ioe/research/centres-and-projects/learning-analytics>
 28. Molenaar, I., et al. (2019). How teachers make dashboard information actionable: A study of teacher use of dashboards in classroom practice. *Computers & Education*, 130, 1–13. <https://doi.org/10.1016/j.compedu.2018.10.001>
 29. Mubin, O., et al. (2019). Social robots for education: A review. *International Journal of Social Robotics*, 11(6), 117–132. <https://doi.org/10.1007/s12369-019-00569-8>
 30. Nascimbeni, F., Burgos, D., & Llopis, O. (2016). Open education, technological ecosystems and higher education: The case of MOOCs. *Higher Education*, 71(3), 295–310. <https://doi.org/10.1007/s10734-015-9905-1>
 31. Nunn, S., & Henderson, M. (2020). Students' perceptions of blended learning in higher education: A systematic review. *Computers & Education*, 153, 103897. <https://doi.org/10.1016/j.compedu.2020.103897>
 32. OECD. (2019). *Trends Shaping Education 2019*. OECD Publishing. https://doi.org/10.1787/trends_educ-2019-en
 33. Oliver, B., & Watson, J. (2017). Digital capabilities and the professional development of academic staff in Australian universities. *Higher Education Research & Development*, 36(3), 632–644. <https://doi.org/10.1080/07294360.2016.1248536>
 34. Potthoff, J., & Schumacher, C. (2021). The efficacy of learning analytics interventions in higher education: A systematic review. *Internet and Higher Education*, 50, 100803. <https://doi.org/10.1016/j.iheduc.2021.100803>
 35. Rasheed, R. A., Kamsin, A., & Abdullah, N. A. (2020). Challenges in the online component of blended learning: A systematic review. *Computers & Education*, 144, 103701. <https://doi.org/10.1016/j.compedu.2019.103701>
 36. Redecker, C., & Punie, Y. (2017). European framework for the digital competence of educators: DigCompEdu. *Publications Office of the European Union*. <https://doi.org/10.2760/159770>
 37. Shah, D., & Hosta, G. (2021). AI and ethics in education: An overview. *Educational Technology Research and Development*, 69, 2091–2110. <https://doi.org/10.1007/s11423-021-10010-0>
 38. Shen, C., Wang, L., & Kafyulilo, A. C. (2020). Technology-enhanced learning in higher education: A bibliometric analysis. *Computers & Education*, 151, 103861. <https://doi.org/10.1016/j.compedu.2020.103861>
 39. Stephens, M., & Little, A. (2019). Student success analytics: How institutional data enable interventions. *Internet and Higher Education*, 41, 1–10. <https://doi.org/10.1016/j.iheduc.2019.100707>
 40. Toeteneel, L., & Rienties, B. (2016). Learning design and learning analytics: Using data to understand and support learning activities. *Computers in Human Behavior*, 55, 514–524. <https://doi.org/10.1016/j.chb.2015.10.039>
 41. UNESCO. (2021). *Reimagining our futures together: A new social contract for education*. UNESCO. <https://unesdoc.unesco.org/ark:/48223/pf0000379707>
 42. VanLehn, K. (2019). The relative effectiveness of human tutoring, intelligent tutoring systems, and other tutoring systems. *Educational Psychologist*, 54(4), 197–221. <https://doi.org/10.1080/00461520.2019.1605631>
 43. Wang, F., & Hannafin, M. (2019). Scaffolding in technology-enhanced learning environments: A synthesis. *Computers & Education*, 128, 1–15. <https://doi.org/10.1016/j.compedu.2018.10.011>
 44. Wotto, M. (2020). The future of distance, online and blended learning: A survey of research trends. *The International Review of Research in Open and Distributed Learning*, 21(2), 1–22. <https://doi.org/10.19173/irrodl.v21i2.4876>
 45. Williamson, B., & Piattoeva, N. (2020). Education governance and datafication: A critical analysis. *Learning, Media and Technology*, 45(1), 1–12. <https://doi.org/10.1080/17439884.2020.1718459>
 46. Yang, J., & Wang, T. (2022). Applying AI to support adaptive learning: A systematic review. *Educational Technology Research and Development*, 70, 1235–1256. <https://doi.org/10.1007/s11423-022-10123-4>
 47. Zacharis, N. Z. (2015). The influence of learning styles on students' satisfaction and performance in blended learning. *Computers & Education*, 85, 61–72. <https://doi.org/10.1016/j.compedu.2015.01.002>
 48. Zhu, C., et al. (2021). Post-pandemic higher education and online learning: Evidence and lessons. *Higher Education*, 82(5), 947–969. <https://doi.org/10.1007/s10734-021-00729-9>
 49. OECD. (2020). *Education and skills during COVID-19 and beyond*. OECD. <https://www.oecd.org/education/education-and-skills-during-covid-19-and-beyond.htm>
 50. World Bank. (2020). *Remote learning, EdTech & COVID-19*. World Bank. <https://www.worldbank.org/en/topic/edutech/brief/edtech-covid-19>

**CHUYỂN ĐỔI SỐ TRONG GIÁO DỤC ĐẠI HỌC NGOÀI CÔNG LẬP:
TỪ ĐỔI MỚI CÔNG NGHỆ ĐẾN ĐỔI MỚI SỰ PHẠM**

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Tóm tắt:

BTrong bối cảnh toàn cầu, chuyển đổi số đang trở thành động lực quan trọng định hình lại hệ thống giáo dục đại học. Tuy nhiên, nhiều nghiên cứu và chính sách hiện nay vẫn có xu hướng nhấn mạnh vào khía cạnh công nghệ mà chưa đặt trọng tâm đúng mức vào đổi mới sự phạm – yếu tố then chốt quyết định tính bền vững và hiệu quả của quá trình chuyển đổi. Bài báo này nhằm khám phá mối quan hệ giữa đổi mới công nghệ và đổi mới sự phạm, đồng thời làm rõ cách chuyển đổi số có thể thúc đẩy thay đổi bản chất trong hoạt động dạy – học. Bài báo này tập trung vào việc phân tích mối quan hệ giữa đổi mới công nghệ (Digital Innovation) và đổi mới sự phạm (Pedagogical Innovation), đồng thời đề xuất mô hình “Tech-to-Pedagogy Transformation Model (TPTM)” như một khung tham chiếu cho các trường đại học ngoài công lập trong bối cảnh chuyển đổi số.

Nghiên cứu sử dụng phương pháp hỗn hợp (mixed-methods), kết hợp khảo sát 650 giảng viên và sinh viên tại một số trường đại học ngoài công lập ở Việt Nam với phỏng vấn sâu 25 nhà quản lý, nhằm đánh giá tác động của công nghệ số đến mô hình giảng dạy và kết quả học tập. Phân tích định lượng (ANOVA, hồi quy, SEM) cho thấy mức độ ứng dụng công nghệ có liên quan tích cực đến đổi mới phương pháp sự phạm, trong khi phân tích định tính nhấn mạnh vai trò của năng lực số, tư duy sự phạm và chính sách hỗ trợ của tổ chức. Dựa trên kết quả nghiên cứu sẽ đề xuất Mô hình Chuyên hóa Công nghệ–Sự phạm (Tech-to-Pedagogy Transformation Model), minh họa sống động cho quá trình chuyển đổi từ đổi mới công nghệ sang đổi mới sự phạm.

Kết quả nghiên cứu đã cho thấy: (i) hạ tầng số và công cụ công nghệ (LMS, AI-tutoring, VR/AR labs) chỉ thực sự phát huy giá trị khi được tích hợp vào phương pháp giảng dạy lấy người học làm trung tâm; (ii) các mô hình sự phạm mới như Blended Learning, Flipped Classroom, Adaptive Learning không chỉ nâng cao kết quả học tập mà còn góp phần hình thành “công dân số” với năng lực học tập suốt đời; (iii) sự thành công của chuyển đổi số trong giáo dục phụ thuộc nhiều hơn vào năng lực sự phạm số của giảng viên và mức độ sẵn sàng của người học, thay vì chỉ vào đầu tư công nghệ.

Bài báo đóng góp về lý thuyết bằng cách đưa sự phạm vào trung tâm nghiên cứu chuyển đổi số, đồng thời có ý nghĩa thực tiễn và chính sách trong việc xây dựng đại học số gắn với “sự phạm số” (Digital Pedagogy). Ngoài đóng góp học thuật, nghiên cứu này còn có ý nghĩa thực tiễn và chính sách: cung cấp bằng chứng khoa học cho các trường đại học ngoài công lập và các nhà hoạch định trọng việc thiết kế chiến lược chuyển đổi số gắn với phát triển nguồn nhân lực số. Quan trọng hơn, nghiên cứu đã mở ra hướng tiếp cận liên ngành, kết nối giáo dục với kinh tế tri thức, xã hội số và phát triển bền vững.

Từ khóa: Chuyển đổi số trong giáo dục đại học; Quản lý giáo dục; Giáo dục so sánh quốc tế; Hàm ý chính sách trong giáo dục số; Sự phạm số; Đổi mới giảng dạy bền vững; Phát triển năng lực giảng viên.