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The Influence of Factors on the Development of Digital Competence through Teaching among Students of the Faculty of Education, Tay Nguyen University

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Abstract: This study examines the current situation and evaluates factors influencing the development of digital competence (DC) through teaching among students of the Faculty of Education, Tay Nguyen University, amid digital transformation and the Fourth Industrial Revolution. The survey was conducted during the second semester of the 2025–2026 academic year and involved 40 administrators and lecturers, as well as 570 second-, third-, and fourth-year students majoring in Primary Education and Literature Teacher Education. The results show that the development of students' DC through teaching is currently rated as "satisfactory," with more than 60% of respondents selecting this rating. The most effective approaches to developing DC are lecturers' teaching activities (identified by 90% of administrators and lecturers and 72.28% of students) and students' self-directed learning and independent research (82.5% and 70.70%, respectively). Regarding influencing factors, the most significant subjective factors are lecturers' digital competence (92.5% of administrators and lecturers; 76.49% of students) and lecturers' teaching methods (77.5% and 80.88%, respectively). The most significant objective factors are the university's physical facilities and equipment (95% of administrators and lecturers; 91.23% of students) and the teacher education curriculum (80% and 87.19%, respectively). Despite progress, the development of DC continues to face challenges, including outdated and poorly integrated IT infrastructure, a lack of specialized software, and the absence of a dedicated digital competence framework for student teachers.

Keywords: digital competence, teaching, students of the Faculty of Education, Tay Nguyen University, digital transformation in education, physical facilities, teaching methods.

1. Introduction

In the early decades of the twenty-first century, the rapid development of digital technology and the advent of the Fourth Industrial Revolution have presented new challenges for Vietnamese education in general and higher education in particular. These challenges call for sustained efforts to keep pace with the times and participate in the development of a "knowledge economy."

UNESCO defines digital competence as "the ability to access, manage, understand, integrate, communicate, evaluate, and create information safely and appropriately through digital technologies, for tasks ranging from simple to complex, as well as for entrepreneurship. Digital competence is an integration of computer competence, information technology competence, information literacy, and communication competence" [10].

To implement the Politburo's resolution on a number of policies and guidelines for proactively participating in the Fourth Industrial Revolution, on June 3, 2020, the Prime Minister issued Decision No. 749/QĐ-TTg, approving the National Digital Transformation Program through 2025, with orientations toward 2030 [5]. On January 25, 2022, the Prime Minister issued Decision No. 131/QĐ-TTg, approving the project "Strengthening the Application of Information Technology and Digital Transformation in Education and Training for 2022–2025, with Orientations toward 2030." The project aims to harness technological advances to promote innovation in teaching and learning, improve the quality and accessibility of education, and enhance the effectiveness of educational management [6]. On May 10, 2022, the Ministry of Education and Training issued Decision No. 1282/QĐ-BGDĐT, promulgating its "Plan to Strengthen the Application of Information Technology and Digital Transformation in Education and Training for 2022–2025." This further affirmed that applying information technology and undertaking digital transformation are critically important for the education sector today [2].

In response to the need for educational reform amid the Fourth Industrial Revolution, the Prime Minister approved the project "Enhancing the Capacity of Lecturers and Managers at Higher Education Institutions to Meet the Requirements of Fundamental and Comprehensive Education and Training Reform for 2019–2030" [4]. The profound impact of the Fourth Industrial Revolution on education requires schools in general, and universities in particular, to revise their educational objectives and content, as well as their teaching methods. Online teaching and the digital tools that support instruction have significantly changed teaching and learning at universities. They have helped modernize education and promote international integration, while also raising numerous issues that require lecturers to reconsider their teaching methods to achieve the greatest possible effectiveness in higher education today [3].

Circular No. 20/2018/TT-BGDĐT, which promulgates the Professional Standards for Teachers in General Education Institutions, sets out five standards and 15 criteria. Criterion 15 addresses the "application of information technology and the utilization of technological equipment in teaching and education." This criterion can be regarded as one component of digital competence. However, the assessment of general education teachers' digital competence is not clearly addressed in the professional standards set out in Circular No. 20 [1]. Today, digital competence is considered essential for success in learning, research, and future career development [7].

2. Research Content

2.1. Research Methods

***Purpose of the survey:** To collect factual and objective data on the factors influencing the development of digital competence (DC) through teaching among students of the Faculty of Education, Tay Nguyen University.

***Survey focus:** To examine teachers' and students' views on the factors influencing the development of DC through teaching among students of the Faculty of Education, Tay Nguyen University.

***Survey participants:** The survey was conducted during the second semester of the 2025–2026 academic year at Tay Nguyen University. Participants comprised 40 lecturers and administrators, and 570 second-, third-, and fourth-year students from the Faculty of Education, majoring in Primary Education and Literature Teacher Education. The student breakdown was as follows: Primary Education—194 second-year students, 192 third-year students, and 93 fourth-year students; Literature Teacher Education—46 second-year students, 21 third-year students, and 24 fourth-year students.

***Survey methods and instruments:** The study used questionnaire surveys, interviews, and statistical methods commonly applied in educational research.

2.2. The Current Availability of Facilities and Equipment for Developing Students' Digital Competence Through Teaching at Tay Nguyen University

The current state of the facilities and equipment available to support the development of students' digital competence through teaching at Tay Nguyen University is presented in Table 1.

Table 1: Facilities and equipment available for developing students' digital competence through teaching

No.	Number of computer rooms	Number of computers	Condition
1	9	30	
2	2	40	Many are damaged
3	1	50	Many are damaged
Total	**12**	**400**	

Overall, Tay Nguyen University's facilities and equipment are relatively adequate to support the development of digital competence among students in general and students of the Faculty of Education in particular. Regarding the adequacy of facilities and equipment for developing the digital competence of Faculty of Education students through teaching, lecturers and students share the view that the university's facilities are generally sufficient for studying the courses in the curriculum, but are not yet optimal for developing students' digital competence through teaching.

The university has made considerable efforts to provide IT infrastructure, but it remains outdated compared with what is available on the market and has not kept pace with the rapid development of science and technology. Most software is unlicensed, and there is a shortage of specialist learning and teaching software. The main reason is insufficient funding for investment in digital technology infrastructure. Observations of the university's computer labs indicate that the computers and other digital devices are old and outdated, and that

the university does not yet have a learning management system (LMS) or software to support teaching and learning.

Unlike lecturers and students, administrators believe that the university's facilities and equipment are adequate for students' academic study and professional training, as well as for developing Faculty of Education students' digital competence through teaching.

However, student enrollment is increasing year by year. In the Faculty of Education alone, enrollment is projected to rise from 100 students in the 2023–2024 academic year to 200 in 2025–2026 and 250 in 2026–2027 in Early Childhood Education and Primary Education. Enrollment in the other programs—Physical Education, Literature Teacher Education, Literature, and Educational Psychology—is also increasing, by 15 to 30 students in each program. Given this growth, the existing facilities and equipment may not be sufficient to support the development of digital competence through teaching among students of the Faculty of Education, students in teacher-education programs more broadly, or the university's student body as a whole.

2.3. Current Approaches to Developing Digital Competence Through Teaching among Students of the Faculty of Education

The study examined the effectiveness of the following approaches to developing digital competence (DC) among students of the Faculty of Education: (1) teaching and learning activities; (2) students' self-directed learning and independent research; (3) pedagogical skills training and teaching practicum; (4) extracurricular activities; (5) professional development courses; and (6) other approaches. The survey results are presented in Table 2.

Table 2: Approaches to developing students' digital competence through teaching

No.	Approach	Administrators and lecturers		Students	
		No.	%	No.	%
1	Through teaching and learning activities	36	90	412	72,28
2	Through students' self-directed learning and independent research				
3	Through pedagogical skills training and teaching practicum				
4	Through extracurricular activities	23	57,5	312	54,74
5	Through professional development courses	26	65	363	63,68

The results in Table 2 show that 36 administrators and lecturers (90%) considered teaching and learning activities to be highly effective, compared with 412 students (72.28%). Students' self-directed learning and independent research were considered effective by 33 administrators and lecturers (82.5%) and 403 students (70.70%). Pedagogical skills training and the teaching practicum were identified by 29 administrators and lecturers (72.5%) and 397 students (69.65%). The remaining approaches received effectiveness ratings ranging from 57.5% to 65% among administrators and lecturers, and from 54.74% to 63.68% among students.

Both groups rated teaching and learning activities as the most effective approach, followed by students' self-directed learning and independent research, and then pedagogical skills training and the teaching practicum. Extracurricular activities were rated as the least effective of the approaches listed.

These findings are consistent with practice at universities, where the development of students' digital competence through teaching occurs primarily through the teaching activities of lecturers responsible for methodology courses and information technology courses, as well as through students' own independent learning. Specialized professional development courses on developing digital competence through teaching, as well as related extracurricular activities, are rarely organized at Tay Nguyen University.

2.4. Current Level of Implementation of Digital Competence Development Through Teaching among Students of the Faculty of Education, Tay Nguyen University

To assess the overall level of implementation of digital competence (DC) development through teaching among students of the Faculty of Education at Tay Nguyen University, the study asked: "How would you assess the university's level of implementation of DC development through teaching for students of the Faculty of Education?" Respondents could choose from five options: (1) Not implemented; (2) Below satisfactory; (3) Satisfactory; (4) Fairly good; and (5) Good.

**Administrators' and lecturers' assessments.* The survey results are presented in Table 3.

Table 3: Administrators' and lecturers' assessments of the implementation of DC development through teaching among students

No.	Level	Number	Percentag
1	Not implemented	0	0
2	Below satisfactory	3	7,5
3	Satisfactory	25	62,5
4	Fairly good	10	25
5	Good	2	5

The data in Table 3 show that more than 60% of respondents rated the implementation of DC development through teaching among Faculty of Education students at Tay Nguyen University as satisfactory. A further 25% rated it fairly good, while just over 10% rated it either below satisfactory or good. No respondents selected "not implemented."

**Students' self-assessments*

Table 4: Students' self-assessments of the implementation of DC development through teaching

No.	Level	Number	Percentage
1	Not implemented	8	1,40
2	Below satisfactory	57	10,00
3	Satisfactory	367	64,39
4	Fairly good	134	23,51
5	Good	4	0,70

The data in Table 4 show that 64.39% of surveyed students rated the implementation of DC development through teaching among Faculty of Education students at Tay Nguyen University as satisfactory, while 23.51% rated it fairly good. The remaining respondents—just over 11%—rated it as not implemented, below satisfactory, or good.

The survey findings were further verified through interviews with a number of administrators, lecturers, and students. Most interviewees said that, in recent years, in response to directives to strengthen the application of information technology and digital transformation in higher education, universities had stepped up the use of IT in teaching and learning. Most lecturers use electronic lesson plans, and some actively guide and advise students on applying digital technologies in teaching. In particular, during the COVID-19 pandemic, many universities shifted to online teaching, which also helped encourage lecturers and Faculty of Education students to develop their own digital competence.

Although DC development through teaching is being implemented for Faculty of Education students, its effectiveness remains limited, and its overall level is rated as satisfactory. The reasons cited include insufficient attention from the university, ineffective teaching and learning methods among lecturers and students, a lack of courses on applying digital technologies in teaching in the curriculum, and inadequate digital infrastructure. Most importantly, the university has established only general IT learning outcomes for all students; it has not developed digital competence standards for students in general or for Faculty of Education students in particular.

2.5. Factors Influencing the Development of Digital Competence Through Teaching among Students of the Faculty of Education, Tay Nguyen University

**Subjective factors influencing the development of digital competence through teaching among students of the Faculty of Education*

The study examined the current state of subjective factors influencing the development of digital competence (DC) through teaching among students of the Faculty of Education. The following five levels of influence were used: *(1) No influence; (2) Little influence; (3) Moderate influence; (4) Influential; and (5) Highly influential*. The survey results are presented in Table 5.

Table 5: Subjective factors

No.	Factor	Administrators and lecturers		Students	
		No.	%	No.	%
1	Faculty of Education students' awareness of developing digital competence through teaching	15	37,5	412	72,28
2	Faculty of Education students' engagement and initiative	24	60	267	46,84
3	Faculty of Education students' learning methods	29	72,5	219	38,42
4	Administrators' and lecturers' awareness of developing digital competence through teaching among student teachers	24	60	312	54,74
5	Lecturers' digital competence	37	92,5	436	76,49
6	Lecturers' teaching methods	31	77,5	461	80,88

According to the data in Table 5, administrators and lecturers identified lecturers' digital competence as a major subjective factor influencing the development of DC through teaching among Faculty of Education students. This factor was selected by 37 administrators and lecturers (92.5%) and 436 students (76.49%). The next most influential factor was lecturers' teaching methods, selected by 31 administrators and lecturers (77.5%) and 461 students (80.88%). Students' learning methods were selected by 29 administrators and lecturers (72.5%), but by only 219 students (38.42%). Conversely, only 15 administrators and lecturers (37.5%) selected students' awareness of developing digital competence through teaching, compared with 412 students (72.28%). For the remaining factors, 60% of administrators and lecturers identified them as influential, while the corresponding figures among students ranged from 38.42% to 54.74%.

Both groups agreed that lecturers' digital competence and teaching methods were the two most influential factors. This finding confirms the important role lecturers play in developing Faculty of Education students' digital competence through teaching.

**Objective factors influencing the development of digital competence through teaching among students of the Faculty of Education*

The study examined five objective factors influencing the development of DC through teaching among Faculty of Education students, using the same five levels of influence: (1) No influence; (2) Little influence; (3) Moderate influence; (4) Influential; and (5) Highly influential. The survey results are presented in Table 6.

Table 6: Objective factors

No.	Factor	Administrators and lecturers		Students	
		No.	%	No.	%
1	Teacher education curriculum	32	80	497	87.19
2	Educational reform in Vietnam amid digital transformation	24	60	242	42.46
3	Application of information technology and digital transformation at Tay Nguyen University	29	72.5	309	54.21
4	Application of information technology and digital transformation in general education schools	18	45	406	71.23
5	Facilities and equipment at Tay Nguyen University	38	95	520	91.23

The data in Table 6 show that administrators and lecturers identified the teacher education curriculum and the facilities and equipment at Tay Nguyen University as the two objective factors with the greatest influence on the development of DC through teaching among Faculty of Education students. Ratings for these factors ranged from 80% to 95% among administrators and lecturers and from 87.19% to 91.23% among students.

The application of information technology and digital transformation at Tay Nguyen University was selected by 29 administrators and lecturers (72.5%), compared with 309 students (54.21%). Conversely, the application of information technology and digital transformation in general education schools was selected by only 18 administrators and lecturers (45%), but by 406 students (71.23%). Educational reform in Vietnam amid digital transformation was identified by 24 administrators and lecturers (60%) and 242 students (42.46%).

Both groups agreed that the teacher education curriculum and the university's facilities and equipment were the two most influential factors. These findings indicate that Tay Nguyen University should review and improve its teacher education curriculum and ensure that adequate facilities and equipment are available to support the development of digital competence through teaching among students of the Faculty of Education.

2.6. Overall Assessment of the Current State of Digital Competence and Its Development in Teaching among Students of the Faculty of Education at Tay Nguyen University

***Achievements**

Amid the ongoing digital transformation and the Fourth Industrial Revolution, Tay Nguyen University has paid attention to developing digital competence among students in general and students of the Faculty of Education in particular. The key achievements are as follows:

- The University has given particular attention to developing students' digital competence, viewing it as one of the measures for building and strengthening professional competence, ensuring that Faculty of Education students meet the expected learning outcomes, and preparing them to meet teachers' professional standards and the requirements of the 2018 General Education Curriculum.

- Students' digital competence for teaching has improved over the course of their studies. This competence is positively associated with the time students spend studying at the University. Whereas second-year students' digital competence is at a basic level, it reaches an intermediate level in the third year and continues to develop to a higher level in the fourth year.

- The findings show that all component competencies within Faculty of Education students' digital competence for teaching develop during their studies at the University. Tay Nguyen University has achieved these results primarily for the following reasons:

+ Administrators, lecturers, and Faculty of Education students have a sound understanding of the importance of developing students' digital competence for teaching. Digital competence is one of the fundamental competencies required of teachers in the 21st century and therefore needs to be fostered among Faculty of Education students while they are at university.

+ Lecturers' digital competence is generally sufficient to support the development of Faculty of Education students' digital competence for teaching.

+ Faculty of Education students make efforts to develop their own digital competence. Most students use computers and digital devices for an average of two to five hours, primarily for study and social communication.

+ The approaches used to develop Faculty of Education students' digital competence for teaching are relatively coordinated and effective.

+ Advances in science and technology, together with the growing application of information and communication technology (ICT) and digital transformation in education, have created conditions forand helped drivethe University's efforts to develop students' digital competence.

***Limitations**

Despite these achievements, the development of digital competence for teaching among Faculty of Education students at Tay Nguyen University still has limitations that need to be addressed:

First, although Faculty of Education students' digital competence for teaching develops during their university studies, the level of development remains modest. Their digital competence is found to have improved, but it is only at an intermediate level and continues to have significant limitations.

Second, the development of digital competence among Faculty of Education students has not been guided by an appropriate plan or has lacked systematic planning. Efforts have focused mainly on teaching ICT as a subject in the degree program. The University and its lecturers have not addressed the question of which digital competencies for teaching students need to acquire, or how these competencies should be developed.

Third, the University's administrators, lecturers, and Faculty of Education students recognize the need to develop digital competence for teaching, but have not demonstrated an adequate level of attention to it. This is reflected in the fact that many survey respondents did not know whether the University had published a digital competence framework or an ICT competency framework, or whether it had a strategy or plan for developing ICT competence among Faculty of Education students.

The development of digital competence for teaching among Faculty of Education students at Tay Nguyen University remains limited, resulting in less-than-optimal outcomes. The main reasons are as follows:

- The University has not published expected learning outcomes for Faculty of Education students' digital competence. A framework for students' digital competence for teaching provides a basis for designing the curriculum and implementing teaching and learning aimed at developing their professional competence. However, Vietnam has not issued a digital competence framework for teachers, and universities have yet to develop and finalize a framework for Faculty of Education students' digital competence for teaching.

- Competency-based education is an advanced model used internationally, but it remains relatively new to Vietnamese universities. The way courses are taught does not clearly reflect an orientation toward developing preservice teachers' professional competencies, including digital competence for teaching.

- Collaboration between Tay Nguyen University and schools in developing students' professional competence in general, and their digital competence in particular, is not consistent, and its effectiveness remains limited.

- Students do not take sufficient initiative in developing their own digital competence for teaching. They spend more time on social media for entertainment and connecting with friends than on study. Although students acquire basic ICT knowledge through the degree program, they are not adequately taught how to apply digital technologies effectively in teaching.

- The University's student advising and support services have not given sufficient attention to developing students' digital competence in general or Faculty of Education students' digital competence for teaching in particular.

- The University's digital infrastructure has not been adequately equipped in a comprehensive, coordinated, and modern manner.

2.7. Opportunities and Challenges

The context of the Fourth Industrial Revolution and the implementation of digital transformation in education and training offer significant opportunities, while also creating considerable challenges for developing preservice teachers' digital competence for teaching at universities. Teacher-training institutions therefore need to clearly identify these opportunities and challenges and adopt appropriate measures to capitalize on the former and overcome the latter. Doing so will help develop preservice teachers' digital competence for teaching and contribute to improving the quality of teacher education.

***Opportunities**

As the Fourth Industrial Revolution advances rapidly, digital transformation has become an inevitable trend affecting every area of social life, including education. Digital transformation in education involves applying information and communication technology (ICT) to educational and training activities to improve the quality of education and meet learners' needs in the modern era. In this context, the Prime Minister issued Decisions No. 749/QĐ-TTg and No. 131/QĐ-TTg, and the Ministry of Education and Training issued Decision No. 1282/QĐ-BGDĐT [2, 5, 6]. At the regular meeting held on April 6, 2023, of the Ministry of Education and Training's Steering Committees for Administrative Reform and Digital Transformation, Minister Nguyễn Kim Sơn emphasized that administrative reform and digital transformation should be viewed as breakthrough measures for advancing state management in education and improving the quality of education (Ministry of Education and Training, 2023).

The rapid development of digital technologies is transforming not only all aspects of school administration but also teaching and educational activities at every level, from general education to higher education. It is having a significant impact on the renewal of teaching methods and formats, as well as on the methods and tools teachers use to assess learners. Teachers with digital competence can take advantage of new opportunities and adapt to modern teaching environments. They can improve teaching quality and create learning environments accessible anytime and anywhere, helping learners become more interested, active, self-directed, and creative in their studies.

Digital technology creates more flexible educational environments. Schools can make full use of these technologies to diversify teaching and learning formats, enabling lecturers and students to access domestic and international learning resources anytime and anywhere, without being restricted by place or time. This allows school pupils and university students to study independently and expand their knowledge more effectively, thereby contributing to improved training quality.

***Challenges**

The Fourth Industrial Revolution has changed the role and position of teachers and requires them to develop new competencies that were not previously expected of them. Teacher-training institutions must therefore prepare their students to become future teachers who can respond flexibly and effectively to these new demands. However, many teacher-training institutions continue to face significant limitations in areas such as teaching staff, curriculum content, teaching methods, and modern equipment and tools.

In addition, Vietnamese universities currently lack a framework or standards for preservice teachers' digital competence for teaching.

Facilities at teacher-training universities also remain inadequate, from classrooms and libraries to equipment, which is often both insufficient and outdated. Modern equipment to support teaching and learning is lacking in many classrooms, and internet access may be unavailable or, where available, too weak to support

simultaneous access by many students. This poses a major obstacle to guiding students in searching for, accessing, and using online information to support in-person lessons.

3. Conclusion

Developing digital competence for teaching among students of the Faculty of Education at Tay Nguyen University is an urgent task, necessary to meet the Professional Standards for Teachers and the current requirements for reforming general education. This development is shaped by the close interaction of subjective and objective factors. Lecturers' digital competence and teaching methods play a pivotal role, while facilities and the curriculum provide essential conditions and a foundation for the process.

This study of the factors influencing the development of digital competence for teaching among students of the Faculty of Education at Tay Nguyen University has provided an overview of the current situation, opportunities, challenges, and the subjective and objective factors that directly affect this process. Survey findings indicate that, although the University, lecturers, and students have made considerable efforts and achieved encouraging results rated as good or satisfactory the development of digital competence has yet to make a significant breakthrough and continues to face several limitations. These include the absence of a comprehensive digital competence framework, digital infrastructure that has not kept pace with practical developments, and a curriculum that does not yet make optimal use of technology in teaching.

The analysis confirms that lecturers' digital competence and teaching methods are the leading and decisive subjective factors. Meanwhile, facilities, equipment, and the curriculum are the key objective factors that provide the foundation for successful digital competence development. To improve the effectiveness of developing digital competence for teaching among students of the Faculty of Education, Tay Nguyen University should: (1) develop and issue a specific Digital Competence Framework, including expected learning outcomes, for preservice teachers; (2) improve and revise the curriculum to strengthen the integration of digital technology into subject-specific and teaching-methods courses; (3) provide professional development to enhance lecturers' digital competence and renew their teaching methods; (4) invest in modernizing ICT infrastructure, computer laboratories, the learning management system (LMS), and specialized teaching software; and (5) strengthen collaboration with general education schools while encouraging students to take an active role in independent learning and research on digital technologies.

As digital transformation in education and the Fourth Industrial Revolution continue to advance rapidly, it is urgent to finalize the digital competence framework for graduate outcomes, upgrade technological infrastructure, renew the curriculum, provide professional development for lecturers, and strengthen students' initiative. These measures will be essential to helping Tay Nguyen University improve the quality of its teacher education and equip future teachers with the confidence and digital skills needed to meet the demands of the ongoing fundamental and comprehensive reform of general education.

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