

Limitations of ICT Support in Post-Pandemic E-Learning among Students of Islamic Studies, UiTM Shah Alam

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ABSTRACT

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ICT is an important factor in supporting e-learning, especially in the post-pandemic period. However, ICT has also been found to have limitations in supporting e-learning. This study focuses on identifying the limitations of ICT support in pursuing e-learning and methods to address it at the higher education level. The final year student of Islamic studies at the Academy of Contemporary Islamic Studies, Universiti Teknologi MARA Shah Alam was involved as a respondent (n=87) after screening. The online questionnaire is used as an instrument of data collection as e-learning is still applied. The data is analyzed using IBM SPSS Statistics computer software. Friedman's test results found a significant difference in the variable "Unsatisfactory internet access and coverage" (mean rank: 2.75) with $\chi^2(3)=12.507$, $p=.006$, and on the variable "Working in part-time jobs to accommodate the needs" (mean rank: 2.83) with $\chi^2(3)=24.788$, $p=.000$. This study suggests unsatisfactory internet access and coverage as a major factor in ICT limitations that is common in pursuing online learning among higher education students in UiTM Shah Alam. The students also had to work part-time jobs to accommodate this need. A qualitative approach, especially ethnography is recommended to be adapted to deepen the real situation based on the current reality of higher education students for future studies.

Contribution/Originality: This study is one of very few that have investigated a novel research issue pertaining to the constraints of ICT support in e-learning among

students of Islamic studies at university, specifically in the post-pandemic era. This study examines the factors and potential solutions associated with this challenge.

1. Introduction

Information and communications technology (ICT) is an important factor in supporting e-learning, especially in the pandemic and post-pandemic era. E-learning, as a process of transferring skills and knowledge, is usually carried out through computer technology, telecommunications, and internet networks (Encarnacion et al., 2021). ICT in e-learning includes web-based learning, computer-based learning, virtual education, and the use of digital data provision. Digital content is transmitted via the internet, in the form of digital documents, audio, or video. E-learning focuses on student-centered learning in accommodating individual virtues and needs (Uskov et al., 2014). Access to the best sources and reference materials, lecture sessions, teaching points, and experienced teachers is given (Wani, 2013).

However, ICT has also been found to have limitations in supporting e-learning. Some of the identifiable problems limit the e-learning process, especially the support of technical aspects. In most problems, internet access is one of the main limitations in supporting e-learning (Sakkir et al., 2021). The rural areas subsequently have limited internet access (Ekezue et al., 2022), and even though the cost is quite reasonable, but not affordable for them, especially the 'hardware', and accompanied by a requisite 'software' (Péter, 2020). Some fields of study require high-end digital devices and software which will cost it high. In the pandemic situation, e-learning, which also had to be conducted in their homes, was faced with inappropriate training. Physical ergonomic domestic equipment (Eldho & Muthukumar, 2022) and convenient space (Feliz et al., 2022) to support e-learning at home also have to be taken seriously for maintaining performance and focus throughout participation.

This study focuses on identifying the limitations of ICT support in following e-learning and methods to deal with it among Final Year Students of Islamic Studies in Universiti Teknologi MARA Shah Alam, Selangor. The aspects of ICT limitations in supporting e-learning need to be known for sure and refined. This study, in addition to being able to assist authorities in solving problems related to ICT in supporting e-learning, also allows the virtues of students to be guaranteed. The authorities need to provide a review plan to allow no learners to be left behind from participating in e-learning due to technical problems.

1.1. The Importance of ICT in E-Learning

In recent years, advances in ICT have embodied a new paradigm in the dissemination and acceptance of information among the public (Brown et al., 2019). ICT has also established a learning model for higher education around the world. The widespread use of ICT leads to the adaptation of open, flexible, and distance learning systems. This concept is referred to as e-learning. E-learning forms an educational concept that is easily accessible to many people around the world with the support of optimum ICT scarcity (Babu & Sridevi, 2018).

The application of ICT in the education system has made a significant impression on the entire education system with the emergence of the concept of e-learning. The concept of

e-learning allows the learning system to be implemented whether it is campus-based or remote. As a concept of digital education, e-learning is also used in the virtual classroom and blended learning (Singh, 2021). This concept usually reduces the cost of transportation, lodging, and living cost compared to conventional learning concepts. With e-learning, the ability of educational opportunities can be improved, especially with ICT support (Nikolić et al., 2019). However, effective strategies must be designed and implemented to provide completeness of ICT in line with the needs of e-learning.

ICT is an important factor in the increased demand for e-learning systems in the local and international markets. The increase in digital education through e-learning is common in most institutions of higher learning compared to secondary and primary education due to the support of infrastructure facilities and maintenance (Kumar, 2020). The development and implementation of comprehensive higher education e-learning need to be well planned, implemented, and expanded to the secondary and primary education levels (Babu & Sridevi, 2018).

1.2. E-Learning: A Model of Post-Pandemic Education

During the early phase of the COVID-19 pandemic, more than 1.5 billion or nearly 88% of the world's student population was affected by school closures involving more than 181 countries (UNESCO, 2020; Lynch, 2020). In the face of this situation, the concept of online learning was introduced to control and reduce the risk of COVID-19 infection. The process of teaching and learning through this session is initially expected to be easier and more efficient as there is no need to face-to-face and use physical documents. Nevertheless, unequal access to different technologies and levels of ICT support is a major challenge in this learning process (Lynch, 2020).

The COVID-19 pandemic has had a significant impact on all sectors, including education. This situation drastically changes lifestyle and flexibility. But for some community groups, the digital approach involving ICT devices is considered difficult and out of the ordinary in their affinity especially in the suburbs and rural areas. However, COVID-19 is gradually stimulating the efforts of the authorities in meeting the optimal needs and facilities to support life in a pandemic environment equally at all levels of society (Cathy & Farah, 2020; Hoq, 2020).

In pandemic and post-pandemic conditions, e-learning is considered the best teaching and learning method. E-learning covers all forms of digitally supported learning and teaching. E-learning can expand the reach of learning and sharing of teaching resources regardless of distance and time. However, ICT devices are needed as support for e-learning such as video devices, audio devices, and computers, as opposed to conventional delivery methods (Wani, 2013).

The concept of e-learning usually refers to the learning process that uses the internet and optimal ICT devices. In e-learning, the learning process is carried out continuously during the storage and implementation of data containing aspects of experts, educational syllabuses, series of documents, platform provision, and productivity (Masters & Ellaway, 2008). In secondary and lower education, pros e-learning emphasizes the concept of flexible, entertaining, and learner-centered pedagogy. However, e-learning in higher education emphasizes the aspect of efficient and effective knowledge transfer as a medium for sharing expertise and discussion of ideas (Childs et al., 2005; Colace et al., 2006; Masters & Ellaway, 2008).

1.3. ICT in Islamic Studies

The philosophy of education and study in Islam is comprehensive. Islamic education and studies focus on building students' personalities in faith, worship, and morality. Nilai-Islamic values are based on the al-Quran and the tradition of prophetic hadith (Faryadi, 2015). Traditionally, Islamic education and studies are carried out through teaching and learning methods on the printing of copies and specialized documents. Nevertheless, the goal of Islamic education cannot be fully achieved by relying solely on the classical learning style, especially in this postmodern period (Gyagenda, 2021).

The pandemic situation caused the curriculum and the difficulty of the lesson to be forced to be converted to adapt to the use of ICT in the teaching and learning process. Conventional teaching and learning methods in Islamic studies, e.g. face to face learning (talaqqi musyafahah) (Yusof et al., 2018), face to face Quranic recitation improvement (tahsin al-Quran) (Nurzannah & Ginting, 2022), and face to face Quranic memorization (tasmi' al-Quran) (Ismail et al., 2022) are considered inefficient in the pandemic situation. Developed Islamic countries such as Malaysia and Brunei provide the basis for implementing expertise training to adapt the digital literacy needed as the main platform for e-learning to teachers and students (Lubis et al., 2011).

In sustaining Islamic education and studies, several open-access websites and software as a reference in Islamic studies are widely used in universities in Malaysia and other countries. Among the websites and software that are often used are for instance Tanzil Quran Navigator (<https://tanzil.net>), Sunnah.com (<https://sunnah.com/>), and al-Maktabah al-Syamilah al-Hadithah (<https://al-maktaba.org/>). These websites provide a lot of information on various fields of Islamic studies, such as tafsir (interpretation of the Quran), hadith (prophetic tradition), fiqh (Islamic law of worship), and tasawwuf (Islamic morality and manners). As with any other academic field, Islamic education and studies use several e-learning platforms such as Cisco Webex, Google Meet, Zoom Meeting, and MOOC (massive open online courses) (Basri et al., 2021). However, in reality, the use of ICT still has its limitations in Islamic education and studies, especially when it comes to aspects of morality and discipline that require direct interaction among people (Gyagenda, 2021).

2. Literature Review

Ayuba (2021) examines the use of ICT devices for teaching and learning Islamic studies during the COVID-19 confinement order in Kwara Country, Nigeria. It is found that smartphones, radios, and television are widely used as ICT devices that support the e-learning of Islamic studies. Some digital platforms are also used such as Whatsapp, Zoom, Telegram, Facebook, Google, Zgo, Twitter, and Instagram. Ayuba (2021) reserves that teaching staff and students need to undergo professional training using ICT devices to the maximum. The use of ICT devices needs to be mastered so that e-learning in Islamic studies becomes practical and efficient (Ayuba, 2021).

A study on the availability, accessibility, and use of ICT in the teaching and learning of Islamic studies at the College of Education, Northeast, Nigeria, had been carried out by Ali (2018). However, this study revealed that the respondent's ICT usage level is unfortunately low, and only restricted computer packages and limited internet services are provided in the use of ICT in Islamic studies. This situation is considered to have not

reached the optimum level of ICT provision compared to other developing countries (Ali, 2018).

Meanwhile, Ahmad (2022) conducted a study on the use of e-learning as an implication of the COVID-19 pandemic for the higher education of Arabic language and Islamic studies in Ogun State. This study indicated that Arabic language and Islamic studies should increase efficiency in the use of ICT during and after the COVID-19 pandemic. The study also recommends that lecturers in Arabic language and Islamic studies be more proactive in acquiring strong digital knowledge to remain relevant in the profession (Ahmad, 2022).

Rahman et al. (2022) analyzed several issues and challenges for the implementation of e-learning in Islamic studies at Malaysian institutes of higher learning. Among the issues identified are the aspect of the preparation of students and lecturers to implement e-learning, the stigma of face-to-face teaching, the availability of ICT infrastructure and facilities, the negative impact of technology, and the continuity of the concept of talaqqi as a tradition in Islamic studies. Among the proposed solutions are the provision of optimal infrastructure and facilities, as well as a new model of talaqqi in e-learning. The talaqqi method of suspecting the tradition of Islamic studies in e-learning is proposed to be preserved innovatively as e-talaqqi (Rahman et al., 2022).

Razak et al. (2021) propose a future master plan development for national e-learning not only focusing on ICT facilitation in campuses and residential colleges but also paying attention to the personal students' ICT facilities. Authorities need to consider the sustainability of this learning across places and times and all walks of life. The COVID-19 pandemic stimulates the concept of open learning and should continue in the post-pandemic as well as normalization of preparation for uncertain future situations (Razak et al., 2021).

All of these researches (Ali, 2018; Ayuba, 2021; Ahmad, 2022; Rahman et al., 2022; Razak et al., 2021) revealed a few major problems of ICT aspects in supporting e-learning in post-pandemic, which are: (a) the ICT usage among students and academic staff is considered low; (b) ICT barriers in Islamic studies teaching and learning methods; (c) lack of ICT professional training among students and academic staff; (d) negative impact of ICT; (e) limitation of internet access; and (f) personal students' ICT facilities. However, based on the pilot survey that has been conducted earlier, this study focuses on selected problems as a construct of e-learning participation: (a) unsatisfactory internet access and coverage; (b) ineffective digital devices; (c) unsupported digital applications and software; (d) unergonomic domestic physical equipment.

3. Methodology

3.1. Sampling and Demographics

Final-year students of Islamic studies in Universiti Teknologi MARA Shah Alam were involved as respondents in this study (P=113, n=87) after screening (original amount n=91) due to the exclusion criteria of issuing international students. Random sampling technique is used and the sample size is determined using Krejcie and Morgan (1970). Descriptive statistical analysis (Table 1) shows the frequency of academic program categories, gender, and socioeconomic level.

Table 1: Respondent Demographics ($n=87$): (a) Academic Programme; (b) Gender; and (c) Socioeconomic Level.

	Categories	Frequencies	Percentage (%)
(a)	Mualamat	41	47.1
	Halal Industry Management	46	52.9
(b)	Male	19	21.8
	Female	68	78.2
(c)	Earning <MYR 5 thousand per month)	48	55.2
	Earning >MYR 5 thousand per month)	34	39.1
	Earning >MYR 10 thousand per month)	5	5.7

3.2. Instrumentation

The online questionnaire set is used as an instrument of data collection in this study as the online learning process is still underway. The data is analyzed using IBM SPSS Statistics computer software. Descriptive statistical analysis and Friedman tests are conducted to analyze the data. The questionnaires have been developed based on particular constructs (Table 2):

Table 2: Questionnaire Constructs: (a) Limitations of ICT Support in e-Learning; and (b) Methods of Dealing with ICT Limitations to Support e-Learning.

	Constructs
(a)	Unsatisfactory internet access and coverage.
	Ineffective digital devices.
	Unsupported digital applications and software.
	Unergonomic domestic physical equipment.
(b)	Working in part-time jobs to accommodate the needs.
	Compulsive to borrow money from others.
	Had to borrow/rent a digital device and equipment.
	Using a used digital device and equipment.

4. Result & Discussion

4.1. ICT limitations in E-Learning

The Friedman test (Table 3) found a significant difference in the variable “Unsatisfactory Internet access and coverage” (mean rank: 2.75) higher than the variable “Unsupported digital applications and software” (mean rank: 2.58), the variable “Ineffective digital devices” (mean rank: 2.44), and the variable “Unergonomic domestic physical equipment” (mean rank: 2.22) with $\chi^2(3)=12.507, p=.006$.

Table 3: Friedman Test: (a) Mean Rank; and (b) Test Statistics.

	Items	Results
(a)	Unsatisfactory internet access and coverage	2.75
	Ineffective digital devices	2.44
	Unsupported digital applications and software	2.58
	Unergonomic domestic physical equipment	2.22
(b)	Chi-Square	12.507
	df	3
	Asymp. Sig.	.006

Based on the analysis (Table 3), unsatisfactory internet access and coverage are the main limitations of ICT in e-learning. This finding is in line with Adeoye et al. (2020), Alsoud and Harasis (2021), Sarker et al. (2019), and Azlan et al. (2020) with their studies in Nigeria, Jordan, Bangladesh, and Malaysia respectively.

Adeoye et al. (2020) have conducted research in Nigeria, suggesting that e-learning serves as an alternative to conventional learning concepts. E-learning can help higher education institutes to provide more efficient learning methods. The COVID-19 pandemic has stimulated learning growth to improve Nigeria's education system, especially at the higher education level. The e-learning challenges in Nigeria consist of non-strategic electricity supply, high internet subscription costs, and poor internet access. Other aspects that need to be paid attention to in the implementation of e-learning include ICT facilities and infrastructure, professional training, and the cost of personal ICT devices.

In the meantime, Alsoud and Harasis (2021) examine the experiences of university students in Jordan in e-learning during the COVID-19 pandemic. The vast majority of students have ICT devices that support e-learning. However, limited internet access, lack of dedicated space to study, and inadequate personal ICT devices are factors in ICT limitations in supporting e-learning. They also had to allocate longer time to e-learning than conventional learning before the pandemic. The Jordanian government, university administrators, and authorities should develop an education system that supports e-learning for the future of Jordan's education system.

However, Sarker et al. (2019) have identified some limitations involving institutions from administration and technical aspects in the implementation of e-learning in Bangladesh. The provision of competent ICT training to users, high-quality learning content, and a conducive medium of interaction between educators and learners is known to be the main factor to utilize the use of ICT in the implementation of e-learning in Bangladesh.

Nevertheless, Azlan et al. (2020) suggested that e-learning can be normalized as a post-pandemic hybrid learning at the University of Malaya, Malaysia. An e-learning activity is proposed to be improved to achieve comparable quality to a conventional physical class. However, recording lectures and online meetings are not enough for an effective e-learning concept. Online collaborative learning needs to be diversified to increase the level of efficiency of teaching delivery and student engagement (Azlan et al., 2020).

4.2. Method of Dealing with ICT Limitations in E-learning Participation

The Friedman test (Table 4) found a significant difference in the variable "Working in part-time jobs to accommodate the needs" (mean rank: 2.83) higher than the variable "Compulsive to borrow money from others" (mean rank: 2.58), the variable "Using a used digital device and equipment" (mean rank: 2.36), and the variable "Had to borrow/rent a digital device and equipment" (mean rank: 2.23) with $\chi^2(3)=24,788$, $p=.000$.

Based on the analysis, most students admit to having a part-time job to support the need for e-learning. This finding is consistent with Tsurugano et al. (2021), which state that as many as 37% of students are worried about living expenses and tuition fees, and a higher percentage of students are aware of having unsound finances to cope with deteriorating health. Nevertheless, 70.5% of students can carry out their assignments online based on

perception, attitude, and awareness even in pandemic situations. This fact shows the effect of perception and a significant attitude toward the awareness of students to do online assignments (Maison et al., 2021).

Table 4: Friedman Test Analysis: (a) Mean Rank; and (b) Test Statistics.

Items		Results
	Working in part-time jobs to accommodate the needs.	2.83
(a)	Compulsive to borrow money from others.	2.58
	Had to borrow/rent a digital device and equipment.	2.23
	Using a used digital device and equipment.	2.36
	Chi-Square	24.788
(b)	df	3
	Asymp. Sig.	.000

Meanwhile, [Asgari et al. \(2021\)](#) found several parents had lost their careers due to COVID-19 pandemic. The entire family was dependent on the part-time work of the younger adults (students) to make ends meet. In specific case, COVID-19 has affected college students living in a metropolis in Southern United States. Some of them were required to work up to 60 hours a week or perform numerous part-time jobs in contract work, personal banking, and shop retailing ([Gan & Flores, 2021](#)). As in general, COVID-19 post-pandemic environment gives a significant growth in work-from-home opportunities during the epidemic has changed the way many jobs and people evaluate the usefulness of working from home ([Fatmi et al., 2022](#)), including university students. Therefore, this effort greatly contributes to the provision of solutions that allow students to continue participating in e-learning while pushing the limits of ICT.

5. Conclusion

This study suggests unsatisfactory internet access and coverage as a common ICT limitations factor in pursuing post-pandemic e-learning, especially among students of Islamic studies in UiTM Shah Alam. Internet access is an aspect that should be emphasized by the authorities. Most of the students come from the middle-income group and live in the suburbs and rural areas. They are believed to diving into the hard work with enthusiasm even during the pandemic. However, this situation is expected to worsen as their parents/carers suffer heavy losses in the business, were laid off, shut down their businesses, and were left without being paid due to the execution of movement control orders throughout the country. In addition, this situation adversely affects the support of e-learning, especially in providing for the needs of ICT equipment. Even in the post-pandemic, this impact has not yet fully recovered. The students had to continue to do part-time work while studying to help their families as well as to meet their own learning needs. In addition, face-to-face learning sessions will be conducted and they are required to participate in a physical class. These circumstances are expected to aggravate as involving high costs of accommodation, transport, and living.

A qualitative approach, especially ethnography in adaptation to deepen the actual situation based on the current reality of higher education students is recommended for future studies. There should be studies that can provide either short-term or long-term

solutions to this problem. In the future, it is expected that the pandemic phase can recur and the preparation for it will need to be more efficient and comprehensive. Regarding the pandemic that has not subsided yet around the world, authorities and the community need to be better prepared. The experience in developing strategic planning needs to be improved and refined to assure that nobody is left behind for better educational opportunities, especially in pandemic and post-pandemic situations.

Ethics Approval and Consent to Participate

The researchers adhere to the research ethics guidelines established by the Research Ethics Committee of Universiti Teknologi MARA (RECUiTM). All procedures performed in this study involving human participants were conducted in accordance with the ethical standards of the institutional research committee.

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Conflict of Interest

The authors reported no conflicts of interest for this work and declare that there is no potential conflict of interest with respect to the research, authorship, or publication of this article.

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