

DEVELOPING DIGITAL CAPACITY FOR TEACHERS AND EDUCATIONAL MANAGERS IN HIGH SCHOOLS IN VIETNAM

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INFORMATION	ABSTRACT
<p><i>Received: 10/07/2025</i> <i>Revised: 16/08/2025</i> <i>Accepted for publication: 18/8/2025</i> <i>Code: TCKH-S03T08-2025-B16</i> <i>ISSN: 2354 - 0788</i></p> <p>Keywords: <i>Digital competence, teachers, educational managers, high schools, Vietnam .</i></p>	<p><i>This study investigates the development of digital competency among teachers and educational administrators in high schools in Vietnam. Using a mixed-methods approach combining qualitative and quantitative methods, the research surveyed 264 participants and analyzed relevant documents on digital competency development models. The results indicate that most participants possess basic knowledge of digital technology but their practical application skills and advanced usage of digital tools remain limited. The study proposes eight solutions, including enhancing digital skills training, improving technological infrastructure, developing programs to support information security, organizing professional workshops and encouraging the application of technology in teaching and management. These recommendations aim to strengthen the capacity of teachers and administrators, improve teaching quality, optimize administrative processes and foster a digitally competent learning environment for students.</i></p>

1. Introduction

Amidst the rapid advancement of the Fourth Industrial Revolution, digital technology has become an indispensable component across all sectors of life, ranging from economics and healthcare to education. Advancements in artificial intelligence, big data and the Internet of Things (IoT) have not only driven innovation in various industries but have also imposed new demands on educational systems. In this context, equipping teachers and educational managers with digital competencies is a critical factor to ensure rapid adaptation to digitalization trends and to meet the demands of workforce training in the new era. The application of digital technology extends beyond mere instructional

tools such as presentation software or online learning platforms; it also opens opportunities to develop advanced teaching methods such as data-driven learning, personalized learning pathways and assessment of learning outcomes based on data analytics. However, to effectively apply digital technology in teaching and management, teachers and educational administrators need not only solid basic technological knowledge but also proficiency in advanced application skills, along with a readiness to innovate in management thinking and teaching methods; thus, building digital competencies among teachers and education managers is a vital responsibility for educational institutions and the sector at large. This study is

conducted to contribute, albeit modestly, towards fulfilling that mission. The specific objective of this research is to assess the development level of digital competencies among teachers and education managers in high schools, thereby proposing solutions to enhance their digital skills to better adapt to the digitalization context. The study will focus on surveying the knowledge and technological application skills of teachers and managers, identifying factors influencing digital competence and recommending measures to strengthen digital capacity. The findings from this study are expected to assist educational management authorities in developing appropriate training and professional development programs, while simultaneously improving the effectiveness of technology integration in teaching and administration at high schools across southern provinces. Furthermore, this research may serve as a foundation for implementing digital competency development models for teachers and education managers in other provinces nationwide.

2. Literature review

Digital competence in education refers to the ability to utilize information and communication technology to enhance the quality of teaching and educational management. According to Krumsvik (2007), digital competence encompasses not only the use of technological tools but also their effective application in teaching and learning processes. The model for developing teachers' digital competence proposed by Põldoja et al. (2011) focuses on key areas such as designing learning environments, modeling digital democracy and professional development. Ferrari (2013) expanded the concept to include skills related to information, communication, production, digital safety and problem solving, emphasizing the crucial role of problem-solving skills that enable teachers and

educational managers to apply technology in addressing complex educational situations.

The United Nations educational, Scientific and Cultural organization (UNESCO, 2011) proposed a digital competence framework applicable to both teachers and educational managers, concentrating on elements such as policy, curriculum and learning environments. Studies by Tomte, Karstein and Olsen (2013) and Lund et al. (2014) emphasized that educational managers need digital skills to support teachers in integrating technology into instruction. Similarly, Gudmundsdottir, Loftsgarden and Ottestad (2014) highlighted that teachers' professional competence in the digital age requires continuous development and adaptation to new technological contexts.

More recently, the International society for Technology in Education (ISTE, 2021) developed a set of digital competence standards for teachers, including personal digital competence development, designing learning activities and using data to improve teaching quality. Blanc et al. (2025) and Domínguez-González et al. (2025) emphasized the importance of transversal problem-solving skills and strategic planning for teachers' digital competence. Research by Liu and Xu (2025) provides a comprehensive analysis of trends in teachers' digital literacy, highlighting the increasing integration of advanced technologies in education.

In specific regional contexts, studies have addressed digital competence in emerging educational systems. Hong and Jiang (2025) examined factors influencing foreign language teachers' digital competence in Chinese universities, while Le and Ho (2025) explored the use of large language models for educational management in low-resource settings. In Vietnam, Nguyen and Tran (2025) investigated opportunities and challenges in digital transformation and Nguyen and Le (2025)

assessed the digital management capacity of high school principals in the Mekong Delta. Additionally, Pham and Do (2022) analyzed Vietnamese high schools' readiness for digital transformation and Suparno and Pujianto (2025) proposed strategies to improve teachers' digital competence through school management reforms.

Despite growing research on digital competence in education, several gaps remain that justify this study. First, most studies primarily focus on teachers' digital skills, while the digital competence of educational managers—such as principals and department heads—has been examined to a much lesser extent (Nguyen & Le, 2025; Pham & Do, 2022). Second, few studies investigate the interaction between teachers and educational managers in digital environments, particularly regarding how managerial support can enhance teachers' digital competence (Le & Ho, 2025; Nguyen & Tran, 2025). Third, there is limited empirical data in the context of Vietnamese high schools, which constrains the generalizability of findings from international studies (Nguyen & Tran, 2025; Suparno & Pujianto, 2025). Finally, while international frameworks and strategies for developing digital competence exist (UNESCO, 2011; ISTE, 2021), evidence on their effectiveness in real-world school settings in Vietnam is scarce.

Addressing these gaps, this study focuses on evaluating and enhancing the digital capacity of both teachers and educational managers in high schools in Vietnam, aiming to provide practical insights for implementing effective digital competence development strategies.

3. Research methodology

3.1. Research design and Data collection instrument

This study employed a descriptive and qualitative analytical approach combined with a survey method. The primary data collection instrument was a structured questionnaire developed to assess participants' digital competence, factors influencing its development

and the necessity and feasibility of strategies to enhance digital competence. The questionnaire consisted of 28 items, including questions on personal information organized into four domains: digital knowledge and skills, information and data management, problem-solving and strategic planning and digital collaboration and leadership. Items were measured using a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree). The questionnaire was developed based on existing frameworks (UNESCO, 2011; ISTE, 2021) and adapted to the Vietnamese educational context through expert review and a pilot test with 20 participants to ensure clarity and relevance.

3.2. Sampling and Recruiting process

The survey targeted participants of the management training courses at the Institute of Education Management in Ho Chi Minh City (IEMH). A total of 264 participants completed the survey. All participants were recruited using online invitations via Google Forms distributed to attendees of the training courses. Participation was voluntary and all respondents provided informed consent. This approach ensured that the sample consisted of individuals with relevant experience and active engagement in educational management training.

3.3. Data analysis methods and Implementation procedure

After data collection, the data were processed and analyzed using statistical methods. Descriptive analysis was conducted to summarize and describe the characteristics of participants' responses, providing an overview of trends and patterns in digital competence among the training course attendees. Reliability analysis was performed using Cronbach's Alpha to evaluate the internal consistency and reliability of the measurement scales. The results indicated high reliability across all scales: the first scale with five items yielded $\alpha = 0.891$, the second scale with eight items yielded $\alpha = 0.924$ and the third scale with five items yielded $\alpha = 0.947$.

The reliability analysis showed high internal consistency across all measurement scales. While values above 0.9 can sometimes indicate that items are highly similar, in this study these results confirm that the questionnaire items consistently and reliably measure the intended constructs, ensuring the validity of the data for further analysis.

The study followed a systematic implementation procedure, including designing and piloting the questionnaire, administering the survey via Google Forms, collecting and processing data and analyzing and presenting the research results. This structured approach ensured accurate and reliable data interpretation.

3.4. Strengths and weaknesses of the chosen method

The methodology offers several strengths. Using a structured questionnaire allowed data collection from a large number of participants attending the training courses, providing a comprehensive overview of digital competence levels. The survey enabled quantitative assessment across multiple dimensions, while descriptive and qualitative analysis facilitated a clear understanding of trends and patterns in the data. The high Cronbach's Alpha values further demonstrate the reliability of the measurement scales.

However, there are inherent limitations. Self-reported data may introduce response bias and the survey may not capture in-depth reasoning or contextual factors behind participants' answers. Additionally, using Google Forms and recruiting only from the training courses limits the generalizability of the findings to other educational contexts. Acknowledging these strengths and weaknesses ensures transparency and allows readers to interpret the results with appropriate caution.

4. Results and Discussion

4.1. Results

To assist respondents in accurately assessing the necessity and feasibility of

solutions aimed at enhancing the digital competence of teachers and educational managers, this study expands on the current status of support for digital competence development within institutions, as well as factors influencing the development of digital competence in teaching and management. Based on their understanding of the working environment and available training programs, teachers and educational managers can gain a clearer perspective on their current digital competence and more easily validate the relevance of the proposed solutions. Therefore, the research results focus on three main issues:

The current status of support for digital competence development for teachers and educational managers in surveyed high schools in southern Vietnam;

The current digital competence of educational managers and teachers as assessed through the survey;

Solutions to enhance digital competence for teachers and educational managers in high schools in southern Vietnam.

Result 1: The current status of support for digital competence development for teachers and educational managers in the surveyed high schools.

The survey results regarding the current status of digital competence development support for teachers and educational managers at schools depict an overall picture of the implementation level of activities aimed at enhancing digital competence. Specifically, the item assessing whether the school has promoted the application of digital technology in school management and administrative activities to encourage digital competence development (Question 2.1) received a mean score of 2.77 (Standard deviation 1.111), indicating that despite efforts to apply digital technology, the outcomes have not yet been highly effective in improving the digital competence of teachers and educational managers.

Table 1. Description of the current status of support for digital competence development for teachers and educational managers

Item No.	Statement	N	Mean	Std. Deviation	Variance
Q2.1	The school has promoted the application of digital technology in school management and administrative activities to encourage the development of digital competence.	262	2.77	1.118	1.250
Q2.2	The school has established a flexible and creative working and learning environment supplemented by online platforms to foster the enhancement of digital competence among teachers and educational managers.	260	2.69	1.079	1.164
Q2.3	The school has significantly restructured its organization to support the application of digital technology and the improvement of digital competence.	261	2.71	1.078	1.161
Q2.4	The school has organized continuous, effective and goal-oriented training programs to enhance the digital competence of teachers and educational managers.	258	2.69	1.132	1.282
Q2.5	The school has established appropriate reward policies for teachers and educational managers who have made significant contributions to the unit's digitalization efforts.	259	2.85	1.146	1.314

Similarly, the question regarding the establishment of a flexible and creative working and learning environment supplemented by online platforms to foster digital competence enhancement (Question 2.2) yielded a mean score of 2.70 (standard deviation 1.074), suggesting that the schools still lack a conducive learning and working environment to improve the digital skills of teachers and educational managers.

Regarding organizational restructuring to support digital competence development (Question 2.3), the mean score was 2.72 (Standard deviation 1.082), reflecting that although adjustments have been made, they are not yet sufficiently robust to effectively support the enhancement of digital competence in teaching and management.

Continuous training programs aimed at improving digital competence for teachers and educational managers (Question 2.4) scored a mean of 2.69 (Standard deviation 1.131), indicating that these courses still do not fully

meet the needs for digital competence development.

Finally, the question on reward policies for individuals who have made significant contributions to the effectiveness of digital transformation (Question 2.5) received a mean score of 2.86 (Standard deviation 1.151), suggesting that while reward systems have been established, they have not yet created strong motivation for teachers and educational managers to promote digital transformation and enhance digital competence.

Overall, the evaluation of activities supporting digital competence development for teachers and educational managers reveals that programs and policies have been implemented but have not achieved the expected level of effectiveness, highlighting several gaps in the development of digital competence within schools.

Result 2: Current digital competence of educational managers and teachers based on survey

Table 2. Assessment of digital competence of teachers and educational managers

Item No.	Statement	N	Mean	Std. Deviation	Variance
Q3.1	Competence in using digital platforms for communication and collaboration	262	3.60	1.098	1.206
Q3.2	Competence in searching, evaluating, and using information online	262	3.54	1.113	1.238
Q3.3	Competence in information security and personal data management	261	3.52	1.069	1.143
Q3.4	Competence in using basic digital tools and devices	260	3.67	1.031	1.063
Q3.5	Competence in understanding the social impact of technology	261	3.62	1.006	1.012

Table 2 presents the research results assessing the digital competence of educational managers and teachers. The data depict a relatively balanced self-assessment across various digital skill domains. Among the competencies surveyed, the ability to use basic digital tools and devices received the highest mean score of 3.67, indicating that most educational managers and teachers feel confident in using fundamental technological tools.

Following closely is the competence in using digital platforms for communication and collaboration, with a mean score of 3.60, reflecting a high level of readiness to apply digital platforms for communication and teamwork. Items related to understanding the social impact of technology (mean = 3.62) and competence in searching, evaluating and using online information (mean = 3.54) also scored fairly well, indicating relatively good awareness and use of technology in these areas.

However, the competence in information security and personal data management received the lowest mean score of 3.52, suggesting that this is an area where educational managers and teachers feel less confident and require improvement. Notably, the standard deviation and variance indices indicate moderate

dispersion in the responses, with the lowest standard deviation observed in the competence related to understanding the social impact of technology (1.006), reflecting a high level of consensus regarding the awareness of technology's societal effects.

In contrast, the competence in information security shows a higher standard deviation (1.069), indicating greater variability in individuals' confidence levels in this domain. Although most competencies achieved moderate average scores, these results reveal a gap between the current reality and the expected level of digital competence among educational managers and teachers.

Overall, the survey findings indicate that the digital competence of educational managers and teachers in the surveyed high schools is relatively uniform. However, specific areas, particularly information security and online information literacy, were identified as needing targeted improvement. This implies the need to develop training and professional development programs that prioritize these weaker areas to meet the increasing demands for digital competence in modern educational environments.

Result 3: Solutions to Enhance digital competence for Teachers and Educational managers in high schools in Southern Vietnam.

Table 3. Description of the perceived necessity of Solutions to enhance digital competence for Teachers and Educational managers

Item Code	Solution Description	N	Mean	Std. Deviation	Variance
GP1	Strengthening training on digital technology skills and raising awareness about information security.	261	3.76	0.863	0.745
GP2	Developing training programs on the ability to search for and process information online.	260	3.77	0.804	0.647
GP3	Providing training on information security and personal data protection during the digital transformation process.	261	3.74	0.786	0.618
GP4	Integrating online communication tools into teaching and scientific research activities.	261	3.79	0.820	0.672
GP5	Establishing reward policies to encourage the adoption of digital technology in education.	259	3.78	0.819	0.671
GP6	Developing a flexible learning environment supported by online platforms.	259	3.78	0.785	0.616
GP7	Improving technological infrastructure to meet teaching and management needs through digital platforms.	261	3.75	0.828	0.686
GP8	Implementing support programs to improve access to digital technology in disadvantaged areas.	262	3.77	0.719	0.516

The results from table 3 (Description of the feasibility of proposed solutions for developing digital competence for educational managers and teachers in high schools) and table 4 (Description of the feasibility of proposed solutions for developing digital competence for educational managers and teachers in high schools) provide a comprehensive overview of the perceived necessity and feasibility of solutions aimed at enhancing the digital competence of teachers and educational managers in the context of digital transformation. These solutions were rated highly in both necessity and feasibility, reflecting a consensus among respondents regarding the importance of improving digital competence in the educational environment.

Firstly, regarding necessity, solutions related to training and improving digital technology skills received very high ratings. Solution 4, "Integrating online communication tools into teaching and scientific research" achieved the highest mean score of 3.79,

indicating a strong perceived need for the integration of technology into teaching and research activities. Following closely were Solution 2, "Developing training programs on the ability to search for and process online information" (mean = 3.77) and Solution 8, "Implementing support programs to improve access to digital technology in disadvantaged areas" (mean = 3.77), which reflect particular concern for enhancing access to and use of digital technology, especially in underserved regions. Additionally, solutions related to information security, such as Solution 3, "Training on information security and personal data protection during digital transformation" (mean = 3.74), also received high necessity ratings, emphasizing the essential role of data protection in digital environments.

Regarding feasibility, all solutions were considered implementable. Solution 4 again received the highest feasibility rating with a mean of 3.78, confirming the practical viability of integrating online communication tools into

teaching and research. Solutions 1, "Strengthening training on digital technology skills and raising awareness of information security" (mean = 3.73) and 3, "Training on information security and personal data protection during digital transformation" (mean = 3.76), were also regarded as feasible for implementation.

However, some solutions such as Solution 7, "Improving technological infrastructure to meet teaching and management needs via digital platforms" (mean = 3.63) and Solution 8, "Implementing support programs to improve access to digital technology in disadvantaged

areas" (mean = 3.59), received comparatively lower feasibility scores. This suggests potential challenges in implementing these solutions, particularly concerning infrastructure development and improving technology access in remote or disadvantaged areas. In summary, the survey results indicate that solutions for enhancing digital competence among teachers and educational managers are widely regarded as both necessary and feasible, especially those related to training and technology utilization. Nonetheless, improving infrastructure and expanding access to technology in underserved areas remain significant challenges that must be addressed in future efforts.

Table 4. Description of the feasibility of proposed solutions for developing digital competence for educational managers and teachers in high schools

Item Code	Solution Description	N	Mean	Std. Deviation	Variance
GP1	Strengthening training on digital technology skills and raising awareness about information security.	263	3.73	0.750	0.562
GP2	Developing training programs on the ability to search for and process information online.	262	3.71	0.742	0.550
GP3	Providing training on information security and personal data protection during the digital transformation process.	263	3.76	0.741	0.549
GP4	Integrating online communication tools into teaching and scientific research activities.	261	3.78	0.777	0.604
GP5	Establishing reward policies to encourage the adoption of digital technology in education.	261	3.74	0.750	0.563
GP6	Developing a flexible learning environment supported by online platforms.	261	3.75	0.727	0.528
GP7	Improving technological infrastructure to meet teaching and management needs through digital platforms.	263	3.63	0.770	0.592
GP8	Implementing support programs to improve access to digital technology in disadvantaged areas.	264	3.59	0.719	0.517

4.2. Discussion

Digital competence in education today encompasses not only the ability to use information and communication technologies but also the effective application of these technologies in teaching and educational management. This is clearly reflected in digital competence models such as those proposed by Krumsvik (2007) and Põldoja et al. (2011), where digital competence includes not only tool

usage but also the capacity to design and manage digital learning environments, apply technology in teaching and engage in continuous professional development. These factors play a crucial role in improving educational quality, particularly within the current context of comprehensive digital transformation.

Survey results indicate that among solutions for enhancing the digital competence of teachers and educational managers, elements such as

training on information security, integrating online communication tools in teaching and developing flexible learning environments received strong consensus from participants. Specifically, the item related to strengthening training on digital technology skills and raising awareness of information security achieved a mean score of 3.76, highlighting both the necessity and feasibility of this approach for teachers and educational managers. Notably, in the context of digital transformation, the aspect of “problem solving” through technology, emphasized by Ferrari (2013), is highly significant. Our survey results also demonstrate a clear trend that both teachers and educational managers recognize the role of technology in addressing complex educational situations. This aligns with previous research perspectives from UNESCO (2011) and the International Society for Technology in Education (ISTE, 2021), which assert that equipping teachers and managers with problem-solving skills mediated by technology enhances their effectiveness in teaching and management.

However, a notable gap remains unaddressed in current research regarding the digital competence of educational managers. While most studies focus primarily on teachers, research on the digital competence of educational managers is still limited. Our survey findings also reveal that although there is high agreement on the feasibility of solutions aimed at enhancing teachers’ digital competence, some educational managers still lack the necessary skills and knowledge to apply technology effectively in administrative management and teaching. This situation underscores an urgent need to develop specialized training programs targeted specifically at educational managers, enabling them to lead and promote digital transformation within educational institutions. Furthermore, the development of digital competence models and frameworks for both teachers and educational managers will play an important role in enhancing the effectiveness of

the digital transformation process. Survey respondents also strongly supported improving technological infrastructure and establishing reward policies to encourage technology adoption. These factors are essential for building a modern, flexible and efficient educational system in the digital era. In summary, developing digital competence not only helps teachers improve instructional quality but also facilitates educational managers in enhancing management strategies, thereby creating better learning environments for students. Future research should focus on developing digital competence frameworks and studying the interactions between teachers and educational managers, thereby fostering the digital transformation of education.

5. Conclusion and recommendations

5.1. Conclusion

The research results indicate that the digital transformation process in high schools in the southern provinces has made significant progress but still faces many challenges. The application of digital technology in teaching and educational management has helped create a more flexible and creative learning environment, while improving management effectiveness. However, the development of digital competence among educational managers and teachers remains uneven and insufficient to meet practical demands. Factors such as supportive policies, infrastructure and training programs need to be further strengthened and improved.

Digital competence encompasses not only proficiency in using technological tools but also the ability to effectively apply them in teaching, management, and solving complex educational situations. The lack of such competence, especially among educational managers, is a major barrier to comprehensive digital transformation. Therefore, developing digital competence for both teachers and educational managers is a key task to ensure successful

technology integration, improve education quality and build a modern, efficient and sustainable learning environment.

5.2. Recommendations

Based on the survey results and analysis, the study proposes the following specific solutions and recommendations to enhance digital competence for educational managers and teachers in high schools:

Provide continuous training and professional development: Organize intensive training courses on digital technology skills, information security and data management for educational managers and teachers, while raising awareness of the importance of information safety in digital environments.

Develop digital skills training programs: Design and implement regular training programs on skills for searching, evaluating and effectively using online information, tailored to the practical needs of teachers and educational managers.

Support digital learning environments: Encourage the development of flexible and creative learning environments based on online platforms, enabling students and teachers to access and participate in learning anytime and anywhere.

Improve technology infrastructure: Invest in upgrading network systems, devices and software to meet the needs of digital teaching

and management, ensuring stability and operational efficiency.

Draw up incentive and reward policies: Establish policies to reward and motivate educational managers and teachers to actively apply digital technology in teaching and management, fostering sustainable development.

Enhance support for disadvantaged areas: Implement programs to improve digital technology accessibility in schools located in disadvantaged areas, ensuring equity in digital transformation across the education system.

Develop digital competence frameworks: Build and refine digital competence frameworks for both teachers and educational managers, focusing on essential skills for effective application of digital technology in education and management.

Strengthen collaboration and sharing: Promote close cooperation among education authorities, schools and professional organizations to facilitate experience sharing, resource pooling and technology exchange, thus enhancing the effectiveness of digital transformation.

The synchronized implementation of these solutions will lay a solid foundation, accelerate digital transformation in education, improve teaching and learning quality and prepare teachers and educational managers to meet the demands of the digital era.

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