DIGITAL DEVICES AS AN ONLINE LEARNING MEDIUM: STUDENT PERCEPTIONS

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ABSTRACT

As a result of the Covid-19 pandemic, Polytechnic Malaysia adopted online teaching and learning, prompting an online survey of students in the Department of Civil Engineering to gather their opinions on using digital devices as a learning medium. Conducted in December 2020/2021, this study aimed to achieve two objectives: 1) identify the benefits of using digital devices for online learning, and 2) determine the effects of digital devices as a learning medium.. The highest mean for benefits was the ability to store useful information, followed by the versatility of digital devices and easy access to vast resources. However, the study also revealed that many students experienced physical discomfort such as back pain, neck pain, and headaches from prolonged use of digital devices for online learning. To enhance the online learning experience, a well-defined strategy and plan are essential, as long periods of online learning can cause concentration problems and physical issues such as poor posture and back pain.

Keywords: *Digital Devices, Learning, Online, Perception*

1. INTRODUCTION

The COVID-19 pandemic has disrupted traditional educational systems worldwide, leading to the closure of schools, universities, and other educational institutions. As a result, many students have shifted to online learning as an alternative way to continue their education. While online learning has its benefits, it also poses several challenges and problems for students, teachers, and educational institutions. In Malaysia, the Movement Control Order was put into effect on March 18, 2020, in an effort to contain the spread of the virus. This resulted in students from various educational institutions, including schools and universities, having to return home. While online learning has been prevalent in higher education for some time, it has become more widespread as a result of the pandemic.

One of the primary issues is that many students do not have access to reliable internet connections and appropriate devices to participate in online learning effectively. This has created a digital divide and made it difficult for some students to access educational materials and participate in online classes. Additionally, online learning has increased the amount of screen time for students, which can cause eye strain, fatigue, and other health problems. The lack of face-to-face interaction with teachers and peers has also led to a sense of isolation and disengagement among some students. Furthermore, online learning has forced many educators and educational institutions to quickly adapt to new teaching methods and technologies, which can be challenging and overwhelming. Some educators may not have the necessary skills or resources to teach effectively online, which can impact the quality of education students receive. While online learning has been a necessary adaptation to continue education during the pandemic, it has also highlighted the need for equitable access to technology, the importance of social interaction, and the need for ongoing teacher training and support.

To ensure success in online learning, it is crucial to consider various key factors such as having access to appropriate devices, allocating sufficient time and energy, making a constant effort, possessing specialized computer skills, and developing effective learning strategies. Since online learning involves distance education, effective communication between lecturers, students, and classmates is essential. Furthermore, a strong online education programme requires administrative support and a robust infrastructure, as highlighted by Meyer & Barefield (2010).

This study was conducted with the main aim to determine students' perception on adopting devices as online learning medium. Previously, this study found that most students own multiple digital devices for online learning, with smartphones and laptops being the most commonly used devices. Students spend between 5 to 7 hours on average using these devices for online learning sessions. Results indicated that the majority of respondents accept online learning and utilizing digital devices for educational purposes only out of necessity. A mere 8% of participants expressed a dislike for digital devices as a learning medium. Challenges include focusing on the screen for long periods, physical problems, and the cost of internet data. Addressing these challenges is important for improving the efficiency and accessibility of online learning, and optimizing online resources for different types of devices is essential to meet learners' requirements and preferences.

For this paper, a total of two (2) objectives have been outlined, namely 1) identify the benefits of using digital devices for online learning, and 2) determine the effects of digital devices as a learning medium. An online survey conducted among the Department of Civil Engineering, Polytechnic Malaysia during Semester December 2020/2021. The findings can be used to gain insight and assist stakeholders in implementing the best practices for integrating digital devices into online learning.

2. LITERATURE REVIEW

The advent of digital devices has revolutionized the way education is imparted. Digital devices such as laptops, tablets, and smartphones have become ubiquitous in modern classrooms, and are increasingly being used as an online learning medium. Digital devices used by students and lecturers as a medium to access teaching and learning activities and to communicate.

According to It Law (2021), a digital device is an electronic instrument that can receive, store, process, or communicate digital data. In a broader sense, a digital device is an electronic device that can create, generate, send, share, communicate, receive, store, display, or process data, and such electronic devices include, but are not limited to, desktops, laptops, tablets, peripherals, servers, mobile telephones, smartphones, and any other similar storage device that currently exists or may exist as technology develops (Law Insider, n.d.).

Ally (2011) stated that e-learning, internet learning, virtual learning, and distant learning are some of the terms widely used to describe online learning. All these terms imply that the student is separated from the lecturer, that the student uses technology and digital devices to access the learning session, and that the student interacts with the educator, other learners, and instructional materials. Dhawan (2020) stated that accessibility, cost, flexibility, learning pedagogy, life-long learning, and policy are all factors to consider when it comes to online learning. Online learning is believed to be simple to use and may even reach rural and remote areas. Karupiah (2021) referred to recent research conducted by Chegg.org, students' perspectives have evolved considerably after the epidemic. According to the study, online learning is preferred by 78 percent of Malaysian and Chinese tertiary students over face-to-face sessions since it is less expensive. A similar pattern has emerged in other countries. Online learning, for example, is preferred by 83 percent of Canadians.

Research on the use of digital devices as an online learning medium has grown in recent years. Several studies have shown that digital devices can enhance learning outcomes, particularly when combined with effective instructional design and pedagogy. For example, a meta-analysis of 67 studies found that digital devices can improve student achievement in mathematics, science, and language arts (Cheung & Slavin, 2013). Other studies have shown that digital devices can increase engagement, motivation, and collaboration among learners (Dabbagh & Kitsantas, 2012).

Dhawan (2020) believed that online learning is simple to use and can even reach out to rural and remote locations. In terms of transportation, accommodation, and overall costs of institution-based learning, it is considered to be a significantly less expensive style of education. Another appealing feature of online learning is the ability to arrange or plan one's time for completing courses offered online. Blended learning and flipped classrooms are created by combining face-to-face lectures with technology; this form of learning environment can help students learn more effectively. Students can learn at any time and from any location, gaining new skills and preparing for a lifetime of learning. In this fast-paced world, the government also recognizes the growing relevance of online learning.

However, Tan (2020) contended that there are challenges to overcome. Some students find it challenging to participate in digital learning because they do not have reliable internet access or technology. Also, the current tools may only be a temporary solution due to the pressure to get online during the MCO. For online learning to be effective, both educators and students must have access to a dynamic and engaging platform. It must be able to systematically monitor student activities and behaviours, especially when there are few or no opportunities for face-to-face encounters. In addition, Dhawan (2020) indicated that despite the fact that

digital equity is critical to the success of online learning, not all teachers and students have access to all digital devices, the internet, and Wi-Fi. The lack of appropriate digital tools, internet connections, or Wi-Fi connections can cause a lot of problems, and many students may miss out on learning opportunities as a result. Some studies have also highlighted the drawbacks of using digital devices, such as their potential to distract learners and exacerbate existing inequities in education (Gneezy, et al., 2019).

3.   METHODS

4.   Data were collected using online surveys. Simple random sampling is used to collect samples among Malaysian polytechnic students. Before the questionnaire was distributed to the respondents, it was first tested in a pilot study with 30 respondents to detect any issues that might arise during the data collection process. This questionnaire is divided into five sections which are; the demographics of the respondents, the students' experience using digital devices and online classes, the benefits of using digital devices as a medium for online learning, the challenges faced by students during online learning using digital devices and the effects due to long hours of online learning through digital devices.

5.   The level of agreement towards the benefits of digital devices as a medium for online learnings and level of effects caused by extended hours of online learning via digital devices interrogate through the five Likert's scales. Meanwhile, the four Likert scales are used to investigate the level of agreement towards the challenges of digital devices as a medium for online learnings. To define the characteristics of the respondents and answer particular research questions, descriptive statistics were utilised in this study. Furthermore, a mean score was calculated based on the respondents' responses. The average score and central tendency are used to create a general picture of the data. (Sekaran, 2003). The statistical analysis for this study was done using the Statistical Package for Social Science (SPSS).

6.   RESULTS & DISCUSSION

6.1   A total of 417 students of Civil Engineering Department from various polytechnics throughout Malaysia were the respondents of this study. Based on Krejcie and Morgan's table, this sample size is reasonable and acceptable. The survey was conducted within one month and distributed by using link to the google forms. The internal consistency of the data collected checked by finding the Cronbachs' alpha value. Referring to Taber (2016), the average Cronbach's alpha value for this study was strong and reliable, with a value of 0.925 which were exceeded 0.70 as suggested by A Nunnally, Bernstein, & Berge (1994).

6.2   Demographic

Table 1 shows the demographic of the respondents. A total of 242 (58%) female and 175 (42%) male students from various polytechnic institutions took part in this survey. Most respondents were between the ages of 19 and 20, with 153 (36.7%) being under 19 and 194 (46.5%) being over 20. 18 (4.3%) respondents were 22 years or older, and 50 (12%) respondents were 21 years or older. With 229 (54.9%) respondents participating, Diploma Kejuruteraan Awam had the highest participation rate in this survey, followed by Diploma Ukur Bahan with 153 (36.7%) respondents. With 147

(35.3%) respondents, Semester 4 students made up the largest set of respondents.

Table 1. Demographic of the Respondents

Respondent	Frequency	Percent
Gender		
Male	175	42
Female	242	58
Age		
18 years old	2	0.5
19 years old	153	36.7
20 years old	194	46.5
21 years old	50	12
22 years and older	18	4.3
Programme		
Diploma Kejuruteraan Awam	229	54.9
Diploma Ukur Bahan	153	36.7
Diploma Perkhidmatan Bangunan	19	4.6
Diploma Geomatik	16	3.8
Semester		
Semester 1	53	12.7
Semester 2	117	28.1
Semester 3	55	13.2
Semester 4	147	35.3
Semester 5	31	7.4
Semester 6	14	3.4
Politeknik		
PSAS	139	33.3
PKB	108	25.9
POLIMAS	90	21.6
PUO	11	2.6
PSA	23	5.5
PMM	14	3.4
PTSB	6	1.4
PKK	26	6.2

6.3 The Benefits of Using Digital Devices for Online Learning

Assessing the benefits of digital devices for online learning is an important objective as it helps to understand how learners are using these devices to enhance their learning experience. The study's findings can be used to optimize online learning resources to meet learners' requirements and preferences. Table 2 presents the percentage and frequency of the benefits of digital devices as a medium for online learning.

Table 2. Benefits of digital devices as a medium for online learning.

Benefits	Mean
Digital devices help me to learn independently.	3.62
Digital devices enable me to use varied sources for study.	3.72
Digital devices let me to learn at my own pace.	3.68
Digital devices can be used for a variety of purposes.	3.89
Digital devices can store useful information.	3.92
Digital devices help me to improve my study.	3.48
Digital devices are easy to reach at any time.	3.69
Digital devices allow me to attend classes from any location of my choice.	3.73
Online learning through digital devices improved my class attendance.	3.56
Online learning through digital devices allows reducing my financial costs.	3.47
Online learning through digital devices creates a learning environment that suits my needs.	3.31
Digital devices can be used without any time limit.	3.61
Digital devices help me to record, and memories things related to my study.	3.78
Digital devices provide easy access to thousands of useful sources.	3.8
Digital devices provide fast access to thousands of useful sources.	3.74
Digital devices provide efficient access to thousands of useful sources.	3.74
Online learning through digital devices offers lecturer an efficient way to deliver lessons to me.	3.5

The results from the survey suggest that digital devices have a positive impact on online learning. The mean ratings range from 1 (low) to 5 (high). Respondents rated the ability to store information, access multiple sources, and learn at their own pace as the most valuable benefits. Additionally, respondents rated the ability to attend classes from any location and reduce financial costs as important benefits of online learning through digital devices. These advantages can help learners to customize their learning experience to fit their needs and preferences.

On the other hand, the lowest-rated benefit was the creation of a learning environment that suits one's needs, which suggests that some respondents may not feel that digital devices provide a personalized learning experience. The rating for the efficiency of online learning through digital devices was also relatively low, indicating that there may be room for improvement in the delivery of online lessons.

This finding can help educators to identify areas where digital devices are most effective and where further improvements can be made. By leveraging the benefits of digital devices for online learning, educators can provide learners with a more personalized, collaborative, and engaging learning experience that can improve learning outcomes.

6.4 The Effects of Digital Devices as a Learning Medium

Table 3 presents the mean ratings for various effects associated with long hours of online learning through digital devices. The mean ratings range from 1 (low) to 5 (high), with higher mean ratings indicating that the effect is perceived as more significant.

Table 3. Effects due to long hours of online learning through digital devices

Effect	Mean
Eye problem.	2.95
Ear problem.	2.33
Having back pain.	3.56
Having neck pain.	3.49
Having hand pain.	2.92
Headache.	3.44
Feels difficult to sleep at night due to the long use of digital devices.	3.28
Changes in sleep patterns.	3.41
Changes in eating patterns.	3.17
Changes in weight of the body.	2.93
Lose interest in other things.	3.02
Laziness.	3.16
Less interest in other hobbies.	3.00
Less interest in outdoor activity.	3.07
Feel uneasy about face-to-face interaction with other people.	2.95

The results show that the highest-rated effects include having back pain (mean rating of 3.56), having neck pain (mean rating of 3.49), and headache (mean rating of 3.44). These effects are all related to physical discomfort and may be due to prolonged sitting and staring at a screen. Other effects that are rated relatively high include changes in sleep patterns (mean rating of 3.41), changes in eating patterns (mean rating of 3.17), and laziness (mean rating of 3.16). These effects may be due to the sedentary nature of online learning through digital devices, which can lead to a lack of physical activity and a disrupted daily routine.

Additionally, the results suggest that long hours of online learning through digital devices may also have an impact on individuals' social lives, as some respondents reported feeling less interested in other hobbies (mean rating of 3.00) and less interested in outdoor activities (mean rating of 3.07). Respondents also reported feeling uneasy about face-to-face interaction with other people (mean rating of 2.95). Generally, the table highlights the potential negative effects of long hours of online learning through digital devices, particularly in terms of physical discomfort and disruptions to daily routines and social lives. These findings suggest the importance of implementing strategies to promote healthy habits and prevent the negative effects of online learning through digital devices.

7. CONCLUSION

The COVID-19 pandemic has brought significant disruptions to the traditional education system worldwide, with many students shifting to online learning. While online learning has its benefits, it also poses challenges and problems for students, teachers, and educational institutions.

The lack of access to reliable internet connections and appropriate devices for online learning, increased screen time, and a sense of isolation and disengagement are some of the challenges that online learning presents. On the other hand, online learning has highlighted the need for equitable access to technology, the importance of social interaction, and the need for ongoing teacher training and support. To ensure success in online learning, various key factors need to be considered, such as having access to appropriate devices, allocating sufficient time and energy, possessing specialized computer skills, and developing effective learning strategies. Effective communication between lecturers, students, and classmates is also crucial. The use of digital devices as an online learning medium has grown significantly in recent years. Digital devices have been found to enhance learning outcomes, particularly when combined with effective instructional design and pedagogy. Several studies have shown that digital devices can improve student achievement in mathematics, science, and language arts, increase engagement, motivation, and collaboration among learners.

In conclusion, online learning is here to stay, and educational institutions should strive to optimize online resources for different types of devices to meet learners' requirements and preferences. Furthermore, stakeholders must implement the best practices for integrating digital devices into online learning. This can be achieved by addressing the challenges that online learning presents, such as the lack of access to technology and the need for ongoing teacher training and support.

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