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Information and Communications Technology (ICT) as a Teaching and Learning Tool: A Study of Students' Readiness and Satisfaction

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Abstract. Students and academics in higher education institutions (HEIs) were perilously hit by the unparalleled changes due to the COVID-19 pandemic. Within a span of less than a month, teaching and learning activities were shifted online to warrant continuity. This study intends to probe the online learning readiness and satisfaction among university students within the scope of students' prior ICT knowledge and the university's ICT infrastructure. This study employs a quantitative approach with a questionnaire as the research instrument. A sample size of 1,692 Sunway University students in the Ministry of Education (MOE) General Studies subjects were chosen. The data were analysed descriptively, and the results revealed that students are generally ready for online learning, and they are satisfied with the ICT amenities provided. As a result, both students and Sunway University are well-prepared, with the major implication that student preparation and satisfaction, as well as infrastructures, are critical to scaffold the accelerated transition in the use of online learning.

Keywords: readiness; satisfaction; Information and Communication Technology; teaching tools

1. Introduction

The COVID-19 pandemic has forced educators to shift from face-to-face to online learning (Mahmud et al., 2022). Even though the world has entered an endemic phase, online teaching and learning methods remain a popular option. Youths today are accustomed to digital learning sessions, and their lives are constantly exposed to the most recent developments in information and communication technology (ICT). In other words, information technology and ICT are inextricably linked to the lives of today's generation. This is because ICT functions

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support the learning revolution by providing global communication and information access, flexibility, interactivity, communication facilities, and online discussions that promote learning outside of the classroom. Access to learning materials and the use of multimedia can make learning more enjoyable (Thandevaraj et al., 2021). Furthermore, online learning allows students and lecturers to communicate, and learning sessions can take place concurrently even if their locations are different (Mahmud, 2018; Salleh, 2021). As a result, students' readiness to use technology and communication is an important factor in ensuring student excellence in online learning. If students do not have the knowledge and skills to use ICT, the learning process will be hampered.

One of the challenges that students face that makes them less prepared to pursue online learning is a lack of a personal computer. According to the findings of a survey by Salleh et al. (2021) at Politeknik Ibrahim Sultan Johor (PIS), 18.1 per cent of engineering science programme students did not have a personal computer. Their research also demonstrated the importance of personal computer ownership, even though it is a relatively minor component in PIS. This finding is supported by the study of Aziz and Sieng (2019) as well as Jafar et al. (2020), who stated that the equipment of technology facilities affects the learning process among students. Due to this, students are forced to just utilise their mobile phones to keep up with their studies, which is inappropriate because they do not have access to computers (Hassan, 2021). Furthermore, students' readiness to pursue online learning is hampered by a lack of internet access (Mahmud et al., 2021). Interrupted internet access is a common problem in online teaching and learning, whether for lecturers or students. According to Mahmud et al. (2021) when the Movement Control Order (MCO) is issued, lecturers must enter the campus to obtain ICT facilities provided by the Institution of Higher Education to ensure that online teaching and learning run smoothly. Furthermore, for this to happen, students must have adequate ICT knowledge and skills.

Furthermore, students' lack of knowledge about ICT use causes the online learning process to fall behind. According to Hasin et al.'s (2021) study on the difference in achievement between rural and urban students in the use of ICT, rural students are less interested than urban students. They claim that constraints and a lack of ICT facilities have harmed the effectiveness and quality of rural education. Because of the impact of ICT use, 87.5 per cent of respondents agreed that there is a knowledge gap and competition between rural and urban students. According to the Malay dictionary, Kamus Dewan (2015), knowledge refers to information that has been mastered or known. As a result, students require preliminary knowledge, particularly regarding their ICT experience, to learn information more quickly (Kit & Ganapathy, 2019). For example, ICT has increased students' interest in learning by making it easier and faster to access necessary learning materials online (Muhammad & Ismail, 2020). According to Ishak and Yamin (2019), ICT knowledge includes various skills in using ICT tools, such as computer tools and hardware, application software, the internet, and so on. Students' knowledge and use of ICT are seen as beneficial to the country's education and the formation of knowledgeable human capital.

In addition to knowing ICT, skills in using the latest technology are an important factor in the readiness of students to use ICT as a learning tool. Skill means competence or ingenuity (Kamus Dewan, 2015). Skills are also associated with the achievement, application, or manipulation of knowledge. According to Das (2019), ICT is an abbreviation for Information and Communication Technology and is defined as the equipment and resources of technology used to communicate, create, disseminate, store and manage information. Therefore, ICT skills in this context are skills where users understand and can use ICT equipment and knowledge in performing any task. Furthermore, Ishak and Yamin (2019) also stated that students with sufficient ICT skills could use various resources such as computer hardware, computer networks, software, and the internet to meet their information needs. This is supported by Muhammad and Ismail (2020) who say that adequate ICT skills have encouraged students' interest in mastering knowledge by simply accessing the required learning materials online more easily and quickly. ICT skills learnt by students are seen as very important in the learning process and in line with the development of modern education. Even a blended learning approach can also improve students' ICT skills.

Other factors, such as having a personal laptop, knowledge and skills, all contribute to the element of student readiness in online learning. If students are not prepared through online learning, they will find it a significant challenge. For example, the lack of laptops and internet access will inevitably have an impact on the direct online learning process. According to Mohamad's (2021) study on the pedagogical challenges of the new norm at Perlis Islamic University College (KUIPs), almost all students have smartphones. But they are still less capable of retrieving data or connecting to the internet. Students who are less able and do not have the convenience of gadgets such as laptops find it difficult to keep up with all of the online learning, making it a challenge. As a result, external factors are critical in contributing to the satisfaction of students who pursue online learning. Among the factors identified are the university's infrastructure facilities, such as adequate ICT facilities, cutting-edge ICT facilities, encouraging ICT facilities, and access to teaching materials. According to Ho et al. (2021), the experiences that students have regularly on campus will form a source of satisfaction for them. Thus, student satisfaction with the university's ICT facilities is an initial expectation of the experience students have after completing the online learning process.

The first external factor is that the university's ICT facilities must be adequate. For example, technological advances in the twenty-first century have resulted in a slew of new facility platforms that facilitate communication between educators and students (Camilleri, 2021). The university must provide an appropriate platform for teaching and learning used by the majority of educational institutions, such as Zoom applications, Microsoft Teams, Google Classroom, and Google Meet, which are popular teaching and learning trends. These findings are consistent with the findings of Bizami et al. (2022) who stated that teaching and learning sessions are now using technologies with appealing and sophisticated software features. This research backs up the findings of Gopal et al. (2021), who discovered that the use of online web technology media affects student

satisfaction and performance. As a result, students can learn about many mediums and applications that are rarely or never used. Finally, e-learning methods with adequate ICT capabilities can now entice the younger generation to acquire knowledge easily and effectively.

The second external factor is that the most up-to-date ICT facilities play a significant role in ensuring current students' happiness with the online learning process. During the ICT-based teaching and learning process, technology plays a significant role. There are a variety of gadgets, including desktops, laptops, mobile phones, smart devices, internet connections, and online learning platforms (Rafique et al., 2021). With the university's comprehensive and cutting-edge ICT facilities, instructors can not only deliver, receive, access, and share information in a variety of formats, but also provide students with a satisfying and conducive learning environment that can broaden their perspectives and make collaborative learning sessions more effective. This is corroborated by Mustamam et al. (2021), who found that the effectiveness of online learning content was successfully given via ICT teaching facilities in the form of videos. Through this online learning, the instructor can also teach students how to think critically and creatively. In addition, the ICT facilities enable students to explore the rapidly expanding world of information and communication technology (Salleh et al., 2021). Therefore, the most recent ICT facilities have become essential at all levels of education, from elementary schools to institutions of higher education.

Furthermore, student satisfaction can be seen in the aspect of ICT facilities that can encourage more exciting and productive teaching and learning. Providing innovative online learning tools can pique students' interest and satisfaction. Panopto learning tools, for example, make it easier for students to quickly access lecture videos. Students can access Panopto via laptops, mobile phones, and tablets to better understand the learning syllabus. Metz and Metz (2022) added that Panopto has advantages such as being able to access personal computers, Macs, tablets, and mobile phones, and students can find important information in the video by typing keywords only. Other ICT tools, such as Mentimeter, Nearpod and Padlet, can also increase student satisfaction with learning. This is because the tool can spark lively discussions, transforming the classroom environment. This is consistent with Gao's (2021) claim that Mentimeter can entice students to engage in conversation and measure their opinions. As a result, each web-based teaching tool should be appropriate and appealing to foster an active learning environment and a positive collaboration with lecturers. According to Dhawan (2020), an institution must choose the best online teaching and learning tools. Simultaneously, web-based teaching tools should address issues such as safety, laboratory availability and conditions, internet speed, internet access, beneficiary digital literacy level, and so on (Mahmud et al., 2021). As the introduction of ICT technology has been accelerated in various areas today, many people have been interested in its effect, especially students who are benefiting from the technology in completing their assessments efficiently. Such a situation is very helpful in assignments such as promoting their events on social media to attract public support. As a result, the availability of a wide range of technology also has contributed to web-based teaching tools, which have been advantageous in

launching online learning and increasing student satisfaction with the university's infrastructure.

The final external factor is the ease with which teaching materials can be accessed. This refers to the features found in a platform that are designed to prevent students from becoming confused while searching for information. Students are also satisfied when they can clearly understand the features of the platform that has been provided. The university, for example, provides platforms such as eLearn Blackboard, Moodle, Massive Open Online Courses (MOOC), and so on. In line with the findings of Yaacob et al. (2021), one of the features found in eLearn Blackboard is the "Announcements" section, which is a section that distributes important information and reminders to students who access the platform, such as important dates, class activity lists, and so on. Next, Meirbekov et al. (2022) claim that the teaching materials available in eLearn can help students develop skills and stimulate critical thinking. In short, students' satisfaction with the ease of accessing online learning materials is also dependent on the platform provided by the institution, which allows students to focus more on their learning.

Based on the above description, the problem statements are to analyse how prepared the students are to use online teaching and learning technology and how satisfied they are with the technology facilities supplied by higher education institutions. Thus, the aim of this research is to identify students' readiness to use technology for online teaching and learning and to identify the level of student satisfaction with technological facilities provided by higher learning institutions. This is because the readiness and satisfaction of students in using ICT as a learning tool is an important measure for the university to ensure that the services provided are adequate and comfortable. According to Talip and Taat (2021), the level of student satisfaction with an institution of higher learning can be used to assess the quality of its services. In addition, students must improve their ICT skills for ICT-based learning to run smoothly. In this case, there is a need to strike a balance between students' readiness and the university's ICT resources to achieve adequate e-learning quality.

2. Materials and methods

All data gathered are intended to answer the study's purpose and questions. As a result, this section discusses the study design, research samples, research instruments, study procedure and analysis of data gathered.

2.1 Research design

This study is quantitative and was conducted according to the survey method. According to Raman et al. (2019), this method is suitable for measuring the respondents' views on an issue or topic, the achievement of an objective, and the attitudes and behaviours of respondents. This method was selected based on its suitability with the purpose of the study, which is to survey the perception of the level of readiness and satisfaction of students with their experience using technological facilities provided by the institution. This method is seen as practical as the respondents of this study involve a large number of students.

2.2 Study sample

This study used a random sampling technique for its sampling. The target audience is comprised of Sunway University students enrolled in the Department of General Studies between January and March 2022. This study's sample consists of 1,692 students from Sunway College and Sunway University who were enrolled in online courses; 1008 respondents were female (59.6%), while 684 were male (40.4%). In terms of ethnicity, the bulk of respondents for this research are Chinese, with 1,404 (45.7%), followed by Indians and others with 160 (9.5%) and Malays with 126 (7.5%) (Table 1).

Following that, all respondents are from three educational levels. The highest number of students involved in this survey is degree students (81.7%), followed by diploma students (1.6%), and certificate students (6%). Respondents come from four different programmes: Sunway University Business School (SUBS), Sunway Arts School (SOA), Sunway TES, and Sunway Science and Technology School (SST). Most respondents (73.6%) came from SUBS, followed by the SOA (11.3%), Sunway TES (8.1%), and the SST 118 (7%), as shown in Table 2.

Table 1: Demographic Profile of the Respondents

Characteristic	Frequency	Percentage
Gender		
Female	1008	59.6
Male	684	40.4
Race		
Chinese	1404	83.0
Indian & others	160	9.5
Malay	126	7.5
Area of living		
City	1258	74.4
Rural area	433	25.6

Table 2: Respondents' Course Details

Characteristic	Frequency	Percentage
Level of Education		
Degree	1383	81.7
Diploma	197	11.6
Certificate	112	6.6
Program/Department		
Sunway University Business School (SUBS)	1245	73.6
School of Arts (SOA)	191	11.3
Sunway TES	137	8.1
School of Science and Technology (SST)	118	7
Semester		
Semester 1	375	22.2
Semester 2	642	38.0
Semester 3	444	26.3
Semester 4	228	13.5
General Studies' Subject		
Islamic Civilization and Asian Studies	674	39.8

Ethnic Relation	488	28.8
Appreciation of Ethics and Civilizations	168	9.9
Bahasa Kebangsaan A (BKA)	147	8.7
Philosophy and Current Issues	117	6.8
Islamic Studies	60	3.5
Malaysian Studies 2	35	2.1
Mode of Learning		
Hybrid Method (Pre-class & Face to face or Live Class)	846	50.0
Full live Class Online	740	43.7
Full Face to Face Class	106	6.3

2.3 Research instruments

The instrument is a collection of questionnaires used to collect data as a measuring tool. The questionnaires used in the study were developed by the General Studies department and called the General Subject Questionnaire (MPU) 2022. There are demographic items and 70 questionnaire items on students' perceptions and attitudes towards the acceptance of blended online learning. The questionnaire is divided into 13 sections. Only one of these 13 sections is directly related to this research. The primary focus of this study is Part J, titled infrastructure facilities, which includes eight items. The items built are related to students' level of readiness and satisfaction with their experience using technological facilities provided by educational institutions. The researcher used Cronbach's alpha to validate the questionnaires. The value for the eight items is 0.961. Based on the alpha values, it shows that the questionnaires have high reliability and can measure the variables in this study well.

2.4 Study procedure

Prior to data collection procedures, the researcher had the questionnaire reviewed by an expert for question summary and title correction. Google Forms was used to create the questionnaire for online data gathering. After the question had been prepared, it was emailed to the respondents. Respondents were asked to indicate whether they agreed or disagreed with each of the items given. The collected data were then analysed using descriptive statistics and SPSS software.

2.5 Analysis

The collected data were analysed using descriptive statistics through SPSS software. This study's questions were answered using descriptive analysis with mean score values. The average score in this study has been divided into three levels, namely low, medium and high, to give a more precise explanation of the level of variables. Factor levels are measured using a 5-point Likert scale. The score range is between 1.00 to 5.00. For the low level, the score range is 1 to 1.7. For the medium level, the score range is 1.8 to 3.4, while, for the high level, the score range is 3.5 to 5. This division is obtained by dividing the highest score, which is a score of 5, into three parts (low level, medium and high), and the new standard deviation obtained is 1.7 for each level. The mean score values were then interpreted using the mean score interpretation, as shown in Table 3. Yaacob

(2016) adopted this mean score interpretation, which has been modified to facilitate data analysis.

Table 3: Interpretation of Mean Score Values

Means Score	Level
1.00 until 1.70	Low
1.80 until 3.40	Moderate
3.50 until 5.00	High

3. Results

Table 4 displays the mean score findings for the four items for the level of readiness of students in learning with teaching tools. Overall, items with a personal laptop recorded the highest mean score (mean score = 4.25), followed by having internet access facilities (mean score = 4.12), and knowledge items in ICT also recorded the lowest mean score (mean score = 3.94). Overall, students' readiness level in learning with teaching tools is at high level (mean score = 4.07).

Table 4: Students' Readiness in Learning with Teaching Tools

Item	Mean Score	Level
Own a personal laptop	4.24	High
Have internet access	4.12	High
Knowledgeable in ICT	3.94	High
Proficient in ICT	3.95	High
Overall mean score	**4.07**	**High**

Table 5 shows the mean score findings for four items that have been studied on the level of student satisfaction with ICT facilities provided by the university. Among the four items, adequate ICT facilities and the latest ICT facilities recorded the highest mean score of 4.02. The results of the analysis showed that there was no difference between the two items when obtaining the same mean score. These were followed by the ease of accessing teaching materials which is at a moderate level (mean score = 3.54). Overall, the level of student satisfaction in ICT provided by the university recorded a mean score at a high level of 3.88.

Table 5: Students' Satisfaction with ICT Facilities Provided by the University

Item	Mean Score	Level
Adequate ICT facilities	4.02	High
Latest ICT facilities	4.02	High
Engaging ICT facilities	3.95	High
Easy access to teaching materials	3.54	High
Overall mean score	**3.88**	**High**

4. Discussion

The findings show that the mean score for students' readiness in using technology in the teaching process of general courses at Sunway University is high, with a mean score of 4.07. The high percentage of computer ownership ensures students' preparedness and contentment with the online teaching and learning given by lecturers. This is supported by a study conducted by Ismail et al. (2021) at the Dato

'Razali Ismail Campus Teacher Education Institute (IPGKDRI), which discovered that 98.6 per cent of students, or 629 out of 638, are ready to use personal computers in following teaching and learning process when compared to other digital devices. These findings are also consistent with the research of Bestiantono et al. (2020), who found that 71.4 per cent of the 180 study participants in Budi Utomo Secondary School, Indonesia, are confident and ready to utilise computers for online learning. However, other conditions explain the necessity to acquire a computer to assure the preparedness and pleasure of online teaching and learning. This is in line with by the findings of Mokhtar et al. (2021), who discovered that the usage of laptop computers among special education instructors in Selangor is somewhat high. According to the researchers, throughout the pandemic, respondents taught using computers and phones as an appropriate communication medium to apply teaching and learning to children with special needs. Simsek et al. (2021) stated that students are moderately satisfied with online teaching and learning. This study is based on data from Istanbul University, Cerrahpasa in Turkey, which included 8884 out of 13447 students (66.1%) using personal computers and others using cell phones.

A high mean score was also obtained for the item of internet access facilities. Sunway University's location and the fact that most student residences in the city have internet connections testify to this. In line with the findings of Kabir's (2020) study, the majority of private institutions are located in urban regions, and most city students also have better access and exposure to the internet. During the COVID-19 epidemic, a study by Shigemura et al. (2020) found that individuals living in urban regions are more favourable to online learning and have lower student anxiety than those living in rural areas. This circumstance makes it easier for responders to keep up with online teaching and learning. However, according to Mohammad (2020), residential location seems to have little impact on internet access facilities or even access to an internet network, which influences student satisfaction with online learning. This is because students in cities still have issues with low internet connectivity as compared to students in rural areas who have a stable internet network. These findings are also supported by Shamsuddin et al. (2022), who found that students in metropolitan regions have limited access to the internet. As a result, a steady and robust internet network connection can help students study more effectively and enjoy their studies.

The respondents' priority of ICT knowledge and skills was also reflected in a high mean score. The high rating indicates that Sunway University students are prepared and have been exposed to digital technology because the majority live in the city and are quicker to master it. The findings of this study support the views of Olayemi et al. (2021), who said that ICT skills and competencies are required for the efficient and effective use of online learning platforms. The findings of his survey reveal that the majority of students claim to be skilled in using online learning. Moreover, pupils who have a strong background in computer literacy and web browsing are more likely to be interested in online learning. This is because students are unlikely to be engaged in online learning unless they are familiar with computer and internet services such as chat, discussion forums, web, electronic messages, and so on. These findings are also

reinforced by the research of Wahab et al. (2020), who found that students who master ICT abilities are more likely to implement current technology tools and even build a more realistic and dynamic learning environment. Furthermore, Wan et al. (2019) found that ICT literacy skills are extremely good among students due to the use of ICT in the teaching and learning process. This application indirectly improves pupils' ICT abilities. The use of ICT facilities in teaching and learning is capable of improving ICT skills among students in line with the need to accomplish the industrial revolution 4.0.

The overall mean score for the satisfaction level in Sunway University's ICT facilities is at 3.88. The findings yielded demonstrated that the institution has offered sufficient ICT facilities for students to use for teaching and learning. According to Kabir (2020), private institutions of higher learning have been at the forefront of providing ICT facilities for the online learning process, and students are also prepared with the logistics and attitude to accept technology-based learning. Furthermore, students at Sunway University feel more at ease using the campus facilities. When all of the facilities are adequate, this will motivate students to learn. When student happiness is increased, student loyalty to the university increases (Masserini et al., 2019). The findings are also consistent with the findings of Ismail et al. (2021) and Samoylenko et al. (2022), who stated that the use of online web technology media has an impact on teaching and learning as well as student performance, and that internet-based web technology applications can support teaching and learning in institutes of higher learning and the implementation of more effective education systems.

Furthermore, the aspect of accessibility to instructional resources had a modest mean score of 3.54. This demonstrates that, while the university's ICT facilities are comprehensive, they will not guarantee a seamless process of accessing learning materials if students continue to lack knowledge on how to use and access information through the platform given. It is conceivable that some pupils are still inexperienced and uninterested in learning how to use the platform. According to Aziz et al. (2020), a person's perception of ease of use will increase a person's level of acceptance of technology. This is because there is a significant connection between attitudes towards technology's ease of use and acceptance of its use. However, the teaching materials are not available due to network system problems as well as computer maintenance issues in accessing the teaching materials. According to Nambiar (2020), students are disappointed when teachers are not prepared to provide technical help to them. The university must provide technical support such as generating e-content (in-house), providing broadband infrastructure for all, an e-learning platform (Learning Management System Blackboard Author), the construction of an e-learning development unit to assist professors in developing e-modules, and support from the Information Technology Centre (ITC) to enable seamless access to teaching materials (Hisham & Ramlan, 2020). Any such encouragement will increase the probability of using and participating in e-learning.

5. Conclusion

Through this study, two objectives have been investigated by the researcher namely, to identify students' readiness to use technology for online teaching and learning and to identify the level of student satisfaction with technological facilities provided by higher learning institutions. Overall, the study's findings show the readiness and satisfaction of students in using ICT as a teaching and learning tool at Sunway University are at a high level. This supports the view that all Sunway University students are prepared and have good experience using ICT as a learning medium. This is supportive that the university has provided the best services to students, especially in online learning and teaching. Therefore, the findings of this study can be used as a reference, especially for researchers to expand further the study of the role and function of ICT in education in the new millennium, such as network-based learning, computer-based learning, virtual classrooms, and digital collaboration. At the same time, educators can use this study as a guide or procedure to organise, design, and plan to teach and learn with the help of ICT. For example, instructors can use PowerPoint and video recording, YouTube, and online activities like Quizizz, Kahoot, Mentimeter, and others to perform efficient teaching and learning processes. Modules or methods of teaching and learning using ICT can be enhanced with the availability of technology facilities and advanced ICT knowledge. Effective use of ICT will also increase students' motivation to pursue learning digitally. Therefore, ICT should be used as much as possible to uphold the field of modern education and student excellence.

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Appendix 1

This study aims to probe the online learning readiness and satisfaction among university students within the scope of students' prior ICT knowledge and the university's ICT infrastructure

Scale: Strongly disagree, Disagree, Moderate, Agree, strongly agree

Infrastructure facility

1. Adequate ICT facilities?
2. Latest ICT facilities?
3. Engaging ICT facilities?
4. Easy access to teaching material?
5. Own a personal laptop?
6. Have internet access?
7. Knowledgeable in ICT?
8. Proficient in ICT?