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Factors Affecting Lecturers' Digital Competence: A Study at some Universities in the North of Vietnam

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Abstract

In recent years, the decrease in swamp land has been observed in both urban and rural areas. This phenomenon is land hoarding to the deliberate Digital transformation has been deeply penetrating all areas of life, contributing to increasing global labor productivity. The process of digital transformation of education and training in the context of the strong industrial revolution is inevitable. This study aims to show the factors affecting the digital competencies of economics lecturers at universities. The author used SPSS 25.0 software to process and analyze data through a survey of 311 lecturers in economics majors, testing the reliability of the scale using Cronbach's alpha coefficient and exploratory factor analysis. of 5 independent variables with 20 observed variables, and the author also uses regression analysis to test the compatibility between independent factors affecting the dependent factor as well as determine the level of impact of factors and model fit. Research results have shown that it is necessary to build a team of lecturers with digital capabilities that meet standards, which is a key condition to achieve the goal of improving the quality of training and education of Vietnam's universities.

Keywords: *Digital Competency, Economics and business administration, Lecturer, University, Viet Nam.*

INTRODUCTION

Digital transformation has been penetrating deeply into all areas of life, contributing to increasing global labor productivity. Therefore, the process of digital transformation of education and training is inevitable. Educational movements to integrate technology into teaching have received attention and become a priority at the present time (Ertmer et al., 2012). Digital competence is now considered an indispensable skill for educators and is also partly responsible for promoting digital competence in students (Basilotta et al., 2022), which is also Core competencies relate to "the kinds of skills and knowledge that people should have in a knowledge society, what needs to be taught to young people and how to do it" (T. Štemberger & S. Č. Konrad, 2021). Digital competencies in the higher education sector create creative spaces for training, innovation, research and collaboration, new avenues for building social knowledge and professional development of any student (Sánchez et al., 2016).

Digital transformation has shifted from the traditional instructor-centered model to a learner-centered model, in which instructors become instructors or controllers of learning and learners move from information receivers. passive information to active participants in their learning activities (Sewell. et al., 2023). Many studies show the importance of digital competencies in universities (Abarca Amador, 2015; Torgerson & Elbourne, 2002) and the need to improve the digital competencies of university lecturers, students (Cabero et al., 2017; Romero & Jaramillo, 2023) because information technology will attract more students' attention in the teaching-learning process (Saytiyev, 2023) and it is necessary to use information technology in teaching at universities to improve the quality of the process learning (Marta Liesa-Orus et al., 2023). Information technology will promote the use of more positive, engaging and motivating methods (Saytiyev, 2023).

However, the OECD notes: "Teachers are still not proficient enough in using pedagogical methods that make the most of technology" (Schleicher, 2020), (Ruiz-Cabezas et al., 2020) argues that some lecturers in different countries admit that their universities do not have the necessary resources and technological means to improve teaching. Research by Saytiyev (2023) and Marta Liesa-Orus et al., (2023) point out the issue of introducing

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information and communication technology into university classrooms depends on the digital competence of lecturer and manager. Similarly, Siddiq & Scherer (2019) and Abarca (2015) also argue that university institutions benefit from introducing technology into their classrooms, but their instructors are incompetent. Therefore, today's university lecturers need not only the ability to use technology but also digital competence (Foreman-Brown, 2023) and training on how to use various computer applications in teaching (Marta et al., 2023; Abarca, 2015; Ruiz et al., 2020).

In Vietnam, according to a report by We Are Social and Hootsuite (2020), the conditions for digital development are growing stronger than the average in Southeast Asia with the internet penetration rate reaching 70%, more than 145 million mobile subscribers (on average each person uses 1.5 phones) and 65 million active social network accounts. The Vietnamese Government's digital transformation program to 2025, with a vision to 2030, identifies education and training activities as playing a key role, helping to raise awareness, form digital skills and develop human resources. number. With the requirement that 100% of "digital universities" complete digital organizational models, digital governance, digital operations, standardization of digital data, open digital learning resources and digital technology infrastructure. The project clearly points out that teachers and researchers need to be fully equipped with digital knowledge and skills. However, reality has not yet developed commensurately. According to the results of a digital competency survey of lecturers in the field of social sciences and humanities by Ninh (2022), teachers are weak in the digital competency group of data management, creative capacity and ability to participation in the digital environment. Currently, there is no research on the digital competencies of economics lecturers in universities in Vietnam.

Therefore, this study hopes to fill the above gap, and at the same time has significance not only for the work of training, fostering, and improving the capacity of lecturers at economic universities in Vietnam but also as a resource. Important reference material on practice and policy for economic and educational managers at home and abroad.

THEORETICAL BASIS

Concept of digital capacity

Digital competence is a concept that refers to issues of adapting digital technology in the current social context (not just IT application capacity). The term digital competence is widely used in research in most European and South American countries, while the term digital is more popular in Asia and Australia (Spante, 2018). This term is mentioned a lot in various studies on aspects such as "digital literacy", "digital skills" and "digital competences".

Digital competencies are understood as the appropriate abilities of individuals to live, study and work in a digital society (JISC, 2014). Krumsvik, R. A. (2011) suggests that digital competency is a teacher's proficiency in using ICT in a professional context with their awareness of the strategic significance of this competency. According to Jane Secker (2018), the concept of digital capacity is often used at the same time as concepts such as digital skills, information capacity, communication capacity or academic capacity. Griffin et al., (2012) argue that digital competency not only includes online information search skills, but also includes services that require highly specialized expertise such as problem solving, sharing and collaboration. Collaborate with colleagues in a digital environment. Balyk (2020) adds systematic practices to develop the capabilities of individuals or organizations in the modern world and to ensure information security for individuals and organizations there.

Currently, research on digital competencies of teachers in specific scientific disciplines still faces limitations due to the lack of consensus on the concept (Varga-Atkins, 2020). While one side considers digital competency to be technical (Hinrichsen, J., & Coombs, A., 2013), there is another view that, in the field of education, digital competency is a combination of practical activities in various fields. scientific, social and cultural fields with higher forms of knowledge, creativity and innovation (McDougall, 2018), meaning that those skills need to be built in specific practice contexts.

According to UNESCO (2018) digital capacity is the set of abilities to use digital devices, communication applications and networks to access and manage information. These skills enable individuals to create and share

digital content, communicate and collaborate, and solve problems for self-improvement, motivating them to engage productively and creatively in life, study, work and social activities.

Although there are many different understandings, but in our opinion, digital competency is the smooth coordination and integration of knowledge, understanding and skills in using digital media, from which design, creating content that ensures positive social purposes, brings value to society, and ensures safety and intellectual property rights in the digital space.

Elements of Lecturers' Digital Competencies

Studies show that factors affecting lecturers' digital competencies include: technology, awareness, ethics, and the integration between those three aspects so that lecturers can share information and collaborate on building construct new knowledge (Calvani et al., 2009); Attitudes, knowledge, use of digital technology (Cazco et al., 2016); The use and value of information, self-conception of information competence, agency that monitors information capacity at the university (Sales, 2020).

In fact, studies have established, used, evaluated, and adapted digital competency components to suit the research context (Handley, 2018). For example, one study found that digital competency development is dependently linked to age because younger age is associated with higher levels of technological knowledge (Basantes-Andrade, 2020). Research results show that the organization of information and communication technology (ICT) training courses needs to be considered in relation to the content and level of the designed training activities, ensuring appropriateness corresponding to age of course participants. Through that, teachers develop digital competencies to have enough knowledge, skills and awareness to serve research and teaching activities in a creative and flexible way. The overall study also shows that digital capabilities at universities are lagging behind other areas, possibly due to ineffective leadership and changes in culture and innovation levels. and limited financial support (Rodríguez-Abitia, 2021).

Model of Digital Competency of Teachers

UNESCO's survey in 47 countries shows that, in many cases, countries are applying multiple digital competency frameworks to serve many different purposes at the same time. There are 3 competency frameworks developed by international businesses/organizations applied in 43 countries, which are: ICDL-International Computer Drivers License (applied in 31 countries), IC3-Certiport Internet Certification and Computing Core Certification (applied in 13 countries) and Microsoft's Digital Literacy Standard Curriculum (applied in 11 countries). In addition, 11 countries have built their own digital competency frameworks, of which 7 countries still apply the above international competency frameworks at the same time (Nguyen Tan Dai & Marquet, 2018).

To assess the digital capabilities of stakeholders, researchers have used a variety of models. These digital competency models focus on the most basic skills, helping to apply them to daily learning, working and communication (Nguyen Tan Dai & Marquet, 2018). In the world, some of the most commonly used frameworks in the field of education and training are:

Digital Competence Framework for Educators (DigCompEdu): developed by the Joint Research Center of the European Union. DigCompEdu includes 6 competency areas, each area has 22 criteria and 6 levels of competency development from A1 to C2. Competency areas include: (1) Digital professional competency, (2) Digital teaching competency, (3) Digital learning design competency, (4) Assessment competency digital learning, (5) Capacity to facilitate digital learning, (6) Capacity to exchange information and digital collaboration (Redecker, 2017).

Digital Teaching Professional Framework (DTPF): is a competency framework for teachers and trainers in the UK Education and Training sector, emphasizing the combination of pedagogy and technology to enhance learning. DTPF includes three stages of capacity development: beginner, proficient and advanced. Each stage has 12 competency domains and each domain has 3 criteria. Competency domains include: (1) Operating equipment and software, (2) Using digital competencies for careers, (3) Assessing digital learning, (4) Safety and security digital content, (5) Creating digital content, (6) Learning and developing digital competencies, (7)

Exploiting information & data, (8) Communicating and collaborating with stakeholders, (9) Practicing Presenting digital learning, (10) Designing digital learning, (11) Facilitating digital learning, (12) Communicating and collaborating in a digital environment (Gita Subrahmanyam, 2022).

The digital competency framework developed by JISC for the UK higher education environment in the 21st century has 6 core digital competencies, and within each competency there are specific indicators. The six core competencies include: (1) ICT proficiency; (2) information, data and communication capacity; (3) innovation, creativity and problem-solving capacity; (4) capacity to communicate, collaborate and participate in the digital environment; (5) digital learning and development capacity; and (6) capacity to identify and ensure security in the digital environment (JISC, 2017).

Professional Digital Competence Framework for Teachers: This is a professional digital competency framework for teachers developed by Norwegian Center for ICT in education. This framework emphasizes the combination of effective teaching methods with technology to improve learning quality, including 6 competency groups, each group has 3 levels of competency development: dominate, deepen and create. Competency domains include: (1) Understanding ICT in education, (2) Curriculum & assessment, (3) Pedagogy, (4) Applying digital competencies, (5) Organization and management, (6) Professional development (Mourad Benali & Janice Mak, 2022).

UNESCO's digital capacity framework in 2018: proposed on the basis of supplementing the existing content of the European digital capacity framework DigComp 2.0 with capacity groups: (1) equipment and software operations; (2) information and data capacity; (3) communication and cooperation; (4), digital content creation; (5) security; (6) problem solving; (7) career-related competencies (UNESCO, 2018).

In Vietnam, there is currently no digital competency standard specifically for lecturers. In 2022, the Ministry of Education and Training issued Decision 1282/QD-BGDDT on a plan to strengthen the application of IT and digital transformation in education and training for the period 2022-2025, requiring the addition of regulations on digital competency to the standards for lecturers and educational administrators (Viet Nam MOET, 2022).

METHODOLOGY

Mixed research methods were used in the study, including qualitative and quantitative.

Qualitative research: research using secondary documents that are research works related to collaborative learning methods and the effects of collaborative learning methods on student learning outcomes.

Quantitative research: Online survey through a research tool of a questionnaire created on a google form with six variables affecting lecturers' digital competencies: Personal, Environment, support platforms, usage 5-level Likert scale: (1) Completely disagree; (2) Disagree, (3) Uncertain, (4) Agree, (5) Completely agree.

The online questionnaire using the Google Form tool is designed based on reference to Ninh Thi Kim Thoa's digital competency framework in 2022 and adjusted to suit the characteristics of lecturers in economics and management majors. business. The reason this author chose the digital competency framework is because this is a Vietnamese competency framework, surveyed in Vietnam. Additionally, this framework provides specific, up-to-date, and comprehensive guidance on practicing digital competencies for faculty.

The questionnaire was sent to lecturers via email, with a total of 311 lecturers participating in the survey at universities in the North of Vietnam, including: Viet Nam National University, Ha Noi – Universtiy of Education; Thai Nguyen University of Education; Ha Noi Metropolitan University; Ha Noi of Business and Technology; Ha Long University.

Table 1. Descriptive statistics results

Variable	Content	Quantity	Rate
Gender	Male	135	43,4
	Female	176	56,5

Level	Associate Professor	22	7,07
	PhD	115	36,9
	Master	174	55,9
Seniority	< 10 years	89	28,6
	> 10 years	97	31,1

The authors used Microsoft Excel tool to enter and process raw data, using SPSS 25.0 software to analyze descriptive statistics and analyze reliability of Cronbach's Alpha, measuring lecturers' digital competence. Therefore, the data obtained will be quantitative, making the analysis process easier. Analyze collected data to assess lecturers' digital competencies in 5 factors: Information technology expertise; Information and data management, communication capacity; Ability to use technology applications for creativity and innovation; Ability to work, teach and research in a digital environment; Ability to identify and ensure digital security.

Results of the Study

Testing the Scale

Use SPSS software to evaluate the reliability of the scale: Summarizing the results of the system of Cronbach's Alpha test tables: The results show that all observed variables have a suitable total correlation coefficient (Corrected Item – Total Correlation > 0.3) and Cronbach's Alpha coefficient: 0.8 < Cronbach's Alpha < 0.95, so the survey variables are appropriate, reliable and the scale is very good, see details in Tables 2.

Table 2. Results of evaluation of the scale by Cronbach's Alpha

Item	Scale Mean if Item Deleted	Scale Variance if Item Deleted
Coefficient Cronbach's Alpha "Information technology expertise" = 0,727		
CM1	,658	,602
CM2	,598	,633
CM4	,547	,658
CM4	,251	,751
CM5	,392	,714
Coefficient Cronbach's Alpha "information and data management, communication capacity" = 0,780		
NL1	,665	,684
NL2	,373	,821
NL3	,736	,642
NL4	,584	,728
Coefficient Cronbach's Alpha "use technology applications for creativity and innovation" = 0,712		

UD1	,357	,735
UD2	,435	,678
UD3	,629	,597
UD4	,495	,657
UD5	,507	,654
Coefficient Cronbach's Alpha "work, teach and research in a digital environment" = 0,721		
GT1	,424	,762
GT2	,621	,531
GT3	,593	,567
Coefficient Cronbach's Alpha "identity and digital security assurance" = 0,770		
AN1	,559	,745
AN2	,619	,672
AN3	,638	,655
Coefficient Cronbach's Alpha "lecturers' digital competence" = 0,786		
QT	,557	,780
PT	,631	,705
HL	,698	,628

Exploratory Factor Analysis (EFA)

EFA analysis of factors affecting lecturers' digital competencies. The author analyzed 6 influencing factors with 20 observed variables.

The results of EFA analysis show that the observed variables are extracted into 5 factor groups with a total extracted variance of 70.952% > 50%, the scale is accepted. The KMO coefficient = 0.788 is in the range of $0.5 \leq KMO \leq 1$, so factor analysis is appropriate. Bartlett's test with Sig. = 0.000 shows a high level of significance. The loading factors of all observed variables are greater than 0.5, the accepted value (Hair & ctg, 1998). However, there are 4 observed variables with loading factors < 0.5, which are: CM4 (Poor technological expertise) CM5 (Not trained in digital skills) UD2 (Never used AI) GT1 (Limited communication skills in multimedia communication)

Table 3. Rotated Component Matrix[a]

	Component				
	1	2	3	4	5
NL3	,873				

UD1	,847				
NL1	,798				
NL4	,725				
CM1		,894			
CM2		,848			
CM3		,645			
GT2			,868		
GT3			,847		
NL2			,682		
UD5				,837	
UD4				,814	
UD3				,778	
AN2					,786
AN3					,781
AN1					,754

The above observed variable groups will be grouped into the corresponding groups NLtb, CMtb, GTtb, UDtb, ANtb. From there, the author proposes the following research model:

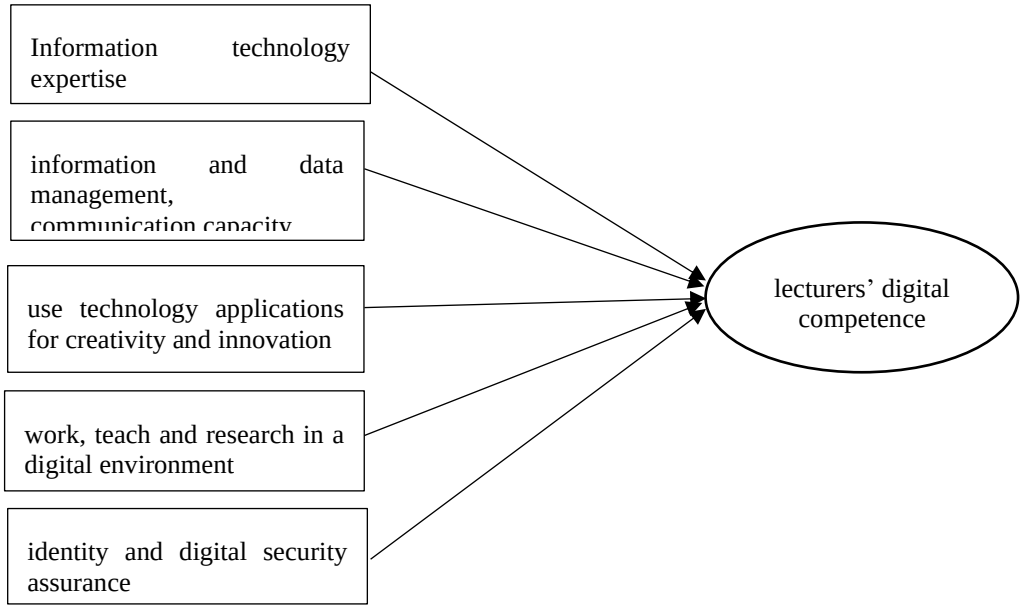

Fig. 1. Research mode

Testing the research model: The research model is tested through regression analysis. The multiple regression equation helps determine the influence of independent factors on the digital competencies of lecturers in Economics and Business Administration. The results of the regression analysis are shown in Table 4.

Table 4. Criteria for assessing the fit of the model

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,775[a]	,601	,595	,56366	1,676

(Source: The author's data processing results)

The results show that the relationship between the variables in the model is quite tight (because the R^2 value = 0.601). The adjusted R2 value = 0.595 (satisfying the condition $0 \leq R^2 \leq 1$ means that the model is 59.5% suitable). The adjusted R^2 value shows that the 5 independent factors in the model explain 59.5% of the variation in the dependent variable "Lecturer's numerical ability". The Durbin - Watson coefficient is 1.676 (about 1÷3), showing that there is no correlation between the residuals. The Sig. in ANOVA is 0.000 <0.5. This confirms that the independence of the residuals is guaranteed, so it can be concluded that the model is suitable for the actual data.

Regression Analysis Results

The results of the regression analysis presented in Table 5 show that all five independent variables CMtb, NLtb, UDtb, GTtb, ANtb are significant (Sig.) < 0.05. Thus, these variables are correlated and statistically significant with the dependent variable at the 5% significance level. The variance inflation rate (VIF) of the independent variables < 2 indicates that there is no multicollinearity.

Table 5. Parameters of multiple regression model

Model		ANOVA		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		F	Sig.	Beta			Tolerance	VIF
1	(Constant)	91,966	,000[b]		-2,075	,039		
	CMtb			,408	9,847	,000	,763	1,310
	NLtb			,241	5,451	,000	,670	1,493
	UDtb			,167	4,270	,000	,860	1,163
	GTtb			,283	7,153	,000	,834	1,199
	ANtb			,088	2,271	,024	,870	1,149

(Source: The author's data processing results)

Multiple regression was used to explain the factors influencing lecturers' digital competence. All five independent variables had an impact on lecturers' digital competence. The largest contribution was related to the professional factor (β = 0.408), followed by the Communication factor (β = 0.283) and the smallest contribution was related to the security factor in the digital environment (β = 0.088). The standardized regression coefficients were as follows:

$$Y = 0{,}408*CMtb + 0{,}283*GTtb + 0{,}241*NLtb + 0{,}167*UDtb + 0{,}088*ANtb + \varepsilon$$

DISCUSSIONS AND MANAGEMENT SOLUTIONS

The 4.0 revolution is happening strongly, affecting every field in the world. The digital transformation process in education and training with the central goal of higher education is an inevitable trend in that revolution. Vietnamese universities are no exception to that trend. Therefore, building a team of lecturers with digital capabilities is a necessary condition to realize the goal of digital transformation at the university level. From the remaining problems mentioned above, the author would like to propose some solutions:

The first, regarding the ability to use technology applications to solve problems in a creative and innovative way: During the teaching process, situations will arise, content that does not exist or has not been prepared in advance, teachers need to be creative. create, innovate to solve problems and solve problems based on the application of technological elements. To do that, lecturers in economics and economic management must raise awareness about digital transformation, constantly explore, self-improve and improve their digital capabilities. The results of this study are similar to the conclusions of (Espinosa et al., 2018) and the positive experiences of Borys Grinchenko Kyiv University and Silesian University in Katowice (Lyudmyla et al., 2019) in improving the digital competence of lecturers includes the development of general ideas of teachers such as: abilities, awareness of the need for self-education, continuous self-improvement, use of innovative pedagogical and digital technologies, Web services 2.0 in the educational process.

The second, regarding the ability of teachers to communicate and cooperate in a digital environment: Working in a digital environment is completely different from working online, so teachers need to learn how to communicate and express their intentions through many way different technological platforms, as concluded by (Sewell et al., 2023). Lecturers teaching the same subject, in the same professional group need to increase information exchange with each other through digital technology platforms based on platforms that have used google drive, google form, microsoft team... In addition, lecturers need to increase the implementation of group exercises through software so that students can proactively access digital technology platforms and improve the effectiveness of training quality. This is also completely consistent with the report of (Abarca Amador, 2015) that with the help of information technology, many activities can be carried out to support specialized content, while increasing the number of resources. communication resources and means so students can communicate digitally with instructors and with other classmates.

The third, it is necessary to build a synchronous and unified university database system, starting with faculties and centers working together to build data, then synchronize it into common data for the whole school and enter it into the national data system. At the same time, invest in network infrastructure and synchronous information equipment to serve effective teaching. In addition, it is necessary to open more frequent training courses to improve digital capacity for lecturers, focusing on subjects on AI, data mining, Internet of Things (IoT), and blockchain... The courses not only refer to documents from domestic universities but also aim at advanced universities in the world. This solution is both urgent and strategic in the long term, determining the quality of training of the school in the current context. It is necessary to consider improving digital capacity as a measure to evaluate the completion of lecturers' tasks, thereby creating motivation for lecturers to improve their own digital capacity.

CONCLUSION AND FUTURE RESEARCH APPROACHES

Building a team of qualified digitally competent lecturers is a key condition to achieve the goal of improving the quality of training and education of Vietnam's universities. Since the outbreak of the Covid-19 epidemic, the essential role of lecturers' digital capabilities has become clear. This is both a practical solution and a step

change to promote digital transformation throughout the community. Lecturers in economics must focus on applying scientific and technical achievements to the teaching and learning process, improving training quality and the ability to respond to the digital technology environment.

This study is an initial assessment of factors affecting the digital competence of lecturers at universities in the North of Vietnam. It also has certain limitations in that it only studies the digital competence of lecturers at universities in the North of Vietnam. In future studies, the scope of the study should be expanded to other universities across the entire territory of Vietnam. In addition, in terms of research methods, it is necessary to use combined research methods such as in-depth interviews to increase the comprehensive results of the study, thereby contributing to the development of digital competence training programs, contributing to the proposal of appropriate programs applying information and communication technology in teaching and research at other universities in Vietnam.

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