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Developing Digital Competence in Teaching for Students of the Faculty of Education at Tay Nguyen University

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Abstract: This article studies the development of digital competencies in teaching for students in the Faculty of Education at Tay Nguyen University. The research was conducted using survey and interview methods with 40 management staff, lecturers, and 570 students from two majors: Primary Education and Vietnamese Language Teacher Education. The findings show the following: *Current status of digital competence:* In general, the digital competencies of student teachers are only at a basic to intermediate level. Students mainly demonstrate proficiency in basic information technology skills (e.g., word processing, presentation skills, and social media use), but they lack pedagogical methods for effectively applying digital technology to real teaching practice. *Development needs:* There is strong agreement between lecturers and students on the necessity of developing digital competencies to meet the requirements of the 4.0 era, improve teaching quality, and align with the 2018 General Education Program. *Implementation level and difficulties:* The implementation of digital competency development has not reached the highest level and is not consistent. It mainly stops at guiding the use of digital devices or communication activities. The causes include: no specific output standards for digital competencies for students, the training program has not allocated appropriate time, and there is a lack of clear responsibility assignment among departments. Overall, the development of digital competencies in teaching for students at the school is assessed as achieved, but additional measures are needed to more effectively and synchronously promote development.

Keywords: Digital competence, digital technology, teaching, student teachers, Tay Nguyen University.

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1. Introduction

In the first decades of the twenty-first century, digital technology has developed rapidly. The world has entered the era of the Fourth Industrial Revolution (Industry 4.0), which has created new challenges for Vietnamese education in general and higher education in particular. This situation requires major efforts to keep pace with the times and to be able to participate in the process of "knowledge-based economy."

To implement the Resolution of the Politburo on certain policies and measures 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 orientation toward 2030 [3]. 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 the period 2022–2025, with orientation toward 2030." The project aims to take advantage of technological advances to promote innovation in teaching and learning, improve quality, enhance educational access, and increase management effectiveness [4]. On May 10, 2022, the Ministry of Education and Training issued Decision No. 1282/QĐ-BGDĐT promulgating the Plan to strengthen the application of information technology and digital transformation in education and training for the period 2022–2025. This again affirms that applying IT and digital transformation is extremely necessary for the education sector today [2].

According to Circular 20/2018/TT-BGDĐT, which promulgates the professional standards for teachers in general education institutions, including 5 standards and 15 criteria. Among them, Criterion 15 refers to "Applying information technology, exploiting and using technological devices in teaching and education." This criterion can be considered a component of digital competency. However, the assessment of the digital competencies of general education teachers has not been clearly specified in Circular 20 [1]. Nowadays, digital competency is regarded as a crucial factor for achieving success in learning, research, and career development in the future [5].

2. Research Content

2.1. Research Methods

*** Purpose of the survey:** To collect real and objective data on the development of digital competencies in teaching for student teachers at the Faculty of Education, Tay Nguyen University.

*** Survey content:** To examine the current status of teachers and students regarding the development of digital competencies in teaching for student teachers at the Faculty of Education, Tay Nguyen University.

*** Survey subjects:** The study involved 40 lecturers, management staff, and 570 students in years 2, 3, and 4 of the Faculty of Education (Primary Education and Vietnamese Language Teacher Education). Specifically: Primary Education Year 2 (194 students), Year 3 (192 students), Year 4 (93 students); Vietnamese Language Teacher Education Year 2 (46 students), Year 3 (21 students), Year 4 (24 students). The survey was conducted in Semester 2 of the 2025–2026 academic year at Tay Nguyen University.

*** Survey method and tools:** Use a questionnaire-based survey method, interviews, and statistical analysis in educational science research.

2.2. Current status of digital competencies in teaching of student teachers at Tay Nguyen University

Current status of digital competencies of student teachers

The current status of digital competencies in teaching of student teachers was examined through survey questions on self-assessment by students, as well as assessments by lecturers and management staff. The questions required evaluation of criteria related to knowledge and skills across 10 components in the digital competency framework for student teachers in teaching. The criteria were rated on levels 1 to 5, corresponding to: "None," "Basic," "Intermediate," "High," and "Very high." The survey results are presented in Table 1 (Table 2.4 in the original text).

Table 1: Current status of digital competencies in teaching of student teachers

TT	Criteria	Administrators and Lecturers		Students	
		Qty	%	Qty	%
1	**Competency in understanding Digital Technology (DT)**				
1.1	Describe trends, policies, and laws regarding the application of DT in teaching.	25	62,5	397	69,65
1.2	Analyze the advantages and disadvantages of DT in teaching.	18	45	243	42,63
1.3	Stay updated on new trends in applying DT in teaching.	22	55	255	44,74
1.4	Strictly adhere to State policies and laws, as well as institutional regulations, regarding the development of DT in teaching.	27	67,5	319	55,96
1.5	Promote the advantages and overcome the limitations of applying DT in teaching.	20	50	246	43,16
2	**Competency in operating DT equipment and software in teaching**				
2.1	Describe the structure, features, and usage of digital tools and equipment in teaching.	15	37,5	204	35,79
2.2	Present methods for maintaining commonly used digital equipment in teaching and how to use certain teaching software.	28	70	322	56,49
2.3	Use common equipment such as computers, projectors, TVs, etc., in teaching correctly according to technical and pedagogical procedures, effectively and safely.	26	65	352	61,75
2.4	Properly maintain commonly used digital equipment in teaching.	27	65,5	366	64,21
2.5	Use various software tools for teaching.	26	65	336	58,95
3	**Competency in building databases and digital learning materials**				
3.1	Describe methods for building and using databases and digital learning materials.	33	82,5	489	85,79
3.2	Present how to design and use digital learning materials such as videos, images, simulations, etc.	35	87,5	477	83,68
3.3	Flexibly and effectively use and exploit data and digital learning materials in the teaching process.	29	72,5	353	61,93
3.4	Search for and select appropriate digital resources to include in the database.	36	90	371	65,09
3.5	Flexibly use and exploit specialized software to build simulations and learning scenarios in both physical and virtual environments.	27	67,5	328	57,54
4	**Competency in using DT in curriculum and textbook development**				

4.1	Elucidate the role of DT in the subject curriculum.	29	72,5	287	50,35
4.2	Explain the relationship between the subject curriculum and the content taught in schools.	33	82,5	316	55,44
4.3	Select the organizational forms, methods, and DT tools for students to learn in alignment with the subject curriculum.	35	87,5	446	78,25
4.4	Correctly determine the content and format for integrating DT into the subject curriculum.	37	92,5	465	81,58
4.5	Search for and select appropriate digital materials suitable for the subject	29	72,5	364	63,86
5	**Competency in digital lesson planning**				
5.1	Describe the process of designing digital lesson plans, and how to exploit and store digital resources for teaching.	27	67,5	248	43,51
5.2	Present methods for designing lessons, creating tools for testing and assessing learning outcomes, and using digital lesson planning software.	24	60	267	46,84
5.3	Search, filter, and store digital resources related to the lesson.	26	65	272	47,72
5.4	Digitize teaching methods and formats suitable for each topic, content, and lesson.	29	72,5	308	54,04
5.5	Design digital lesson plans using selected software.	25	62,5	187	32,81
6	**Competency in executing lesson plans and managing classrooms in a digital environment**				
6.1	Describe the process of applying DT in teaching and how to manage students individually and in groups within a classroom using digital resources.	22	55	195	34,21
6.2	Present methods and strategies for organizing and managing a classroom that applies DT in teaching.	25	62,5	234	41,05
6.3	Select and apply teaching methods utilizing DT in specific teaching situations.	25	62,5	306	53,68
6.4	Effectively execute digital lesson plans.	23	57,5	317	55,61
6.5	Manage the use of digital resources in the classroom for individuals and groups; collect feedback to adjust classroom organization for optimal effectiveness.	19	47,5	309	54,21
7	**Competency in using DT to assess student progress and learning outcomes**				
7.1	Describe how to use common software to support testing and exams.	32	80	378	66,32
7.2	Use evaluation software or tools that support the assessment of student learning outcomes.	29	72,5	325	57,02
7.3	Create tests and exam questions using software.	30	75	315	55,26
7.4	Organize software-based tests and exams for students.	30	75	388	68,07
7.5	Create software applications designed for testing and exams.	27	67,5	264	46,32
8	**Competency in using digital resources to build, manage, and exploit teaching records**				
8.1	Present how to build and update teaching records on a computer.	32	80	362	63,51
8.2	Use software to create, manage, and utilize teaching records.	29	72,5	317	55,61
8.3	Build and update necessary information into teaching records on a computer.	30	75	308	54,04
8.4	Use software to create, manage, and utilize teaching records.	31	77,5	316	55,44

Data processing results in Table 1 show that management staff and lecturers evaluate the student teachers' digital competencies at the highest level in the following competencies:

Component 3: Building digital databases and learning resources (e.g., selecting suitable digital materials for databases; designing and using digital learning resources such as videos, images, simulations; describing how to build and use databases and digital learning resources; using digital data and resources in teaching processes flexibly and effectively; and flexibly using specialized software to build simulations and learning situations in both real and virtual environments).

Component 4: Using digital technology in developing curriculum and textbooks/learning materials (e.g., correctly identifying the content and forms of integrating digital technology into the curriculum; selecting organization forms, methods, and digital technology tools for student learning according to the subject curriculum; explaining the relationship between the subject curriculum and the content taught; and selecting suitable digital materials aligned with the curriculum).

Component 7: Using digital technology to assess students' progress and learning outcomes (e.g., describing how to use common software supporting tests and examinations; creating tests/exams using software; organizing students to take tests/exams on software; using some software to evaluate or support evaluation of

students' learning outcomes; with the lowest level being the ability to create software for testing and assessment).

In addition, consistent with management staff and lecturers' evaluations, students' self-assessments show that 3 out of 8 components reach the basic level: Component 3: Building digital databases and learning resources; Component 4: Using digital technology to develop curriculum and learning materials; Component 7: Using digital technology to assess learners' progress and outcomes. The remaining 5 components are assessed at an intermediate level, ranging from 37.5% - 77.5% for lecturers/management staff and from 35.79% - 69.65% for students.

To further understand the current status of student teachers' digital competencies in teaching, the author conducted interviews with some management staff, lecturers, and students.

When asked: *"What is your general opinion about student teachers' digital competence in teaching?"* most opinions from management staff and lecturers stated that student teachers have basic IT skills such as word processing, presentations, and internet information search, but their digital competence in teaching is only at an intermediate level. This is consistent with the survey results. This demonstrates strong consistency between management staff and lecturers in evaluating the current status of student teachers' digital competencies.

When asked from the student perspective: *"What is your general opinion about your own digital competence in teaching and that of your classmates?"* results were as follows: Year 2 students all reported an intermediate level in 5/8 components; the overall evaluation of the class's digital competence in teaching is intermediate. Among Year 3 students: 1 out of 5 self-assessed their own digital competence at a high level; the other 4 assessed it as intermediate. Among Year 4 students: 1 out of 5 assessed their own digital competence at a high level; the other 4 assessed it as intermediate. All five students agreed that they lack pedagogical methods for effectively applying digital technology in teaching.

Current status of students' use of digital technology in learning activities

Hours of computer or other digital device use per day: Among 570 students, responses showed: Less than 2 hours: 53 students (9.3%); About 2-5 hours: 375 students (65.79%); About 5–8 hours: 92 students (16.14%); More than 8 hours: 50 students (8.77%)

Table 2: Number of hours of using computers or other digital devices

Hours of use/day	Primary Education						Literature Pedagogy					
	2nd Yea		3nd Yea		4nd Yea		2nd Yea		3nd Yea		4nd Yea	
	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%
< 2 hours	26	13,40	11	5,73	9	9,68	3	6,52	2	9,52	2	8,33
2-5 hours	126	64,95	132	68,75	62	66,67	28	60,87	13	61,90	14	58,33
5-8 hours	35	18,04	28	14,58	12	12,90	8	17,39	4	19,05	5	20,83
> 8 hours	7	3,61	21	10,94	10	10,75	7	15,22	2	9,52	3	12,50

Purpose of using computers or other digital devices: The survey shows high percentages for: connecting with friends (over ~85%); learning (around ~73% - 83% depending on year and major); entertainment (around ~60% - 69%) and a much lower proportion for working.

Table 3: Purpose of using computers or other digital devices

Purposes of use	Primary Education						Literature Pedagogy					
	2nd Yea		3nd Yea		4nd Yea		2nd Yea		3nd Yea		4nd Yea	
	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%
Study	142	73,20	143	74,48	78	83,87	34	73,91	16	76,19	19	79,17
Connecting with friends	161	82,99	163	84,90	82	88,17	41	89,13	18	85,71	20	83,33
Entertainment	133	68,56	134	69,79	56	60,22	29	63,04	13	61,90	16	66,67
Work	16	8,25	23	11,98	17	18,28	4	8,70	2	9,52	4	16,67

Purpose of using IT: Social media (over 80%) and online learning (over 70%) are used very frequently, followed by presentations (over 65%). Other uses are much lower (roughly 6% - 20%).

Table 4: Purpose of using IT

Purposes of use	Primary Education						Literature Pedagogy					
	2nd Yea		3nd Yea		4nd Yea		2nd Yea		3nd Yea		4nd Yea	
	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%
Word processing	18	9,28	24	12,50	15	16,13	5	10,87	3	14,29	4	16,67
Using spreadsheets	16	8.25	18	9.38	29	31.18	3	6.52	2	9.52	2	8.33
Presentations	134	69,07	131	68,23	58	62,37	30	65,22	14	66,67	16	66,67
Using specialized learning software	13	6,70	18	9,38	11	11,83	3	6,52	3	14,29	3	12,50
Using teaching software	12	6,19	16	8,33	8	8,60	4	8,70	3	14,29	4	16,67
Exploiting information on websites	15	7,73	19	9,90	10	10,75	3	6,52	2	9,52	2	8,33
Email exchange	17	8,76	21	10,94	11	11,83	4	8,70	3	14,29	5	20,83
Online learning	147	75,77	145	75,52	73	78,49	33	71,74	15	71,43	17	70,83
Social networks	165	85,05	160	83,33	77	82,80	38	82,61	17	80,95	19	79,17

2.3. Current status of developing digital competencies in teaching for student teachers

Current status of students' demand for developing digital competencies in teaching

The findings are presented in Table 5.

Table 5: Current status of the demand for developing digital competencies in teaching of student teachers

TT	Competencies	Administrators and Lecturers		Students	
		Qty	%	Qty	%
1	Competency in understanding DT	36	90	449	78,77
2	Competency in operating DT equipment and software in teaching	29	72,5	356	62,46
3	Competency in building databases and digital learning materials	25	62,5	332	58,25
4	Competency in using DT in curriculum and textbook development	23	57,5	286	50,18
5	Competency in digital lesson planning	34	85	443	77,72
6	Competency in executing lesson plans and managing classrooms in a digital environment	33	82,5	438	76,84
7	Competency in using DT to assess student progress and learning outcomes	30	75	419	73,51
8	Competency in using digital resources in managing and exploiting teaching records	28	70	374	65,61
9	Competency in professional and pedagogical development in a digital environment	25	62,5	293	51,40
10	Security and safety in a digital environment	31	77,5	407	71,40

The results in Table 5 show that all surveyed groups confirm the need to develop digital competencies in teaching for student teachers. Among the 10 component competencies, three competencies were rated as "highly necessary" by both groups, including: Digital technology understanding (90% among management staff/lecturers and 78.77% among students); Developing lesson plans with digital technology (85% among management staff/lecturers and 77.72% among students); Implementing lesson plans and managing classes in a digital environment (82.5% among management staff/lecturers and 76.84% among students); The remaining competencies are considered necessary by management staff/lecturers from 57.5%–77.5%, and by students from 51.40% - 73.51%; To gain deeper insight into students' needs, interviews were conducted. Interviewees agreed that developing digital competencies is essential for student teachers for the following main reasons: meeting the requirement to improve teaching quality; meeting the requirement of the 4.0 industrial revolution era; and meeting the requirement of the 2018 General Education Program.

When asked "Among the 10 component competencies, which should be prioritized for development for student teachers the most?", management staff/lecturers and students gave largely similar answers: management staff/lecturers emphasized digital technology understanding and suggested adding security and safety in digital environments to the priority list; students wanted all components to be developed, with priority on: digital technology understanding, using digital devices and software in teaching, building lessons using digital technology, and using digital technology to assess learners' progress and learning outcomes.

Current status of implementing the objectives for developing digital competencies in teaching

Results presented in Table 6 show that implementing these objectives reaches intermediate to fairly good levels.

Table 6: Current status of implementing the objectives for developing digital competencies in teaching for student teachers

TT	Objectives to help students	Administrators and Lecturers		Students	
		Qty	%	Qty	%
1	Elucidate the significance of applying DT in teaching	35	87,5	427	74,91
2	Proficiently apply DT in learning activities	33	82,5	403	70,70
3	Creatively use DT in pedagogical training activities	31	77,5	451	79,12
4	Proficiently use certain equipment and software in designing and executing lessons	34	85	413	72,46
5	Utilize certain software in testing and assessing learning outcomes	29	72,5	362	63,51
6	Apply DT in designing databases and digital learning materials	27	67,5	387	67,89

Interview and survey results indicate that management staff, lecturers, and students generally agree that objectives related to explaining the meaning of applying digital technology in teaching, applying digital technology in learning activities, and developing teaching performance, lesson design, and implementation are carried out at a **fairly good** level.

Current status of the implementation level of content for developing digital competencies in teaching

Results presented in Table 7 indicate that management staff/lecturers and students evaluate implementation content such as: competency in operating digital devices and software in teaching and competency in understanding digital technology at relatively higher levels, while other competencies remain at intermediate levels.

Table 7: Current status of the implementation level of content for developing digital competencies in teaching for student teachers

TT	Competencies	Administrators and Lecturers		Students	
		Qty	%	Qty	%
1	Competency in understanding DT	34	85	503	88,25
2	Competency in operating DT equipment and software in teaching	36	90	486	85,26
3	Competency in building databases and digital learning materials	20	50	351	61,58
4	Competency in using DT in curriculum and textbook development	25	62,5	284	49,82
5	Competency in digital lesson planning	24	60	257	45,09
6	Competency in executing lesson plans and managing classrooms in a digital environment	21	52,5	198	34,74
7	Competency in using DT to assess student progress and learning outcomes	19	47,5	185	32,46
8	Competency in using digital resources to build, manage, and exploit teaching records	22	55	286	50,18
9	Competency in professional and pedagogical development in a digital environment	27	67,5	291	51,05

Further interview results show: students feel confident in using digital devices for social communication and professional learning, but they still face difficulties applying digital technology to teaching activities. Their digital competencies develop at a relatively modest level. Some competencies develop very little, such as competency in developing curriculum and digital learning materials, and competency in building digital databases and learning resources.

This situation requires the school and lecturers to adopt appropriate measures to develop digital competencies in teaching for student teachers.

Activities of lecturers in developing digital competencies in teaching for student teachers

Results in Table 8 show the current status of lecturer-led activities.

Table 8: Current status of activities for developing digital competencies in teaching for student teachers

TT	Activities	Administrators and Lecturers		Students	
		Qty	%	Qty	%
1	Guide students to use digital equipment such as computers, projectors, interactive whiteboards, video systems, etc.	35	87,5	512	89,82
2	Introduce/guide students to use specialized learning and teaching support software.	29	72,5	482	84,56
3	Guide students to exploit digital resources for learning and pedagogical competency development.	26	65	392	68,77
4	Guide students to design and execute digital lectures.	33	82,5	463	81,23
5	Introduce/guide pedagogical students to use learning outcome assessment software.	24	60	324	56,84
6	Guide pedagogical students in online teaching.	22	55	501	87,89
7	Introduce/guide students to use DT to manage teaching records and learning outcomes.	33	82,5	316	55,44
8	Guide/encourage students to use DT to communicate and stay in touch with teachers and friends.	37	92,5	507	88,95
9	Introduce/explain to pedagogical students the policies, trends, and impacts of digital technology and digital transformation.	27	67,5	497	87,19

The results indicate that activities such as encouraging and guiding student teachers to use digital technology for communication and contact with lecturers and classmates, and guiding the use of digital devices, are rated highly. However, other activities receive only average levels.

The results in Table 8 show that administrators, lecturers, and students evaluated the activities as follows: "Guiding/encouraging students to use digital technology in communicating and connecting with teachers and peers" was rated by 37 administrators-lecturers (accounting for 92.5%) and 507 students (88.95%); "Guiding students to use digital devices such as computers, projectors, interactive whiteboards, video systems, etc." was rated by 35 administrators-lecturers (87.5%) and 512 students (89.82%); "Guiding students to design and deliver digital lectures" and "Introducing/guiding students to use digital technology to manage teaching portfolios and learning outcomes" were rated by 33 administrators-lecturers (82.5%), while for students, there were 463 (81.22%) and 306 (55.44%) respectively; "Introducing/guiding students to use specialized learning software and teaching support tools" was rated by 29 administrators-lecturers (72.5%) and 482 students (84.56%). The remaining competencies were evaluated at an average level, ranging from 55% to 67.5% for administrators-lecturers, and from 55.44% to 87.89% for students.

When explaining why certain activities are implemented at lower levels, some lecturers stated that these content is not included in the training program. Others said that time constraints prevent frequent implementation. In addition, some believe there are no clear regulations or responsibility assignments regarding whether these activities belong to subject lecturers, methodology lecturers, or IT-related lecturers. Another commonly stated reason is that the school has not established an output standard for students' digital competency, so there is no solid basis to organize many competency-development activities and evaluate students' digital competencies accurately.

3. Conclusion

This study conducted surveys, analysis, and assessment of the current status of digital competencies (NLS) and the development of digital competencies in teaching for student teachers at the Faculty of Education of Tay Nguyen University. The study involved 570 student teachers in years 2, 3, and 4 from two majors Primary Education and Vietnamese Language Teacher Education and 40 management staff and lecturers. The research mainly used survey questionnaires, combined with interviews and observation methods. Based on the survey results, the study draws the following conclusions:

The current status of digital competency development in teaching for student teachers at Tay Nguyen University is assessed overall at an "achieved" level. Student teachers' digital competencies in teaching have been developed during their study at the university, but the level of development is not very high. The pathways for developing students' digital competencies in teaching are assessed as effective. Both subjective and objective factors significantly affect indeed, affect a great deal the development of student teachers' digital competencies in teaching at Tay Nguyen University.

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