

Students' Readiness and Required Skills for Digital Higher Education: A Case Study at an Open University in Thailand

Sudaw Lertwisuttipaiboon^{1*} • Apiradee Sriopas² • Warangkana Chankong³
• Sirirat Suwanidcharoen⁴ • Goontalee Bangkadanara⁵

^{1,2,3,4,5} School of Health Science, Sukhothai Thammathirat Open University, Nonthaburi, Thailand.

*Corresponding author: l.sudaw@gmail.com

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Abstract

Digital higher education is an essential part of Thailand's National Scheme of Education (2017-2036), which focuses on education transformation through digital technology. This study aimed to examine distance learning students' readiness for digital higher education, and explore the essential skills they want to improve. A cross-sectional descriptive study involving 271 distance learning students at Sukhothai Thammathirat Open University in Thailand was conducted in May 2023. A 25-item questionnaire containing three parts was administered. The questionnaire was validated by three experts with a content validation score of 0.92, and the Cronbach's alpha reliability coefficient was found to be 0.87. Descriptive statistical methods were used to analyse the survey data. The results showed that health readiness had the highest mean score followed by digital learning devices, digital skills, study time allocation, and financial readiness. The findings also indicated that the essential skills respondents wanted to improve were career skills, critical thinking skills and problem-solving skills, cooperative skills, teamwork and leadership skills, digital skills, and creativity and innovation skills. The results of this study provide convincing evidence of the high level of readiness among distance learning students as well as describe the top five skills students deem necessary for higher education in the digital age.

Keywords: Readiness, Digital Higher Education, Distance Learning, Student, Thailand

1. Introduction

The challenges of the 21st century are driven by external forces such as the digital revolution, the needs of the workforce for 21st century skills, and problems with the education system due to globalisation. Thailand thus urgently needs to reform its national education to meet future challenges, considering that education is the main mechanism for national development that responds to the 20-year national strategic framework and the 12th National Economic and Social Development Plan (2017-2021) under the Constitution of the Kingdom of Thailand (2017-2036), which is expected to lead the country to greater prosperity, wealth, and sustainability over the next 20 years (Office of the Education Council, 2017).

In recent years, digital transformation has dominated in many organisations; those in the education sector have been no exception. Digital transformation is the incorporation of computer-based technologies into an organisation's products, processes, and strategies (Moore & Pratt, 2023). The field of education has witnessed significant transformation due to the advent of digital technologies. Distance learning, in particular, has emerged as a popular alternative to traditional classroom-based education, providing

learners with flexibility, accessibility, and convenience. The invention of the Internet and World Wide Web has forced educational institutions to adapt their teaching and learning techniques to meet learners' demands in providing an ideal learning environment (Xu & Ebojoh, 2007). Digital transformation has become a priority for higher education institutions, and this is a natural and necessary process for organisations that claim to be leaders of change and highly competitive in their respective domains. Higher education institutions have been permeated by technological advancements brought by the Fourth Industrial Revolution, which also forces institutions to deal with digital transformation in all dimensions (Benavides et al., 2020).

During the Covid-19 pandemic, traditional face-to-face learning had to be suddenly replaced by remote synchronous learning. This approach involves leveraging digital technology to make teaching and learning more effective, accessible, and interactive. Higher education institutions in Thailand had to cope with the situation by transferring teaching methods to online platforms. This is similar to the general online learning approach that allows teachers and students to engage in learning with facilities supporting activities and work (Somabut & Tuamsuk, 2022). Digital higher education provides students with flexible learning opportunities, and distance learning students benefit from the ability to access educational resources and participate in courses from any location. Although distance learners who used to rely mainly on teaching materials initially lacked digital literacy and resources for fully online learning, most higher education institutions rapidly adopted digital platforms and other online support services. These measures could lead to wider adoption of digital distance learning.

Sukhothai Thammathirat Open University (STOU) is one of two open universities in Thailand. STOU is the first university in Southeast Asia to use the distance learning system that since its establishment has enabled people throughout Thailand and beyond to receive education without having to be physically present in a classroom. STOU strives to be a world-leading open university utilising technology and educational innovations to provide lifelong education for all (STOU, 2023). As the demand for online education continues to grow, it has become crucial to examine the readiness of distance learning students for digital higher education, which is an essential part of Thailand's National Scheme of Education (2017-2036). By understanding the factors that contribute to the readiness of distance learning students, educators, policymakers, and institutions can better design effective online learning to meet their diverse needs.

2. Literature Review

2.1. The Current State of Digital Higher Education

Higher education is a source of production and development of high-level manpower. It is also a source of knowledge, technology, and innovation, which is a crucial factor in driving various sectors to lead the country forward in a modern way. Digital higher education has become an essential part of the education system. Digital higher education has been defined to cover three broad categories of digital provision: (fully) online, hybrid, and blended education (Organisation for Economic Co-operation and Development (OECD), 2022). The objective of digital education is to provide students with comprehensive education that prepares them for success in the digital age by using digital technologies to facilitate and enhance teaching and learning (Smowltech, 2023).

The demand for digital higher education has increased due to the flexibility it provides to students. According to the National Center for Education Statistics (NCES), the number of students enrolled in distance learning courses increased from 1.6 million in 2002 to 6.7 million in 2016 (National Center for Education Statistics, 2018). Digital higher education has become a popular choice for students due to its flexibility, accessibility, and cost-effectiveness.

Digital technology tends to support lifelong learning, where in higher education it affords people of all ages more learning opportunities through digital technology. Its main requisites include modern network technologies that can effectively satisfy the needs of learners, and high-quality Internet access at every educational institution (Office of the Education Council, 2017). Institutions of higher education that want

to remain relevant in the 21st century turn to technology to improve their teaching, learning, student management, and faculty performance (Zitter, 2020). Before the Covid-19 crisis, online education programmes with fully digital technology embedded in the curriculum were rather rare. Only a few educational institutions, such as open universities, had established fully digital models of teaching and learning (Laufer et al., 2021). However, the unexpected pandemic sparked an ongoing debate about the importance of digital transformation of higher education institutions worldwide, and the risks or opportunities of normalising online teaching (Zaimakis & Papadaki, 2022).

On the positive side, digitalisation is beneficial for improving quality of life and inspiring social progress, with the Internet opening up participation in a knowledge society by decentralising and democratising information. However, there are some barriers for the successful implementation of digital higher education, encompassing a variety of factors from the digital divide caused by lack of training, reluctant attitudes, or systemic exclusion, to inequalities among students that became heightened during the Covid-19 pandemic (Castañeda & Selwyn, 2018; Laufer et al., 2021). Furthermore, various past studies on the effectiveness of distance learning have reported mixed results, with many concluding that investing solely in digital technology cannot actually make learning more effective. Due to the ever-changing business environment in the 21st century, employers have raised concerns about the need for a future workforce with a different set of skills that should include thinking skills, communication skills, digital skills, teamwork and flexibility, ethics and responsibility, ability to study independently, and knowledge management. Moreover, potential employees should have the ability to deal with difficult situations as well as hone well-rounded skills from different areas (Bates, 2015; Raziana Che Aziz et al., 2022).

2.2. Readiness of Distance Learning Students

Readiness is defined as the state of being prepared for something about to be done or experienced. Individuals learn best when they are physically, mentally, and emotionally ready to learn. Basic factors that can improve students' learning abilities include skill, competency, and tendency to utilise technology (Jones, 2012). Learner readiness is a prerequisite for further education. Learning goals can be achieved when students are well supported by their readiness to face a particular situation. In this new era of education, digital technologies play an important role in improving the quality of education. Digital readiness encompasses cognitive skills and digital proficiency. To be digitally ready, students are required to use technology for academic work to meet educational objectives. Students who use digital technology in the learning process and can carry out a critical evaluation of digital culture around learning are more likely to have better academic outcomes (Winarso, 2016; Hong & Kim, 2018; Huang, 2022).

Digital technologies have become an integral part of digital higher education. However, distance learning students face several challenges in digital higher education, especially digital literacy, which is defined as the ability to access, manage, understand, integrate, communicate, evaluate, and create information safely and appropriately through digital devices and networked technologies for participation in economic, social, and political life (United States Agency for International Development, 2023). In addition to digital literacy, distance learning students also struggle with access to technology and support services. One study concluded that educational institutions need to provide distance learning students with the necessary resources and support services to succeed in digital higher education (Kulal & Nayak, 2020). Thus, in the context of educational policy, special attention needs to be paid to the key factors that influence students' learning experiences and readiness for online learning, particularly in terms of available technological devices, adequate digital technology skills, and appropriate home-learning environment. Administrators and academic staff should understand the impact of related factors on students' learning experience in order to better redesign integral pedagogies and more inclusive teaching and learning practices in digital higher education (Aristovnik et al., 2020; Zaimakis & Papadaki, 2022).

2.3. 21st-Century Skills for Learners

The term '21st-century skills' is commonly used to refer to a broad set of knowledge, skills, work habits, and character traits that are believed to be critically important to succeed in the current world, particularly in contemporary careers and workplaces. 21st-century skills can be applied in all academic subject areas, and in all educational, career, and civic settings throughout a student's life (The Glossary of Education

Reform, 2023). An international research project, the Assessment and Teaching of 21st Century Skills (ATC21S) grouped 10 such skills into four categories: (1) ways of thinking (creativity and innovation; critical thinking, problem-solving, and decision-making; learning to learn and metacognition), (2) ways of working (communication; collaboration), (3) tools for working (information literacy; ICT literacy), and (4) living in the world (citizenship; life and career skills; personal and social responsibility) (Binkley et al., 2012; Van Laar et al., 2020). Moreover, the OECD has categorised 21st-century skills into these three dimensions: information, communication, and ethics and social impact (Ananiadou & Claro, 2009). Panich (2013) stated that education in the 21st century must allow people to learn from kindergarten to university and throughout life, with a focus on the following: reading, writing, arithmetic, critical thinking and problem-solving, creativity and innovation, cross-cultural understanding, collaboration, teamwork and leadership, communications, information and media literacy, computing and ICT literacy, and finally, career and learning skills. Van Laar et al. (2017) conducted a systematic literature review to synthesise academic literature related to 21st-century and digital skills. They concluded that to meet workforce demands, it is necessary to propose an expanded conceptual framework that includes 21st-century digital skills. The vision of 21st-century digital skills describes those skills that are needed to participate in a knowledge-based workforce, and that employees take responsibility for their own learning.

In summary, previous studies have described the various aspects of 21st-century skills to enable students to successfully participate in the global economy. Against this background, the objectives of this study were thus to: (1) examine the readiness for digital higher education of distance learning students, and (2) explore essential skills that they want to improve.

3. Research Method

3.1. Subjects, Materials, and Procedures

This cross-sectional study was conducted in May 2023 at STOU, Thailand. A total of 271 students from the target population of 321 students who were registered in the professional experience practicum participated in the survey. To qualify for attendance in the professional experience practicum, students must have only the final one to three sets of subjects remaining to graduate. Consequently, during the professional experience practicum seminar, in accordance to the concept of lifelong education, STOU promotes various courses for this target group to pursue as part of their further education.

The research instrument was a self-administered questionnaire based on the research objectives. Close-ended questions were used to collect quantitative data from respondents. The questionnaire composed of three sections and 40 items:

- Section A: Four demographic items capturing details on gender, age, major field of study, and most-used learning device.
- Section B: 25 items related to learner readiness for digital higher education in five dimensions: digital learning devices, digital skills, study time allocation, finance, and health.
- Section C: 11 items related to the essential skills that the students want to improve.

The content of the questionnaire was validated by experts with a validation score of 0.92, and the Cronbach's alpha reliability coefficient was found to be 0.87. This study was conducted in accordance with the principles of the Declaration of Helsinki, and informed consent was obtained from all participants in the study.

3.2. Data Analysis

The collected data were statistically analysed to determine the percentage, mean, and standard deviation. The questionnaire comprised statements using a five-point Likert scale to determine the participants' level online learning readiness. The ranges of mean scores used to interpret the data are presented in Table 1 (Best & Kahn, 2006).

Table 1. Interpretation of Readiness Level

Mean Score	Interpretation of Readiness Level
4.51-5.00	Very high
3.51-4.50	High
2.51-3.50	Moderate
1.51-2.50	Low
1.00-1.50	Very low

4. Findings and Discussion

4.1. Respondents' Demographic Characteristics

The demographic details of the respondents in this study are illustrated in Table 2. Most of the respondents were female (77.8%) aged between 21 and 40 years old. About one-third majored in Occupational Health and Safety (36.1%), followed by those in Early Childhood Development (35.1%), Management Science (22.9%), and Information Science (5.9%).

Table 2. Respondents' Demographic Characteristics

Demographic Characteristic		N (%)
Gender	Male	59 (21.8)
	Female	211 (77.8)
	Prefer not to answer	1 (0.4)
Age (years)	21 - 30	119 (43.9)
	31 - 40	101 (37.3)
	41 - 50	46 (17.0)
	51 and above	5 (1.8)
Major field of study	Occupational Health and Safety	98 (36.1)
	Early Childhood Development	95 (35.1)
	Management Science	62 (22.9)
	Information Science	16 (5.9)
Most-used learning device	Desktop computer	24 (8.9)
	Notebook/Laptop	132 (48.7)
	Tablet	14 (5.2)
	Smartphone	76 (28.0)
	Traditional stationery tools (e.g., pen, pencil, etc.)	25 (9.2)

Table 2 shows that there is a higher number of female respondents (77.8%) compared to male respondents (21.8%). In addition, the majority were aged between 21 and 30 years (43.9%) and 31 and 40 years (37.3%), followed by those aged between 41 and 50 years (17.0%). Approximately 36.1% and 35.1% of the respondents were undergoing their respective bachelor's degree programmes in Occupational Health and Safety, and Early Childhood Development, respectively. In terms of learning tools, the majority of respondents (90.8%) reported that their most-used learning devices were mobile devices, which comprised notebooks (48.7%), smartphones (28.0%), and tablets (5.2%). Only 9.2% still used traditional stationery such as pens and pencils.

The findings of this study are connected to prior studies that have indicated the benefits of using such mobile devices as notebooks/laptops, smartphones, tablets, and e-readers. These devices can be used either as a communication tool or an instructional tool in teaching. Mobile devices provide vital learning-related notices and enhance learner-learner and learner-instructor interaction. A notable advantage of such devices is their ability to permit learner-content alliance in real time as well as remotely (Deng et al., 2020; Idoga & Kazaure, 2022).

In addition, the results of this study found that notebooks/laptops were the participants' most-used learning device. This may be because nearly half (43.9%) of the study participants were between the ages of 21 and 30, who likely differ in their use of technology compared to older adults who may prefer tablets due to the portability and usability they provide (e.g., adjustable font or icon sizes) that can cater to a wide range of motor and visual abilities (Chan *et al.*, 2016).

4.2. The Respondents' Readiness for Digital Higher Education

Results presented in Table 3 show that health readiness had the highest mean score ($M = 4.21$, $SD = 0.16$), followed by readiness for digital learning devices ($M = 4.18$, $SD = 0.32$), digital skills ($M = 4.05$, $SD = 0.24$), and study time allocation ($M = 4.00$, $SD = 0.12$). Financial readiness had the lowest mean score among all the readiness dimensions ($M = 3.83$, $SD = 0.18$).

Table 3. Students' Readiness for Digital Higher Education

Readiness Dimension	Mean (SD)	Level
Digital learning devices	4.18 (0.32)	High
Digital skills	4.05 (0.24)	High
Study time allocation	4.00 (0.12)	High
Finance	3.83 (0.18)	High
Health	4.21 (0.16)	High

The findings evidenced that the respondents gave the highest rating to health readiness. In this study, health readiness was defined as a state of physical health, mental health, and the ability to perform daily duties effectively and live happily in society. This may be explained by the fact that the majority of the respondents were in their early adulthood (i.e., between the ages of 21 and 40), at their optimal physical strength, and having gone through relatively complete intellectual, emotional, and social development. In addition, the majority of the respondents studied in health-related fields, such as Occupational Health and Safety, and Early Childhood Development. Thus, they may have the knowledge to take care of their own health and have relatively high health readiness.

Besides, the results revealed that the respondents had a high level of readiness in the dimensions of digital learning devices and digital skills. These findings are in line with previous studies (Kim *et al.*, 2019; Händel *et al.*, 2020; Zahir Osman *et al.*, 2021), which concluded that digital readiness is an important factor that can enhance learning capabilities of students in the distance education system. Additionally, digital readiness is a positive signal and motivator for increasing the students' work productivity. Digital readiness enhances students' technology-related knowledge, skills, and competencies, which can play a constructive role in meeting their academic expectations.

Although the results indicated that respondents had high levels of readiness in study time allocation and financial readiness, these two dimensions had the lowest mean scores. This may be due to the fact that the respondents were students at STOU, an open university that manages teaching and learning through the distance education system. At STOU, students comprise people of all age groups who are able to study without leaving their work (Sungsri, 2015). Most of the students are employed. As a result, they tend to have difficulty allocating time to study. In addition, the Covid-19 disease began to spread globally at the end of 2019. The pandemic had an impact not only on health but also other aspects of life, including the students' financial readiness towards digital higher education. This finding is supported by Gewalt *et al.* (2022), who suggested that one of the factors influencing students' e-readiness is their financial status (i.e., their socio-economic status). This should be considered in future research.

However, the results of this study indicated a high level of learners' readiness for digital higher education in all dimensions. These findings thus support the importance of digital transformation in higher education to meet the needs of 21st-century learners.

4.3. Essential Skills for Improvement

Figure 1 shows that the top five skills respondents want to improve are: career skills (n = 174, 64.2%), critical thinking and problem-solving skills (n = 151, 55.7%), cooperative skills, teamwork and leadership (n = 106, 39.1%), digital skills (n = 79, 29.2%), and creativity and innovation skills (n =73, 27%). Arithmetic skills (n =42, 15.5%) and intercultural/inter-paradigm understanding skills (n =39, 14.4%) were considered the least required.

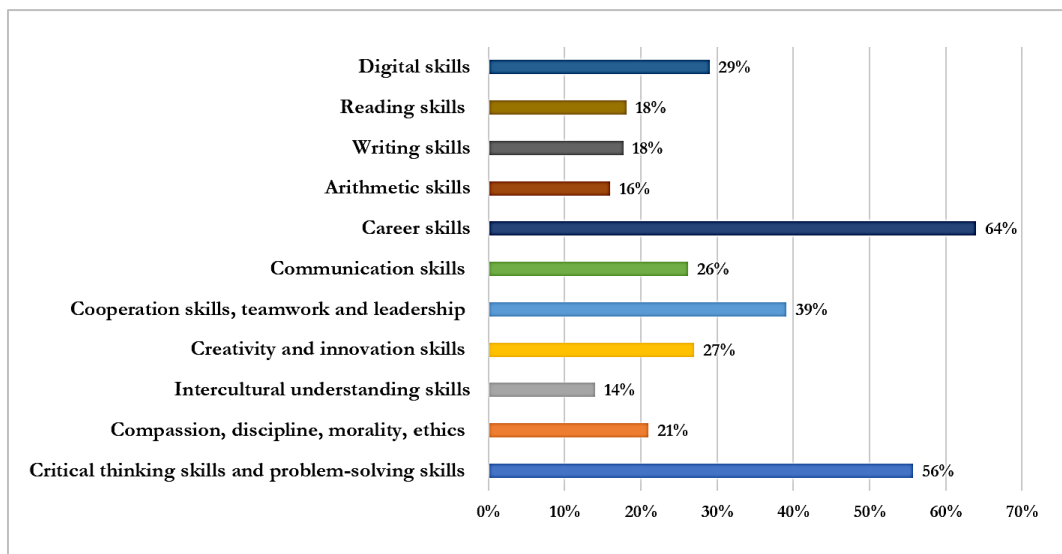


Figure 1. Essential skills that respondents want to improve

The results in this study revealed that the most important skills that the respondents want to improve was career skills, which constitute the sum of professional knowledge, skills, and experiences that enable the individual to perform a job effectively, influencing success at work, income, and career progression (Indeed, 2023). This finding may lend support to the relevant studies (Fuchs, 2010; Van Laar et al. 2020) that assert the workforce’s need to be capable of continuously adapting to shifting job requirements related to new skills-intensive technologies. Development of new technology leads to improved productivity; as a consequence, technology is increasingly replacing manual labour and being integrated into most aspects of work. As workplaces become more complex and supported by information and communication technology, more jobs require technical skills.

The results also evidenced that the respondents rated the following three skills highly: critical thinking and problem-solving skills, cooperative skills, teamwork and leadership, and digital skills. This finding is in line with Rutkowski (2015), who indicated that employers seek not only technical and job-specific skills but also cognitive skills (such as literacy, numeracy and problem-solving) and adequate socio-behavioural skills (such as communication, teamwork and leadership). In particular, the respondents’ recognising the requirement for digital skills is in line with a Washington, D.C. report (2023) that found strong demand for digital skills across every industry and in almost every occupation, including entry-level and frontline positions (National Skills Coalition, 2023). Therefore, it is critical that higher education institutions keep up-to-date on the latest digital technologies required in a rapidly changing labour market as indicated in the report on Digital Transformation of Philippine Higher Education (World Bank, 2022). Likewise, language skills, including reading and writing, are essential for communication in global or culturally diverse workplaces. Through writing the students can express their ideas and thoughts into the written form (Anggraeni & Pentury, 2018).

On the other hand, although skills related to compassion, discipline, morality, ethics, and intercultural understanding were rated relatively low by the respondents, they are all important skills of the desired workforce in today’s world. Higher education institutions play a vital role in producing graduates with good academic qualifications, balanced with good moral and ethical values (Raziana Che Aziz et al., 2022).

As part of the future workforce, fresh graduates need to have all the essential skills and values to face future challenges in the 21st century.

5. Conclusion

This study focuses on the readiness levels and required skills for digital higher education of students at STOU, Thailand. Results revealed that health readiness had the highest mean score, followed by readiness for digital learning devices, digital skills, study time allocation, and financial readiness. The top five skills respondents want to improve were career skills, critical thinking skills and problem-solving skills, cooperative skills, teamwork and leadership, digital skills, and finally, creativity and innovation skills. The study offers a holistic view of students' readiness for digital higher education, as well as essential skills that should be developed in line with the needs of distance learning students. These findings can be used to promote successful learning outcomes in higher education. The limitation of this study was that 271 participants were selected from four different majors and some majors had relatively few students. Therefore, future research may be conducted on samples in other fields of study to generalise the results to a larger group.

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