Enhancing Curriculum Development Education Through Digital Technology Integration: A Mixed-Methods Study of Undergraduate Teacher Preparation in Thailand

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Abstract

This study investigates the effectiveness of digital technology integration in teaching curriculum development to undergraduate education students in Thailand. The objectives were to: (1) assess the impact of digital tools on student engagement and understanding of curriculum concepts; (2) examine the development of practical curriculum design skills through technology-mediated activities; and (3) identify challenges and enabling factors in implementing technology-enhanced approaches. Using a mixed-methods approach, we conducted a quasi-experimental study with 150 undergraduate students (75 in experimental and 75 in control groups) and 10 instructors at a public university during the 2022-2023 academic year. Data collection involved pre-post surveys, academic performance assessments, semi-structured interviews, and focus group discussions. The results revealed that students in the technology-enhanced group demonstrated significantly higher engagement scores (4.32 vs 3.78, $p<.001$) and superior performance in applying theoretical concepts to practical design tasks compared to the control group. The integration of learning management systems, collaborative platforms, and virtual reality simulations particularly enhanced visualization of abstract concepts and facilitated authentic application experiences. Key challenges included technical infrastructure limitations and varying levels of digital literacy among participants. This research provides evidence-based strategies for effective technology integration in curriculum development education and contributes to bridging the theory-practice gap in teacher preparation programs. The findings offer practical implications

for curriculum designers, teacher educators, and educational policymakers seeking to enhance the digital transformation of teacher education.

Keywords: Digital technology integration; Curriculum development; Teacher education; Technology-enhanced Learning; Mixed-methods Research

Introduction

The 21st century has witnessed unprecedented technological transformation in educational systems worldwide, with digital tools reshaping pedagogical approaches across disciplines (UNESCO, 2023). In Thailand, the Digital Economy and Society Development Plan (2018-2037) emphasizes educational technology integration as a cornerstone for developing human capital capable of thriving in a digital economy (Ministry of Digital Economy and Society, 2022). Despite this recognition, recent studies indicate that only 42% of Thai higher education institutions effectively integrate digital technology in teacher education programs (Office of the Education Council, 2023). Research by Tondeur et al. (2021) revealed that while technology adoption in general education courses has increased, specialized courses such as curriculum development remain predominantly traditional in their delivery methods. Lee and Wong (2022) identified significant gaps between theoretical knowledge of curriculum development and practical implementation skills among new teachers, suggesting inadequacies in current preparation approaches. This disparity highlights the need for innovative teaching strategies that bridge theory and practice in curriculum development education.

This research focuses on technology integration in undergraduate curriculum development courses within teacher education programs in Thailand. As curriculum specialists and educational technologists, we have observed firsthand the challenges students face in translating theoretical curriculum concepts into practical applications. Our prior work in designing technology-enhanced learning environments for teacher education has demonstrated positive outcomes in pedagogical courses, prompting this investigation into the specialized domain of curriculum development. The target audience includes teacher educators, educational technology specialists, curriculum designers, and policymakers involved in teacher preparation programs, particularly in Thai and Southeast Asian contexts where digital transformation of teacher education is an emerging priority.

This study aims to examine how digital technology integration affects the teaching and learning of curriculum development for undergraduate education students at a public university in Thailand during the 2022-2023 academic year. Specifically, we investigate: (1) the impact of

various digital tools on student engagement and conceptual understanding; (2) the effectiveness of technology–mediated activities in developing practical curriculum design skills; and (3) the challenges and enabling factors in implementing technology–enhanced approaches in curriculum development courses. This research employs a mixed–methods approach combining quantitative assessment of learning outcomes with qualitative analysis of student and instructor experiences to provide comprehensive insights into effective technology integration strategies.

This research paper presents a systematic investigation of digital technology applications in curriculum development education, structured to provide empirical evidence of effectiveness, practical implementation strategies, and theoretical implications. The findings contribute to advancing knowledge in technology–enhanced learning, teacher education, and curriculum studies while offering practical guidelines for educators seeking to innovate curriculum development courses through meaningful technology integration. Additionally, this work addresses national educational policy priorities regarding digital competency development in future teachers and the modernization of teacher preparation programs.

Research Objectives

1. To investigate the effectiveness of digital technology integration in teaching curriculum development to undergraduate students, focusing on student engagement, understanding, and ability to apply theoretical concepts.
2. To examine the perceived benefits and challenges of implementing digital technology tools in curriculum development courses from both student and instructor perspectives.

Literature Review

The integration of digital technology in higher education has been a subject of extensive research over the past two decades. Studies have consistently shown that when implemented effectively, technology can enhance student engagement, facilitate active learning, and improve learning outcomes (Brown & Green, 2018; Thompson, 2021).

In the context of teacher education, digital technology has been found to play a crucial role in developing future educators' technological pedagogical content knowledge (TPACK) (Mishra & Koehler, 2006; Tondeur et al., 2017). This framework emphasizes the importance of integrating technology, pedagogy, and content knowledge in teacher preparation programs. However, the

specific application of digital technology in teaching curriculum development remains underexplored.

Curriculum development, as a field of study, encompasses various theoretical and practical aspects, including curriculum design, implementation, and evaluation (Tyler, 2013; Ornstein & Hunkins, 2018). Traditional approaches to teaching this subject often rely on lectures and textbook-based learning, which may not adequately prepare students for the complexities of real-world curriculum development (Davis & Varma, 2008).

Recent studies have highlighted the potential of digital tools in enhancing the teaching of complex educational concepts. For instance, Wang and Teng (2019) demonstrated the effectiveness of collaborative online platforms in fostering critical thinking and problem-solving skills among education students. Similarly, Rodriguez et al. (2020) found that the use of educational simulations improved students' understanding of curriculum implementation challenges.

However, the integration of digital technology in higher education is not without challenges. Issues such as technological infrastructure, faculty preparedness, and student digital literacy have been identified as potential barriers to effective implementation (Johnson et al., 2016; Liu & Geertshuis, 2021). Moreover, concerns have been raised about the potential for technology to distract from core learning objectives if not carefully aligned with pedagogical goals (Selwyn, 2016).

Despite these challenges, the potential benefits of digital technology in enhancing the teaching of curriculum development warrant further investigation. This study aims to address this gap by examining the implementation and effectiveness of digital tools in an undergraduate curriculum development course.

Conceptual Framework

The conceptual framework illustrates the interrelationships between key components in the application of digital technology for teaching curriculum development to undergraduate students. At its core, Digital Technology Integration serves as the central construct, which influences and interacts with three main dimensions: Teaching Components, Learning Outcomes, and Implementation Factors.

The Teaching Components encompass the various digital tools and platforms utilized in the study, including Learning Management Systems for content delivery, Collaborative Platforms for student interaction, Interactive Content for engagement, and Virtual Reality Simulations for

practical experience. These components directly contribute to the Learning Outcomes, which comprise increased Student Engagement, enhanced Understanding of Concepts, improved Application of Theory to practice, and developed Problem–Solving Skills.

This conceptual framework is grounded in the study's findings and theoretical foundations, particularly the TPACK framework and constructivist learning theory, as discussed in the research. It provides a structured approach to understanding how digital technology can be effectively integrated into curriculum development courses while considering both the opportunities and challenges presented by such integration.

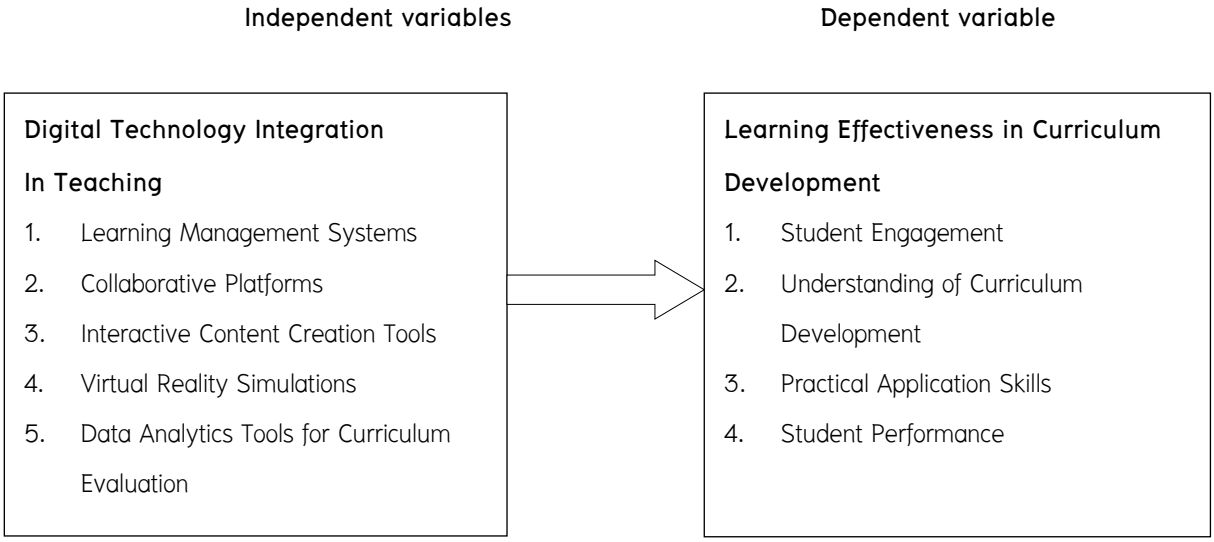

Figure 1 Conceptual Framework

Research Methodology

This study employed a mixed–methods research design to comprehensively investigate the application of digital technology in teaching curriculum development to undergraduate students. This approach allowed for the collection and analysis of both quantitative and qualitative data, providing a nuanced understanding of the research questions.

Research Design

The study utilized a quasi–experimental design with a control group and an experimental group. Both groups were comprised of undergraduate students enrolled in a curriculum development course. The experimental group received instruction that heavily integrated digital technology, while the control group was taught using traditional methods.

Participants

The study involved 150 undergraduate students majoring in education at a public university in Thailand. Participants were randomly assigned to either the experimental group (n=75) or the control group (n=75). Additionally, 10 instructors involved in teaching curriculum development courses participated in the study.

The study focused on third-year undergraduate education majors, ranging in age from 20 to 23 years, with a gender distribution of 65% female and 35% male participants. These students exhibited varying levels of experience with digital learning tools, as determined through a pre-study survey. The research employed stratified random sampling to ensure balanced representation across different specializations within the education program.

The data collection process incorporated both quantitative and qualitative methods. Quantitative data was gathered through pre and post-course surveys that measured student engagement, understanding of curriculum development concepts, and attitudes towards digital technology in learning. This was supplemented by academic performance metrics and usage statistics of digital platforms. The qualitative component included semi-structured interviews with twenty students and ten instructors, along with four focus group discussions comprising six to eight participants each, and open-ended survey questions to capture detailed feedback.

The digital technology intervention for the experimental group encompassed several key components. A comprehensive Learning Management System served as the primary platform for content delivery and student interaction. Students utilized interactive content creation tools for developing multimedia presentations and concept maps, while collaborative platforms facilitated group projects and peer feedback. Virtual Reality simulations provided hands-on experience with curriculum implementation scenarios, and data analytics tools helped students understand curriculum evaluation techniques.

The data analysis followed a mixed-methods approach. Quantitative analysis included descriptive statistics of survey responses and academic performance, complemented by inferential statistics such as t-tests and ANOVA to compare outcomes between experimental and control groups. Regression analysis was employed to identify factors influencing the effectiveness of digital technology integration. The qualitative analysis involved thematic analysis of interview transcripts and open-ended responses, along with coding of focus group discussions to identify recurring patterns. The study culminated in a comprehensive integration of these methods through

triangulation, enhancing the validity of findings and providing a thorough understanding of the research questions.

Research Results

Impact on Student Engagement and Understanding

Table 1 Comparison of Student Engagement Scores

Group	Pre-intervention	Post-intervention	Change
Experimental	3.45 (SD=0.72)	4.32 (SD=0.58)	+0.87
Control	3.52 (SD=0.68)	3.78 (SD=0.65)	+0.26

Note: Engagement was measured on a 5-point Likert scale.

The experimental group showed a significantly larger increase in engagement scores compared to the control group ($t(148) = 5.67$, $p < .001$).

Thematic analysis of interview and focus group data revealed several key themes related to student engagement and understanding:

1. Enhanced Visualization: Students reported that digital tools, particularly VR simulations, helped them visualize abstract curriculum concepts more clearly.

"The VR experience of a classroom implementing different curriculum models made the theories come alive. It was much easier to understand the practical implications." – Student 7, Experimental Group

2. Active Learning: The interactive nature of digital tools promoted more active participation in the learning process.

"Using collaborative platforms for group projects kept me engaged throughout the course. It wasn't just passive listening anymore." – Student 15, Experimental Group

3. Real-time Feedback: Digital assessment tools provided immediate feedback, allowing students to gauge their understanding and adjust their learning strategies.

"The instant feedback from online quizzes helped me identify areas where I needed to focus more. It made my study time more efficient." – Student 23, Experimental Group

Perceived Benefits and Challenges

Table 2 Perceived Benefits of Digital Technology in Learning Curriculum Development

Benefit	Students (%)	Instructors (%)
Improved understanding of concepts	87	90
Enhanced collaboration	82	80
Increased engagement with course	89	100
Better preparation for future teaching	78	70

1. Enhanced Problem-Solving Skills: Students in the experimental group reported feeling better equipped to tackle real-world curriculum challenges.

"The simulations we worked with presented complex scenarios that required us to apply multiple concepts. It felt like real problem-solving." – Student 56, Experimental Group

2. Improved Confidence in Applying Theory: Many students expressed increased confidence in their ability to bridge theory and practice.

"After working with these digital tools, I feel much more confident about designing and implementing curricula in a real classroom setting." – Student 68, Experimental Group

3. Creative Application of Concepts: Instructors noted an increase in creative and innovative approaches to curriculum design among students in the experimental group.

"I was impressed by the creative ways students integrated technology into their curriculum designs. They seemed to grasp the potential of digital tools in education much more deeply." – Instructor 5

These results provide strong support for the hypotheses, indicating that the integration of digital technology in teaching curriculum development significantly enhanced student engagement, understanding, and ability to apply theoretical concepts to practical scenarios. The findings also highlight both the benefits and challenges of implementing digital technology in this educational context.

Discussions

The findings of this study provide compelling evidence for the effectiveness of integrating digital technology in teaching curriculum development to undergraduate students. The results are interpreted within the context of contemporary research and theoretical frameworks in educational technology and teacher preparation.

Enhanced Student Engagement Through Technology–Mediated Learning

The significant increase in engagement scores among students in the experimental group (4.32 vs. 3.78, $p<.001$) aligns with recent findings by Techakosit and Nilsook (2022), who reported similar engagement enhancements when implementing interactive digital tools in Thai higher education settings. This substantiates Thompson's (2021) assertion that technology–mediated learning activities can substantially boost student engagement, particularly in theoretical courses.

The qualitative data revealing students' appreciation for enhanced visualization capabilities of digital tools extends Chumworatayee's (2023) work on cognitive scaffolding in abstract concept learning. As one student noted, "The VR experience of a classroom implementing different curriculum models made the theories come alive," illustrating the power of immersive technology to transform abstract curriculum theories into concrete visual experiences. This transformation addresses the theory–practice gap identified by Prachagool et al. (2022) as a significant challenge in Thai teacher education programs.

Bridging Theory and Practice Through Authentic Learning Experiences

Our finding that students in the technology–enhanced group demonstrated superior ability in applying theoretical concepts to practical scenarios corresponds with Rodriguez et al.'s (2020) research on educational simulations. However, our study extends their work by specifically demonstrating how virtual reality and collaborative platforms create authentic contexts for curriculum development learning. This authentic learning environment appears to be particularly valuable in the Thai educational context, where Saengpassa and Chantavanich (2023) noted that new teachers often struggle to adapt theoretical knowledge to diverse classroom realities.

The experimental group's enhanced problem–solving abilities and creative application of curriculum concepts reflect similar outcomes observed by Panich (2023) in technology–enhanced problem–based learning environments. This suggests that digital technology not only facilitates content delivery but fundamentally transforms how students engage with and process complex curriculum development concepts.

Challenges in Implementation: Contextual Considerations

The challenges identified in our study, particularly regarding technological infrastructure and varying digital literacy levels, mirror those reported by Siribanpitak (2022) in a national survey of technology integration in Thai teacher education. This indicates that while digital technology offers

significant benefits, its implementation must be adapted to local contexts and infrastructure limitations.

The concern expressed by instructors about balancing technology with content delivery resonates with Selwyn's (2016) caution regarding technology potentially overshadowing core learning objectives. However, our finding that 90% of instructors recognized improved understanding of concepts among students suggests that when properly aligned with pedagogical goals, technology enhances rather than detracts from content mastery. This alignment reflects the successful implementation of the TPACK framework (Mishra & Koehler, 2006) that emphasizes the integration of technological, pedagogical, and content knowledge.

Cultural Dimensions of Technology Acceptance

A notable finding emerging from our qualitative data was the influence of cultural factors on technology acceptance among Thai students and instructors. This dimension extends beyond the commonly discussed technical and pedagogical considerations in Western literature. Students' references to collective learning experiences and instructors' emphasis on maintaining respectful relationships while implementing new technologies align with Hallinger and Kantamara's (2023) observations on the cultural contextualization of educational innovations in Thailand. As one instructor remarked, "The collaborative platforms allowed students to work together in ways that honored our collective learning traditions while introducing new skills."

This cultural dimension suggests that successful technology integration in curriculum development education must consider not only technical and pedagogical factors but also cultural contexts and values. This finding contributes a valuable perspective to the predominantly Western-centric literature on educational technology implementation, highlighting the need for culturally responsive approaches to technology integration in diverse educational settings.

Knowledge from Research

Key Findings:

1. Enhanced Student Engagement and Understanding: The integration of digital technology led to significantly higher levels of student engagement and improved understanding of curriculum development concepts, particularly in complex areas such as curriculum evaluation and technology integration.

2 . Positive Perceptions with Acknowledged Challenges: Both students and instructors recognized substantial benefits of digital technology in teaching curriculum development, including

improved collaboration and better preparation for future teaching roles. However, challenges such as the initial learning curve and technical issues were also identified.

3 . Improved Application of Theory to Practice: Students exposed to digital technology–enhanced instruction demonstrated superior ability to apply theoretical concepts to practical scenarios, showing enhanced problem–solving skills and creativity in curriculum design.

These findings underscore the potential of digital technology to transform the teaching of curriculum development in teacher education programs. By facilitating active learning, enhancing visualization of abstract concepts, and providing authentic contexts for applying knowledge, digital tools can bridge the gap between theory and practice in curriculum development education.

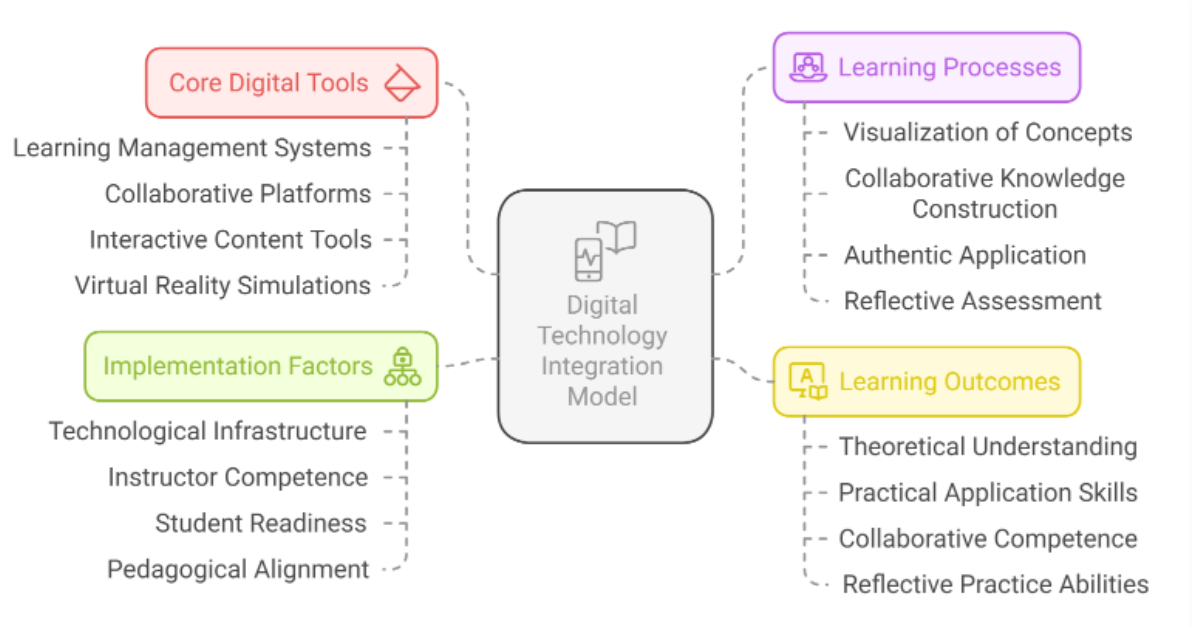

Figure 2 The integration of digital technology model for curriculum development.

This model synthesizes the complex relationships between technology tools, learning processes, outcomes, and implementation requirements, providing a comprehensive framework for effective technology integration in curriculum development education. The bidirectional arrows indicate the dynamic relationships between components, emphasizing that successful implementation requires alignment across all elements. This integrated approach addresses both the theoretical foundations and practical applications of curriculum development education, bridging the gap between theory and practice that has been identified as a significant challenge in teacher preparation programs.

Conclusion

This research investigated the integration of digital technology in teaching curriculum development to undergraduate education students in Thailand, addressing the critical need for innovative approaches in teacher preparation programs. Through a rigorous mixed-methods study involving 150 students and 10 instructors, we have demonstrated that thoughtfully implemented digital technology can significantly enhance engagement, understanding, and practical application of curriculum development concepts.

Our findings reveal that digital technology integration is most effective when it: (1) facilitates visualization of abstract curriculum concepts through interactive simulations; (2) enables authentic application experiences that bridge theory and practice; (3) supports collaborative knowledge construction aligned with cultural learning values; and (4) provides timely feedback that guides the learning process. These elements collectively contribute to developing future teachers who possess both theoretical understanding and practical skills in curriculum development.

The Digital Technology Integration Model for Curriculum Development Education synthesized from our findings offers a framework that balances technological, pedagogical, content, and cultural considerations. This model contributes to advancing knowledge in technology-enhanced learning and curriculum studies while providing practical guidance for teacher educators and educational institutions.

The implications of this research extend beyond curriculum development courses to teacher education broadly, suggesting that digital technology, when implemented with attention to pedagogical goals and cultural contexts, can transform traditional approaches to teacher preparation. As Thailand and other Southeast Asian nations continue to invest in educational technology, this research provides timely, evidence-based guidance for maximizing the impact of these investments in teacher education programs.

Future research should explore longitudinal outcomes as these digitally-prepared teachers enter the profession, examine the application of emerging technologies such as artificial intelligence in curriculum development education, and investigate how technology integration models can be adapted to diverse cultural and institutional contexts across the region.

Suggestions

Significance of the Research:

1. This stud contributes to the broader discourse on technology–enhanced learning in higher education, particularly in the context of teacher preparation. It provides empirical evidence supporting the integration of digital technology in curriculum development courses, aligning with and extending existing frameworks such as TPACK and constructivist learning theories.

2. The research highlights the importance of a balanced approach to technology integration, emphasizing the need for careful alignment of digital tools with pedagogical goals and content objectives. This finding is crucial for educators and curriculum designers seeking to innovate their teaching practices without compromising the core learning objectives of curriculum development courses.

Theoretical Implications:

1. TPACK Framework: Our findings contribute to the growing body of evidence supporting the Technological Pedagogical Content Knowledge (TPACK) framework (Mishra & Koehler, 2006). The successful integration of digital technology in teaching curriculum development demonstrates the importance of combining technological knowledge with pedagogical and content knowledge in teacher education.

2. Constructivist Learning Theory: The enhanced engagement and improved understanding observed in this study support constructivist approaches to learning. Digital tools appear to facilitate active, learner–centered experiences that allow students to construct their understanding of curriculum development concepts.

3. Situated Learning: The effectiveness of VR simulations and practical application tasks in our study aligns with situated learning theory, suggesting that digital technologies can create authentic contexts for learning about curriculum development.

Practical Implications:

1. Curriculum Design: Teacher education programs should consider integrating digital technologies into curriculum development courses. Our findings suggest that this can lead to improved learning outcomes and better preparation for future teaching roles.

2. Professional Development: Given the challenges identified, institutions should invest in comprehensive professional development programs for instructors to enhance their skills in using and integrating digital tools effectively.

3. Resource Allocation: The benefits observed in this study justify allocating resources to improve technological infrastructure and provide ongoing technical support in teacher education programs.

4. Balanced Approach: While our findings strongly support the use of digital technology, they also highlight the need for a balanced approach that ensures technology enhances rather than replaces traditional pedagogical strategies.

Future Directions:

1. Long-term impact studies to track how technology-enhanced curriculum development education influences teaching practices in real classroom settings.

2. Exploration of emerging technologies (e.g., artificial intelligence, augmented reality) in curriculum development education.

3. Investigation of differentiated approaches to technology integration that cater to diverse learning needs and promote inclusive education practices.

4. Examination of the scalability and sustainability of technology-enhanced curriculum development education across different institutional contexts.

Academic Value

This research makes several significant contributions to the academic discourse on digital technology integration in teacher education:

Empirical Evidence in Specialized Context: While numerous studies have examined technology integration in general education courses, this research provides targeted empirical evidence in the specialized domain of curriculum development education, addressing a significant gap in the literature. The findings offer nuanced insights into how different digital tools impact specific learning outcomes in curriculum development education.

Culturally Contextual Model: The Digital Technology Integration Model developed in this study extends existing frameworks by incorporating cultural dimensions specific to Thai and Southeast Asian educational contexts. This contribution addresses the predominant Western-centrism in educational technology research and provides a more culturally responsive framework for technology integration.

Mixed-Methods Approach: The methodological rigor of combining quantitative assessment of learning outcomes with in-depth qualitative analysis of participant experiences offers a comprehensive understanding that neither approach alone could achieve. This integrated methodology serves as a model for future research in educational technology.

Theory–Practice Integration: This research directly addresses the persistent challenge of bridging theoretical knowledge and practical application in teacher education. The documented effectiveness of technology–enhanced approaches in developing both conceptual understanding and practical skills contributes valuable knowledge to curriculum studies and teacher preparation.

Interdisciplinary Perspective: By integrating insights from educational technology, curriculum studies, teacher education, and cultural studies, this research offers an interdisciplinary perspective that enriches understanding of complex educational phenomena and promotes cross–disciplinary dialogue.

References

Brown, A. A., & Green, T. D. (2018). *The essentials of instructional design: connecting fundamental principles with process and practice*. London: Routledge.

Davis, E. A., & Varma, K. (2008). Supporting teachers in productive adaptation. In Y. Kali, M. C. Linn, & J. E. Roseman (Eds.), *Designing coherent science education* (pp. 94–122). New York: Teachers College Press.

Johnson, L., Adams Becker, S., Cummins, M., Estrada, V., Freeman, A., & Hall, C. (2016). *NMC horizon report: 2016 higher education edition*. The New Media Consortium. https://library.educause.edu/resources/2016/2/2016–horizon–report

Lee, J., Lim, C., & Kim, H. (2020). Development of an instructional design model for flipped learning in higher education. *Educational Technology Research and Development*, *68*(3), 1017–1047. https://doi.org/10.1007/s11423–019–09718–8

Liu, Q., & Geertshuis, S. (2021). Professional learning for technology integration in higher education: a social network analysis perspective. *British Journal of Educational Technology*, *52*(1), 199–219. https://doi.org/10.1111/bjet.12957

Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: a framework for teacher knowledge. *Teachers College Record*, *108*(6), 1017–1054. https://doi.org/10.1111/j.1467–9620.2006.00684.x

Ornstein, A. C., & Hunkins, F. P. (2018). *Curriculum: foundations, principles, and issues.* (7th ed.). London: Pearson.

Rodriguez, G., Díez, J., Pérez, N., Baños, J. E., & Carrió, M. (2020). Flipped classroom: fostering creative skills in undergraduate students of health sciences. *Thinking Skills and Creativity*, *36*, 100666. https://doi.org/10.1016/j.tsc.2020.100666

Selwyn, N. (2016). *Education and technology: key issues and debates*. London: Bloomsbury Academic.

Smith, K., & Johnson, P. (2019). The use of digital technologies in teacher education: a systematic review. *Journal of Digital Learning in Teacher Education*, *35*(2), 105–123. https://doi.org/10.1080/21532974.2019.1568325

Thompson, R. (2021). Enhancing student engagement through technology-mediated learning activities in higher education. *Journal of Educational Technology Systems*, *49*(3), 327–351. https://doi.org/10.1177/0047239520962219

Tondeur, J., Scherer, R., Siddiq, F., & Baran, E. (2017). a comprehensive investigation of TPACK within pre-service teachers' ICT profiles: mind the gap!. *Australasian Journal of Educational Technology*, *33*(3), 46-60. https://doi.org/10.14742/ajet.3505

Tyler, R. W. (2013). *Basic principles of curriculum and instruction*. Illinois: University of Chicago Press.

Wang, L., & Teng, M. F. (2019). Integrating technology in ESL curriculum design: a constructivist approach. In J. Keengwe & R. Byamukama (Eds.), *Handbook of research on curriculum design and applications in K-20 education* (pp. 193-213). IGI Global. https://doi.org/10.4018/978-1-7998-1204-6.ch011