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DIGITAL SKILLS AND ADAPTABILITY OF STUDENTS IN THE CONTEXT OF DIGITAL TRANSFORMATION AT THE HO CHI MINH CITY UNIVERSITY OF TECHNOLOGY AND EDUCATION

HABILIDADES DIGITAIS E ADAPTABILIDADE DOS ESTUDANTES NO CONTEXTO DA TRANSFORMAÇÃO DIGITAL NA UNIVERSIDADE DE TECNOLOGIA E EDUCAÇÃO DA CIDADE DE HO CHI MINH

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Abstract: The paper focuses on analyzing the digital skills and adaptability of students in the context of digital transformation based on the results of an online survey of 1.282 students of Ho Chi Minh City University of Technology and Education (HCMUTE). The results show that students' digital skills and adaptability in the context of digital transformation at HCMUTE are demonstrated through aspects such as: HCMUTE's online learning system; document search engines; using digital skills and adaptability; habits are mainly expressed during the study period; Software applications are mainly used for student's learning and adaptability in the context of digital transformation. Applying students' digital skills and adaptability in the digital context also has advantages (the search for information, the development of study plans, the archiving of documents, etc.) and difficulties (insufficient learning facilities, learning space and interaction lead to lower efficiency when compared to traditional learning methods, ...). Therefore, the research results are expected to help provide a more objective view of the reality of digital adoption and students' adaptability in the digital transformation context at HCMUTE.

Keywords: Digital skills. Digital transformation. Ho Chi Minh City University of Technology and Education.

Resumo: O trabalho se concentra na análise das habilidades digitais e adaptabilidade dos estudantes no contexto da transformação digital com base nos resultados de uma pesquisa online com 1.282 estudantes da Universidade de Tecnologia e Educação da Cidade de Ho Chi Minh (HCMUTE). Os resultados mostram que as habilidades digitais e a adaptabilidade dos estudantes no contexto da transformação digital no HCMUTE são demonstradas através de aspectos tais como: Sistema de aprendizagem on-line do HCMUTE; mecanismos de busca de documentos; uso de habilidades digitais e adaptabilidade; hábitos são principalmente expressos durante o período de estudo; aplicativos de software são usados principalmente para o aprendizado e adaptabilidade do estudante no contexto da transformação digital. A aplicação das habilidades digitais e adaptabilidade dos estudantes no contexto digital também tem vantagens (a busca de informações, o desenvolvimento de planos de estudo, o arquivamento de documentos, etc.) e dificuldades (instalações de aprendizagem insuficientes, espaço de aprendizagem e interação levam a uma menor eficiência quando comparada aos métodos tradicionais de aprendizagem, ...). Portanto, espera-se que os

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resultados da pesquisa ajudem a fornecer uma visão mais objetiva da realidade da adoção digital e da adaptabilidade dos estudantes no contexto da transformação digital no HCMUTE.

Palavras-chave: Habilidades digitais. Transformação digital. Universidade de Tecnologia e Educação da Cidade de Ho Chi Minh.

1. INTRODUCTION

The strong development of science and technology, especially information technology, plays an extremely important role in the socio-economic of every country in the world. This requires every individual to use information technology to respond to the new situation. Katz (2007) believed that digital literacy was as important as reading and writing in the last century, Killen (2018) asserted that digital literacy was considered a vital factor to achieve success in learning, research and the future career development. The World Bank's "the Changing Nature of work" report affirms that digital skills are a prominent feature in the skills frameworks of the 21st century and are at the core of future-ready education concepts. The 21st Century Skills Framework identifies "digital skills" as one of three core skill areas.

There are many studies that give different terms to define human attributes related to the use of information technology such as: digital literacy, digital skills hay digital competency. The first, Digital literacy, introduced by Gilster (1998) is considered as the ability to understand and use information from a variety of digital sources. Digital literacy is not limited to understanding technical functions, not just using digital resources effectively. Eshet-Alkalai (2004) said that digital literacy was not only the ability to use software and operate digital devices, but also emphasized social and emotional cognitive skills to perform tasks and solve problems in the digital environment. Ameen & Gorman (2009) argued that digital skill was not simply the ability to understand technological functions, but also the ability to search and select digital information, apply necessary knowledge for people to become "important consumers". In many of their research papers, Van Deursen and Van Dijk (2010) have proposed a series of digital skills concepts that take into account the technical, media, and basic content aspects (skills related to operation, the formal, information, communication, content creation and strategy). In 2018, UNESCO defined digital literacy as the ability to safely and appropriately access, manage, understand, integrate, communicate, evaluate and create information through digital technologies to serve jobs from the simple to the complex as well as start-ups. Digital literacy is a

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combination of computer usage, information technology, information and communication capabilities". A recent World Bank study (Melhem & Jacobsen, 2021) has taken a different approach and used the concept of "digital literacy" to refer to an organization's ability to utilize its employees to achieve its goals. Digital literacy includes not only digital skills but also digital capabilities in leadership and digital culture, all of which are necessary for successful execution of a digital transformation strategy. Although there are different approaches to the terminology of digital literacy, there are differences in the contents and methods to determine the level of digital literacy; the above studies have clarified the nature, role and basic content of digital skills. The above studies are an important basis for individuals and organizations to research on how digital has supported teaching, learning, and research on how to improve digital skills for learners to meet new conditions. For example, Bartlett-Bragg (2017) and Varga-Atkins (2018) both argued that student's learning was greatly influenced by technology-related factors such as the integration of technology in course design, interaction between students, and between students and teachers through technology applications and digital resources. In addition, researchers who are interested in individual characteristics in relation to digital literacy Ng (2012) proposed a three-factor framework based on perception (i.e. choice of technology, information search, and critical evaluation of information), technique (i.e., technical awareness of technology) and society (i.e., support through online communities and protect yourself from harm in the areas of the digital environment). Therefore, the paper will focus on analyzing the current situation of applying students' digital skills and adaptability in the context of digital transformation on a number of aspects such as: HCMUTE's online learning system; document search engines; using digital skills and adaptability; habits are mainly expressed during the study period; Software applications are mainly used for student's learning and adaptability in the context of digital transformation.

2. METHODOLOGY

The main methods used in the article are qualitative research and quantitative research in sociological approach. In the qualitative research, we use the method of analyzing the secondary documents and the qualitative data from the studies of the previous authors. This method not only suggests ideas, but also helps to provide relevant qualitative

information in order to selectively inherit the theoretical basis, content and methods of the research, and at the same time points out the gaps in information in documents, theoretical tools and methods to identify new research tools and methods.

In the quantitative research, the author uses the survey method by online questionnaire and the data processing by SPSS statistical method. The survey results are conducted with 1.282 HCMUTE students. In which, there are 24.6% female (n=315) and 75.4% male (n=967); first-year students accounted for 79.5% (n=1.019); sophomore students accounted for 14.7% (n=189); third-year students accounted for 5.4% (n=69), fourth-year students accounted for 0.2% (n=3), after-fourth-year students accounted for 0.2% (n=2); students from 28 to 25 years old accounted for 99.9% (n= 1.281), students aged 26 and older accounted for 0.1% (n=1); students from the high-quality training system accounted for 67.5% (n=865), students from the mass system accounted for 28.5% (n=365), students from the international association system accounted for 4.1% (n=52).

3. RESULTS AND DISCUSSION

In the "Digital Jobs for Youth: Young Women in the Digital Economy" report, the authors mention that digital skills are mainly based on skills related to the use of technology. Digital skills are divided into three basic, intermediate and advanced groups as divided by UNESCO (2017), including: Basic digital skills are "entry level functional skills required to make rudimentary use of digital devices and applications." With basic digital skills, users are typically able to operate devices such as computers and smartphones, access and store information from online resources, and set up online accounts and profiles. In it, the internet connection system is one of the core issues and determines the ability to apply digital. In our research, the devices used to connect to the internet include fiber optic internet (accounting for 51.5%), 4G network (accounting for 39.5%), 3G network (accounting for 61%) and 5G network (accounting for 2.8%) (Source: Rendered from SPSS, 2022).

And devices used to access and store online resources are mainly laptops (63.1%), followed by Smartphones (30.9%), Desktop (PC) (4.0%), Ipad (1.9%) (Source: Rendered from SPSS, 2022).

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As we mentioned above, Gilster (1998) said that Digital literacy is considered as the ability to understand and use information from a variety of digital sources. Digital literacy is not limited to understanding technical functions, not just using digital resources effectively. Eshet-Alkalai (2004) believed that digital literacy was not only the ability to use software and operate digital devices.

The digital skills and adaptability of students in the context of digital transformation at HCMUTE in this study show that the ability to understand and use information from various digital sources. In which, the digital resources and the ability to exploit resources at HCMUTE are mainly UTExlms (accounting for 37.7%) and FHQxlms (accounting for 59.1%), besides, other digital sources such as Angel, Blackboard Learn, Pearson Education account for a negligible percentage (Table 1).

Table 1. HCMUTE's online learning system

HCMUTE's online learning system	N	Percent
Angel	5	0.3%
Blackboard Learn	5	0.3%
Moodle	14	0.9%
Pearson Education	11	0.7%
UTExlms	597	37.2%
FHQxlms	949	59.1%
Other	25	1.6%
Total	1606	100.0%

Source: Rendered from SPSS, 2022

Moreover, to learn and find resources, HCMUTE students also use other platforms and tools such as zoom, Google meet, Microsoft Teams, Jitsi Meet, Zalo, Face book and some other platforms (table 2).

Table 2. Classmates and searching for documents by the tool

Tools/devices	N	Percent
Zoom	900	21.0%
Google meet	1173	27.3%
Microsoft Teams.	410	9.6%
Jitsi Meet	28	0.7%
Zalo	769	17.9%
Face book	705	16.4%
Other	306	7.1%
Total	4291	100.0%

Source: Rendered from SPSS, 2022

Ameen & Gorman (2009) said that digital skill was not simply the ability to understand the functions of technology, but also the ability to search and filter digital information,

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apply the necessary knowledge to people become "important consumers". In many of their research papers, Van Deursen and Van Dijk (2010) have proposed a series of digital skills concepts that take into account the technical, media, and fundamental content aspects (the skills related to operational, formal, informational, communication, content creation and strategy skills). In 2018, UNESCO defined digital literacy as the ability to safely and appropriately access, manage, understand, integrate, communicate, evaluate and create information through digital technologies to serve jobs from the simple to the complex as well as start-ups.

According to our research results, the Covid-19 epidemic has had an impact (accounting for 51%) on students' digital skills and adaptability in the context of digital transformation at HCMUTE (Source: Rendered from SPSS, 2022). Therefore, to adapt, HCMUTE students not only have the ability to understand technology, digital platforms and tools, but switch to the ability to manage, search, select, create and manage information to serve learning (table 3).

Table 3. Using digital skills and adaptability

Measure	N	Percent
Their participation in information/data management	634	15.0%
Creating the independent digital and digital documents	520	12.3%
Searching and managing the digital information	702	16.6%
Digital creative activities (e.g.: blogs, electronic portfolios, wikis)	433	10.2%
Independent learning	871	20.6%
Management of digital data/information	425	10.0%
Digital creativity	305	7.2%
Digital identity	231	5.5%
Other	112	2.6%
Total	4233	100.0%

Source: Rendered from SPSS, 2022

The results of Table 3 show that the use of digital skills and adaptability are shown in the following aspects: Independent learning (accounting for 20.6%); Searching and managing digital information (accounting for 16.6%); Their participation in information/data management (accounting for 15.0%); Creating the digital documents and digital learning independently (accounting for 12.3%); Digital creative activities (e.g: blogs, electronic portfolios, wikis) (accounting for 10.2%); Management of digital data/information (accounting for 10.0%); Digital identity (accounting for 5.5%). The results of this study show that there is a concordance between digital skills and adaptability with

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previous research results "intermediate Digital Skills enable individuals to use digital tools for more significant task-oriented purposes. Intermediate skills are "the skills that enable an individual to make substantive and beneficial use of online applications and services,". Advanced Digital Skills allow people to use technology in transformative ways. UNESCO defines these as "the group of skills that form the basis of specialist [information and communication technology] occupations and professions." (UNESCO, 2017).

Greene, Yu, and Copeland (2014) studied how self-regulation affects students' learning in the digital environment according to data-driven approaches using the Internet. The ability of learners to self-regulate their learning refers to the ability to define tasks, set goals, make plans, track their own learning progress, and make any necessary changes to their learning process to complete their studies efficiently and more effectively. On the basis of the reasoning of Greene, Yu, and Copeland (2014), we conducted a survey of HCMUTE students about the habits mainly expressed during study time. The research results show that the main habits of students in the digital environment from data-oriented approaches by using the Internet focus mainly on access such as: Video of taking notes on UTEx, FHQx, LMS (20.5), Video of lectures on Web sites (accounting for 16.2%), reading the documents on digital devices (accounting for 16.1%), checking your social media (zalo, facebook, youtobe channel, ...) (accounting for 15.5%), Taking a note the personal work and study content on digital devices (accounting for 11.4%) ,... (table 4).

Table 3. Habits are mainly shown during study time

Measure	N	Percent
Reading documents on digital devices	886	16.1%
Accessing the video of lectures on Web	888	16.2%
Accessing the video of taking notes on UTEx, FHQx, LMS	1125	20.5%
Taking notes of personal work and study contents on digital devices	628	11.4%
Receiving and sending messages to your friends and family	506	9.2%
Checking your social media (zalo, facebook, youtobe channel, ...)	852	15.5%
Searching the University Library to support your reading	402	7.3%
Internet browsing unrelated to lecture topic material	205	3.7%
Total	5492	100.0%

Source: Rendered from SPSS, 2022

A very remarkable research result from the JISC Organization (2015) described digital skills as the digital capabilities that individuals need to live, learn and work in a digital society. This organization introduced a framework called the JISC Digital Capability Framework which consists of 6 components: (1) ICT qualification - involves fundamental

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digital skills in adopting, adapting and using digital devices, applications and services; (2) Information, data and media literacy - involves the ability to find, evaluate, manage and share digital information and data, critically read in a variety of digital media; (3) Digital creativity, problem solving and innovation - involves the process of creating, innovating and solving problems by using technology and/or developing new practices with digital technology; (4) Digital Communication and Collaboration - involves the ability to communicate and collaborate effectively in a variety of digital media for different purposes and audiences; (5) Digital Learning and Development - involves the ability to identify/participate in digital learning opportunities; and (6) Digital Identity and Wellbeing - relates to the ability to maintain a positive digital identity across platforms and take care of one's work-life balance.

To explore the digital capabilities that individuals need to live, study and work in a digital society at HCMUTE, a survey is conducted to capture the basic digital skills of application, adaptation and use of digital devices, applications and services in learning. The results show that the main software applications used are email, website, word processing software, image processing software,... respectively. (table 5).

Table 5. Software applications are used primarily for learning

Measure	N	Percent
Image processing software	501	11.7%
Word processing software	627	14.7%
Email	1035	24.2%
Statistical software	270	6.3%
Website	979	22.9%
Video sharing application	462	10.8%
Virtual learning environment	262	6.1%
Other	141	3.3%
Total	4277	100.0%

Source: Rendered from SPSS, 2022

Eshet-Alkalai (2004) argued that digital literacy was not only the ability to use software and operate digital devices, but also emphasized social and emotional cognitive skills to perform tasks and solve problems in the digital environment. In our research, the social and emotional cognitive skills of HCMUTE students are demonstrated through positive adaptability, good time management ability, high academic persistence, performance in the context of online learning, improving their online learning skills, online learning experience, adaptability. On the other hand, more or less significant differences are

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found in cognitive aspects of technology use, which seem to be related to students' ability and cognitive effort to think critically in the search, evaluation and management and sharing of digital information.

Table 6. Student's adaptability in the context of digital transformation.

Training system	Positive adaptability	Good time management ability	High academic persistence	Performance in the context of online learning	Enhancing online learning skills	Online learning experience	Adaptability
High Quality	3.00	3.00	3.00	3.00	3.00	3.00	3.00
Mass	3.00	3.00	3.00	3.00	3.00	3.00	3.00
International association	3.00	3.00	3.00	3.00	3.50	4.00	4.00
Total	3.00	3.00	3.00	3.00	3.00	3.00	3.00

Source: Rendered from SPSS, 2022

With level 1- the lowest and level 4 - the highest, the results in Table 3.6 show that the digital skills and adaptability of HCMUTE students in the digital context are all at level 3 or higher. In which, there is a new finding that online learning experience and adaptability (both score at level 4) of students of international association system are higher than that of the high-quality system and the mass system (both of them are at level 3). Differences between training systems in the use of student's digital skills and adaptability may be linked to the curriculum structure or student's learning behavior or personal characteristics and family structure which are beyond the scope of this study… However, we recognize that the needs of students at any training system also provide digital platforms to provide the necessary support in developing the strategies of effective information management .

This study shows that HCMUTE students are likely to use unfamiliar technologies and have good adaptive skills if they perceive this technology to serve for learning purposes.

In summary, from the secondary data, researchers have come up with the concept of digital literacy, digital capabilities framework, the impact of digital skills on students' learning process and analyze individual characteristics related to digital capabilities. From the quantitative data carried out on 1.282 HCMUTE students, it shows the current situation of digital skills and adaptability of students in the context of digital transformation at Ho Chi Minh City University of Technology and Education là khá cao.

4. ADVANTAGES AND DIFFICULTIES

Properly and appropriately assessing the difficulties and advantages in determining students' digital skills and adaptability in the context of digital transformation will help schools, faculties, lecturers and students see strengths and weaknesses to make timely adjustments in improving the quality of online teaching and learning nowadays. Survey results with 1,282 students reveal that digital skills and adaptability of students in the context of digital transformation, schools, lecturers and students have the following advantages and disadvantages:

Advantages: As the results analyzed above show, students' access to digital skills and adaptability for online learning now takes place in certain advantages such as:

Firstly, on the UTExlms and FHQxlms systems, the lecturers provided full documents, the detailed and easy-to-understand lectures. Video of lectures on UTExlms and FHQxlms systems are quite diverse and rich.

Secondly, the majority of students in this survey have enough means and tools to participate in online classes, students' digital skills and adaptability in the context of digital transformation are clearly shown. In which, the most popular means and tools are Laptop and Smart phone used for learning and accessing the resources for learning.

Difficulties*:* In collecting opinions from 1.282 students, there are some difficulties as follows:

Firstly, one of the factors affecting students' current digital skills and adaptability is the internet. In online learning, an indispensable factor is the internet connection. The research results show that the fiber optic internet system plays a key role, along with 4G, 3G, and 5G networks. However, the transmission line and internet connection are not stable, making it difficult to access and serve for learning and research purposes.

Secondly, some students still face many other difficulties (such as family economic conditions, Covid 19 epidemic situation, ...) leading to psychological fatigue and stress, which more or less affects their digital skills and adaptability of students in active learning and research.

5. CONCLUSION

In summary, this study has contributed to describe and analyze the current situation of digital skills and adaptability in the context of digital transformation in the learning of

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students at Ho Chi Minh City University of Technology and Education on several aspects such as: HCMUTE's online learning system; document search engines; using digital skills and adaptability; habits are mainly expressed during the study period; Software applications are mainly used for student's learning and adaptability in the context of digital transformation.

The use of digital learning technology transformation adaptability in the context of digital transformation (from on-campus offline learning to online learning and searching) is a challenge for students in forming habits and skills of adapting, solving learning problems.

Although there are different approaches to the terminology related to digital skills, there are differences in the contents and methods to determine the level of digital capabilities, but the above studies have clarified the nature, role and basic content of digital skills. The above studies are an important basis for individuals and organizations to research on how digital has supported teaching, learning, and to research on how to improve digital skills for learners to meet the needs of new conditions.

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