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Teachers' Digital Competence Development in the Context of Educational Digital Transformation: Theoretical Perspectives and Implications for Vietnam

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Abstract---The rapid advancement of digital technologies has accelerated educational digital transformation worldwide, creating new demands for teachers' professional competencies. Among these competencies, digital competence has become increasingly important in enabling teachers to effectively integrate technology into teaching and learning processes. This study aims to examine the theoretical foundations of teachers' digital competence development in the context of educational digital transformation and to identify implications for the Vietnamese educational system. Using a literature review approach, the study synthesizes major perspectives on educational digital transformation, analyzes the concept and dimensions of teachers' digital competence, and explores factors influencing competence development. The findings indicate that teachers' digital competence is a multidimensional construct encompassing technological competence, pedagogical digital competence, information and media literacy, communication and collaboration competence, digital ethics and safety competence, and professional learning competence. The study further emphasizes that the development of teachers' digital competence requires continuous professional development, supportive school leadership, adequate policy frameworks, and equitable access to digital resources. Based on these findings, several implications are proposed for Vietnam, including the establishment of a national framework for teachers' digital competence, the strengthening of professional development programs, the enhancement of educational leadership capacity, the reduction of disparities in digital readiness, and the promotion of lifelong learning among teachers. The study contributes to the growing body of literature on teacher development by providing theoretical insights and practical recommendations for strengthening teachers' preparedness in the digital era.

Keywords---digital education, educational digital transformation, teacher professional development, teachers' digital competence, Vietnam.

Introduction

The twenty-first century has witnessed an unprecedented expansion of digital technologies, profoundly influencing nearly every aspect of social and economic life. Education systems around the world are undergoing significant transformations as they seek to respond to the opportunities and challenges associated with digitalization. The concept of educational digital transformation has therefore become a central concern among policymakers, researchers, and practitioners. Unlike the mere integration of technological tools into existing practices, digital transformation involves comprehensive changes in educational structures, pedagogical approaches, organizational cultures, and professional roles (OECD, 2019; Tabrizi et al., 2019).

Within this transformation process, teachers play a pivotal role. Their ability to effectively utilize digital technologies not only affects the quality of instruction but also influences students' learning experiences and outcomes. Consequently, the development of teachers' digital competence has emerged as a critical component of educational reform initiatives worldwide. Ferrari (2013) defines digital competence as the confident, critical, and

creative use of information and communication technologies for work, learning, participation, and problem-solving. In educational settings, this competence extends beyond technical skills to encompass pedagogical decision-making, digital content creation, communication, collaboration, assessment practices, and professional engagement.

Recent studies have emphasized that successful digital transformation in education depends largely on the preparedness and adaptability of teachers. [Anderson & Dron \(2011\)](#) argue that emerging pedagogical models associated with distance and online learning require teachers to adopt new instructional strategies that facilitate interaction, learner autonomy, and knowledge construction. Similarly, [Carter & Martin \(2018\)](#) highlight the importance of innovative teaching approaches that integrate digital tools to enhance student engagement and promote active learning. These perspectives suggest that teachers must continuously update their competencies to meet the evolving demands of digitally enriched learning environments.

The COVID-19 pandemic further accelerated the urgency of developing teachers' digital capacities. [Hargreaves & Fullan \(2020\)](#) note that teachers' professional capital in the post-pandemic period increasingly depends on their ability to navigate uncertainty, collaborate with colleagues, and leverage technology to support student learning. Continuous professional development has therefore become essential in enabling teachers to sustain effective practices in rapidly changing educational contexts ([Adams, 2021](#)). At the institutional level, leadership also plays a significant role in fostering digital innovation. [Navaridas-Nalda et al. \(2020\)](#), demonstrate that school leaders' strategic vision and support substantially influence the success of digital transformation initiatives within schools.

In Vietnam, digital transformation has been identified as a strategic priority in the educational sector. National policies have emphasized the application of information technology, the development of digital learning resources, and the enhancement of teachers' digital competencies to support educational modernization (Ministry of Education and Training, 2021). However, the implementation of these policies remains uneven across regions and educational levels. [Giang et al. \(2021\)](#) reported that while educational institutions increasingly recognize the importance of digital transformation, varying levels of digital readiness continue to pose significant challenges. [Dinh \(2021\)](#) further identified limitations related to infrastructure, professional training, and organizational support that may hinder the effectiveness of transformation efforts.

Although a growing body of literature has examined digital transformation and teacher development separately, there remains a need for integrative analyses that connect these themes within the Vietnamese context. In particular, greater attention should be devoted to understanding how theoretical perspectives on digital competence can inform practical strategies for teacher development and educational reform ([Chiu et al., 2024](#)).

Therefore, this paper aims to explore the theoretical foundations of teachers' development of digital competence in the context of educational digital transformation and to identify implications for Vietnam. Specifically, the study addresses the following objectives: (1) to clarify the concept and characteristics of educational digital transformation; (2) to examine existing perspectives and frameworks related to teachers' digital competence; and (3) to propose implications for enhancing teachers' digital competence development in Vietnam. By synthesizing international and national scholarship, this study seeks to contribute to ongoing discussions on preparing teachers for effective participation in the digital era.

Theoretical Background

Educational digital transformation: Concept and characteristics

Digital transformation has emerged as a comprehensive process that reshapes organizations through the strategic use of digital technologies. In the educational sector, digital transformation extends beyond the simple adoption of technological tools and involves fundamental changes in teaching, learning, assessment, governance, and institutional culture. [OECD \(2019\)](#) describes digital transformation as a multidimensional phenomenon that affects the ways individuals interact, acquire knowledge, and participate in social and economic activities. Similarly, [Tabrizi et al. \(2019\)](#) argue that successful digital transformation is not primarily about technology itself but rather about changing mindsets, processes, and organizational practices to generate meaningful improvement.

In educational contexts, digital transformation encompasses the redesign of learning environments to promote flexibility, accessibility, collaboration, and learner-centered approaches. [Selwyn \(2012\)](#) emphasizes that education in a digital world requires critical consideration of how technologies shape educational opportunities, relationships, and inequalities. Therefore, digital transformation should not be understood solely as the digitization of existing practices but as a process of pedagogical innovation supported by technology.

Several characteristics distinguish educational digital transformation. First, it promotes the integration of digital technologies into curriculum design, instructional delivery, and assessment practices. Second, it facilitates

personalized and lifelong learning by enabling learners to access diverse educational resources beyond traditional classroom settings. Third, it encourages collaborative knowledge construction through online communication and networking platforms. Finally, digital transformation requires systemic change involving leadership, policy support, infrastructure development, and professional learning opportunities (Bygstad et al., 2022).

The transformation of educational systems has also led to the emergence of new pedagogical models. Anderson & Dron (2011) identified three generations of distance education pedagogy, namely cognitive behaviorist, social constructivist, and connectivist approaches, each reflecting different understandings of how technology can support learning. Contemporary educational practices increasingly draw upon learner-centered and collaborative principles, highlighting the need for teachers to adopt more flexible instructional roles.

In Vietnam, educational digital transformation has become a national priority aimed at modernizing educational management and improving the quality of teaching and learning. The Ministry of Education and Training (2021) has outlined strategies to promote digital infrastructure, develop digital learning resources, and strengthen the digital competencies of educational personnel. However, achieving these goals requires substantial investment not only in technological resources but also in human capacity development.

Teachers' digital competence: Concept and dimensions

The increasing integration of digital technologies into education has elevated digital competence to one of the essential competencies for teachers in the twenty-first century. While numerous definitions have been proposed, most scholars agree that teachers' digital competence involves more than operational proficiency in using technological devices. Instead, it encompasses the knowledge, skills, attitudes, and ethical considerations necessary for the effective and responsible use of digital technologies in professional practice.

Ferrari (2013), through the DigComp framework developed by the European Commission, conceptualizes digital competence as the confident, critical, and creative use of digital technologies for learning, employment, participation, and problem-solving. The framework identifies five broad areas of competence: information and data literacy; communication and collaboration; digital content creation; safety; and problem-solving. Although DigComp was originally designed for citizens in general, its principles have significantly influenced teacher competence frameworks across different educational contexts.

Applied to the teaching profession, digital competence requires educators to integrate technological knowledge with pedagogical expertise. Teachers need to identify appropriate digital tools that align with instructional objectives, facilitate meaningful student engagement, and support assessment practices. Carter & Martin (2018) suggest that innovative teaching in the digital age involves rethinking traditional instructional strategies to capitalize on the affordances of technology for active and interactive learning.

Furthermore, teachers' digital competence encompasses the capacity for professional collaboration and continuous learning. Digital technologies provide opportunities for educators to participate in professional learning communities, access educational resources, and engage in reflective practices. Adams (2021) emphasizes that continuous professional development is essential for helping teachers adapt to evolving technological landscapes and sustain effective pedagogical practices.

Drawing upon existing literature, teachers' digital competence may be understood through several interrelated dimensions:

First, technological competence refers to the ability to operate and manage digital devices, software applications, and online platforms effectively.

Second, pedagogical digital competence involves the selection and implementation of appropriate digital tools to support teaching, learning, and assessment processes.

Third, information and media literacy includes the ability to locate, evaluate, organize, and ethically use digital information.

Fourth, communication and collaboration competence reflects teachers' capacity to interact with students, colleagues, and other stakeholders through digital environments.

Fifth, digital ethics and safety competence encompasses responsible technology use, privacy protection, cybersecurity awareness, and the promotion of positive digital citizenship among learners.

Finally, professional learning competence refers to teachers' willingness and ability to continuously update their knowledge and skills through formal and informal learning opportunities.

These dimensions highlight the multidimensional nature of digital competence and underscore the importance of adopting comprehensive approaches to teacher development rather than focusing exclusively on technical training.

Teachers' digital competence development in the context of digital transformation

The development of teachers' digital competence is a dynamic and ongoing process influenced by individual, institutional, and systemic factors. As educational environments continue to evolve, teachers are expected not only to acquire new technological skills but also to transform their pedagogical beliefs and professional identities.

Continuous professional development represents one of the most important mechanisms for strengthening teachers' digital competence. Adams (2021) argues that professional learning initiatives should move beyond one-time training workshops toward sustained, collaborative, and practice-oriented models. Effective professional development opportunities typically include mentoring, peer learning, action research, reflective practice, and ongoing support tailored to teachers' specific needs.

In addition, Hargreaves & Fullan (2020) emphasize the significance of professional capital in fostering educational improvement. Human capital, social capital, and decisional capital collectively contribute to teachers' capacity to respond effectively to emerging challenges. Within the context of digital transformation, these forms of capital enable teachers to share expertise, build professional networks, and make informed pedagogical decisions regarding technology integration.

Institutional leadership also exerts a considerable influence on teachers' competence development. According to Navaridas-Nalda et al. (2020), school leaders play a strategic role in establishing a shared vision for digital transformation, allocating resources, encouraging innovation, and creating supportive environments for professional learning. Schools characterized by collaborative cultures and strong leadership are more likely to facilitate sustainable changes in teachers' practices.

Nevertheless, the development of teachers' digital competence faces several challenges. Limited access to technological infrastructure, insufficient training opportunities, resistance to change, workload pressures, and disparities in digital readiness may hinder teachers' ability to adopt innovative practices effectively. These barriers are particularly evident in developing educational systems where resource constraints and contextual differences influence implementation outcomes (Vu, 2025).

Consequently, enhancing teachers' digital competence requires coordinated efforts at multiple levels. Policymakers should establish clear competence standards and provide enabling conditions for professional learning. Educational institutions should foster cultures of innovation and collaboration. Teachers themselves should engage in lifelong learning to continuously adapt to changing educational demands.

The success of educational digital transformation ultimately depends on the extent to which teachers are empowered to navigate technological change with confidence, critical awareness, and pedagogical purpose. Developing teachers' digital competence should therefore be regarded not as an isolated intervention but as a strategic investment in the future of education.

Implications for Teachers' Digital Competence Development in Vietnam

Establishing a national framework for teachers' digital competence

A clear and contextually appropriate framework is essential for guiding teacher preparation, professional development, and performance evaluation. Although international frameworks such as DigComp provide valuable references, Vietnam should develop a national framework that reflects its educational priorities, technological conditions, and cultural context.

Such a framework should define the core competencies expected of teachers at different stages of their careers. These competencies may include information literacy, digital pedagogy, digital assessment, online communication, digital ethics, and continuous professional learning. Clearly articulated standards can support universities, teacher education institutions, and schools in designing targeted training programs and monitoring teachers' professional growth.

Moreover, the framework should emphasize progression across different proficiency levels. This approach would recognize the diversity of teachers' existing capacities and provide pathways for gradual competence development.

Strengthening continuous professional development programs

Continuous professional development plays a crucial role in helping teachers adapt to rapid technological changes. Traditional training models that focus primarily on short-term workshops are often insufficient to promote

sustainable improvements in practice. Instead, professional learning opportunities should be ongoing, collaborative, and closely connected to teachers' classroom experiences.

Educational authorities and schools should encourage various forms of professional development, including peer mentoring, professional learning communities, online courses, action research, and reflective practice. Digital platforms can further expand access to professional learning resources, particularly for teachers working in geographically disadvantaged areas.

Professional development programs should also prioritize pedagogical applications of technology rather than merely technical skills. Teachers need opportunities to explore how digital tools can support student engagement, differentiation, assessment, and collaborative learning. Training initiatives should therefore integrate technological, pedagogical, and contextual considerations.

Enhancing the role of educational leadership

School leaders are important agents in promoting educational innovation and creating supportive environments for teachers' professional growth. Effective leadership can facilitate the successful adoption of digital transformation initiatives by establishing a shared vision, encouraging experimentation, and ensuring the availability of necessary resources.

Principals and other educational leaders should actively promote collaborative cultures in which teachers feel encouraged to exchange experiences, discuss challenges, and develop innovative practices. Leadership development programs should therefore incorporate competencies related to digital transformation management, change leadership, and strategic planning.

In addition, leaders should recognize teachers' efforts in implementing digital innovations and provide constructive feedback to sustain motivation and commitment. Building a positive organizational climate is particularly important during periods of educational change.

Reducing disparities in digital readiness

One of the major challenges facing educational digital transformation in Vietnam is the uneven distribution of technological resources and professional learning opportunities across regions and educational settings. Teachers working in rural, mountainous, or socioeconomically disadvantaged areas may encounter significant barriers to developing their digital competence.

Addressing these disparities requires equitable investment in digital infrastructure, including internet connectivity, hardware, and educational software. At the same time, policymakers should ensure that professional development opportunities are accessible to teachers regardless of geographical location. The expansion of online learning platforms and blended training models may contribute to reducing these inequalities.

Special attention should also be devoted to supporting teachers who experience difficulties adapting to technological changes. Personalized guidance and differentiated professional learning pathways can help ensure that no teachers are left behind during the transformation process.

Promoting a culture of lifelong learning among teachers

Digital transformation is characterized by continuous innovation and uncertainty. Consequently, teachers' digital competence cannot be viewed as a fixed set of skills acquired through initial training. Instead, it should be understood as a lifelong developmental process.

Teachers should be encouraged to adopt proactive attitudes toward learning, experimentation, and self-improvement. Participation in professional networks, engagement with educational research, and exploration of emerging technologies can contribute to sustained professional growth.

Teacher education institutions also have an important responsibility in fostering lifelong learning dispositions among pre-service teachers. Preparing future educators for continuous adaptation may prove equally important as equipping them with current technological competencies.

Conclusion

Educational digital transformation presents both opportunities and challenges for contemporary education systems. Within this context, teachers' digital competence has become an indispensable component of professional practice, enabling educators to effectively integrate technology into teaching and learning processes.

This paper has examined the theoretical foundations of educational digital transformation and explored the multidimensional nature of teachers' digital competence. The analysis demonstrates that digital competence extends beyond technical proficiency to include pedagogical application, information literacy, communication, ethical awareness, and commitment to continuous professional development. The study also highlights the importance of institutional leadership, collaborative professional cultures, and supportive policy environments in facilitating teachers' competence development.

For Vietnam, enhancing teachers' digital competence should be regarded as a strategic investment in educational quality and sustainability. Establishing national competence frameworks, strengthening professional development systems, promoting leadership capacity, reducing inequalities in digital access, and fostering lifelong learning cultures represent important directions for future action.

As educational technologies continue to evolve, the ability of teachers to respond creatively and critically to change will significantly influence the success of digital transformation initiatives. Therefore, supporting teachers in developing the competencies required for the digital era should remain a central priority for educational policymakers, institutions, and practitioners.

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