Readiness and Effectiveness of Synchronous Online Teaching and Learning in Higher Education During COVID-19 Pandemic

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ABSTRACT

The abrupt or rapid shift to online learning has pushed students and lecturers to accept the online learning and teaching mode. Therefore, there is a necessity to study students' and educators' readiness in adopting online teaching and learning. Relating to this, the main objective of this paper is to assess students' and lecturers' fitness levels in adapting to online teaching and learning at a selected University. This study focuses on evaluating the online readiness levels that relates to teaching and learning preferences, technology, usefulness and ease of use of the employed e-learning system. The participants of the study involved undergraduate students and lecturers of an engineering department at a selected University. The survey questionnaire survey was distributed to 120 students and 17 lecturers. The responses had reflected moderate fitness level of preference towards online teaching and learning and having adequate digital devices and facilities including Internet to conduct learning virtually. However, significant improvement is encouraged towards expanding the current e-learning platform. The absence of active interaction features and non-verbal cues between teachers and students have been the most reported issue of the current e-learning platform. Some other issues raised by students include the excessive workloads on projects converted online, communication difficulty, and the lack of motivation to study remotely away from the common learning group. The outcome of this study is valuable as to review the current online teaching and learning implementation and its acceptance among students and educators in the University for future improvement and strategic decision making.

1. Introduction

The outbreak of Coronavirus (COVID-19) has impacted the conventional education system from elementary to tertiary level worldwide. In Malaysia, the onset of movement control order (MCO) as a preventive measure in response to the COVID-19 pandemic has accelerated the public acceptance of online learning. All schools, learning institutions and universities nationwide has experienced closure since March 2020. The traditional approach to learning face-to-face is replaced by online learning throughout the country. According to the study conducted by Chung *et al.,* [2], it was found

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that university students and lecturers in Malaysia have acknowledged online learning as one of the most plausible solutions for teaching and learning under the current circumstances. The shift to online learning allows students to continue learning while avoiding close contact between individuals and to lower the risk of virus transmission.

In this study, the implementation of online learning in the targeted university was officially made effective during the May semester in 2020. The mode of delivery is synchronous in which the process occurs via a live, virtual interactive classroom using tools that include Big Blue Button (BBB) and Microsoft Teams. Attendance is registered online through the PowerApps application, where students' current location will be logged to the system. Learning materials such as lecture slides and recordings, notes, and assignments are uploaded to an e-learning platform powered by Moodle. Students are expected to be equipped with tools and resources that include internet connection, smart devices, and conducive environment or space to attend the lecture and perform tests and exams remotely at the stipulated time. Educators on the other hand have to upskill and reskill themselves and be familiar to the tools and technology to conduct online lectures and ensure that the knowledge transfer is as effective as conventional classroom teaching.

The abrupt or rapid shift to online learning has pushed students and lecturers to accept the online learning and teaching mode. Therefore, there is a necessity to study students' and educators' readiness in adopting online teaching and learning. Relating to this, the main objective of this paper is to assess students' and lecturers' fitness levels in adapting to online teaching and learning at a selected University. The research question underpinning this work is as follows: "How well do students and lecturers adapt to the online teaching and learning in this University?" This is important as to review the current online teaching and learning implementation and its acceptance among students and educators in the University for future improvement and strategic decision making.

2. Literature Review

Based on institutions' maturity and adaptability, the Organisation for Economic Co-operation and Development (OECD) has identified three primary forms of online learning. These include online learning as a supplement to traditional classrooms, complete online learning (synchronous and asynchronous online learning through virtual platforms), and the hybrid modes of learning (i.e., both online and face-to-face). Online learning is also associated with the virtual conduit of curriculum materials uploaded on the web, internet, video conferencing, emails, discussion forums, and many other digital-based communication platforms [3].

It is also highlighted that e-learning platform is one of the most valuable assistive technology that support online learning [3-5]. E-learning platform allows synchronous and asynchronous teaching and learning process to occur. It is a virtual platform where students and instructors communicate and engage during online learning. In comparison to the traditional classroom, e-learning platform provided additional flexibility that include teaching and learning at any time and from anywhere and reducing the use of printed materials [3,6,7]. Ikpe [8] further highlighted that the utilization of e-learning in Botswana as one of the solutions to overcrowded classes and issues related to limited instructors and learning resources.

Many researchers from different parts of the world have evaluated the readiness of local government schools, community, and technological infrastructure in supporting online learning. For example, Ünal *et al.,* [9] conducted a readiness survey towards the implementation of e-learning among the undergraduate students in Turkey. Their findings opined that a higher acceptance level is seen among the female, higher grade students, and frequent smartphone users. Furthermore, Rasouli et *al.,* [10] investigated the readiness level towards online learning involving three Iranian

public universities. Results have shown a moderate readiness level among art students and pointed out the critical skills for effective online learning from learners' perspective. These include the metacognitive and cognitive skills, self-navigation or self-regulation skills, communication skills and technology and Internet efficacy skills. Forson and Vuopala [6] had studied the online learning readiness levels that include six learning centres in three different regions of Ghana. The findings revealed an overall positive attitude towards online learning provided that students have good self-regulation and technical self-efficacy levels.

Literature suggested that the readiness survey results is time-dependent and may vary over changes in the teaching force, institution strategies, and instruments used [9]. Rasouli *et al.,* [10] had opined the respondents' acceptance or readiness to be highly dependent on the features and settings of the e-learning environment and leaners'/applicants' ability to adapt to the new norm of online learning which often change over time. The response to the readiness survey may also differ among students enrolling in different disciplines [6]. It is found that the participants'/respondents' readiness within a discipline or field had displayed little continuity of effectiveness to other respondents [5]. This is due to the practical settings that are often unique for a set of students and may or may not be useful to a different learning community.

Hence, due to unpredictability, as indicated by the literature, it is essential to conduct a readiness survey to gauge students' and educators' adaptation to online learning implementation. The findings would help to identify students' and lecturers' opinions and review the current implemented virtual learning system in the University.

3. Methodology

As mentioned before, the study aims to assess undergraduate students' and lecturers' readiness towards adopting online learning. This study is conducted at one of the private universities in Malaysia. It is important to highlight that the University has little experience in conducting complete online learning before COVID-19 strikes. Survey questionnaires are distributed to students and lecturers at the University at the end of 2020 and early 2021 to gauge their responses towards online learning. The responses are collected based on the descriptive survey constructed based on the published questions developed and tested by previous studies [9-11] as presented in Table 3 and 4. The survey questionnaires are divided into the following categories (refer to Table 3 and Table 4):

- Demographic profiles
- Learning & Teaching Preferences
- Availability and Familiarity with Online Technology
- Usefulness of Online Learning
- Ease of Use of Online Learning (Content & Pedagogical Factor)
- Advantage and Disadvantage Reviews of Current Digital Platform

The questionnaire has 40 questions with a 5-point Likert scale with one being "strongly disagree" and five representing "strongly agree". This study adopted the expected readiness scale of [1] as shown in Figure 1. Based on their work, the mean score of 3.40 is accepted as the expected level of readiness towards adopting online learning. [1] scale was adopted by many studies that include the study conducted in Hacettepe University, Department of Information Management [9].
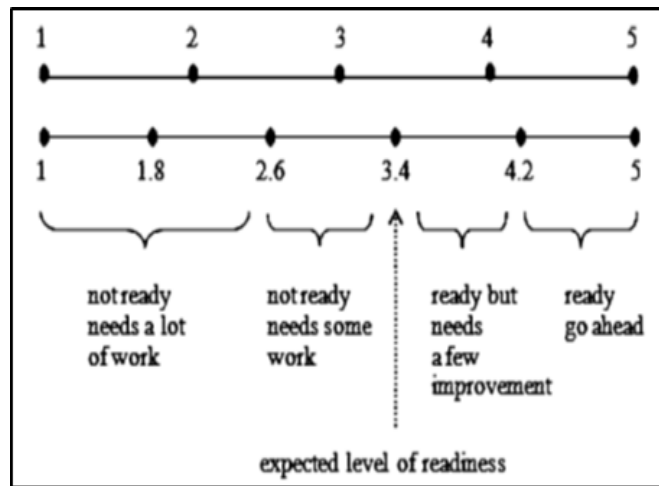
Fig. 1. Aydın and Tasci proposed the scale for gauging
e-learning readiness [1]

The participants of this study involved undergraduate students and lecturers in an engineering department of the University. The survey questionnaire survey was distributed to 120 students and 17 lecturers. Table 1 depicts the gender profiles of the respondents involved in this study. After filtering for incompleteness and duplications, a total of 71 questionnaires (51.8% responses) were taken for further analyses. The records revealed 14 responses from the lecturers (82.35% responses) and 57 responses from students (47.5% responses). The results gathered from this survey is presented in the next section that follows.

Table 1
Demographic characteristics of respondents

	Students		Lecturers	
Gender	Frequency	Percentage (%)	Frequency	Percentage (%)
Male	33	57.9	8	57.1
Female	24	42.1	6	42.9

Table 2 depicts the respondents' experience levels with online learning before COVID-19 strikes. Referring to Table 2, it presents that majority of the lecturers and students had minimal experience with online learning (i.e., less than 4 times). It is shown that 86% of the students and 64.3% of lecturers had less than 4 times of experience with online learning before the pandemic.

Table 2
Respondents' experience with synchronous online learning before COVID-19 pandemic

Respondents	0 or Never	1 to 4 times	5 to 8 times	9+ times
Students	18 (31.6%)	31 (54.4%)	3 (5.2%)	5 (8.8%)
Lecturers	4 (28.6%)	5 (35.7 %)	3 (21.4%)	2 (14.3%)

4. Results and Discussions

As mentioned before, the research question underpinning this study is as follows: "How well do students and lecturers adapt to the online teaching and learning in this University?" The questionnaire responses were analyzed to find answers to the research question. As mentioned in the Methodology section, [1] quantitative spectrum was used as the benchmark to evaluate respondents' acceptance towards online learning in the University. The spectrum of [1] is categorized

into four categories: High Readiness Level (4.2 to 5.0), Moderate Fitness Level (3.4 to 4.2), Lack of Fitness Level (2.6 to 3.4), and Major Lack of Fitness (1 to 2.6). The pointer 3.4 is taken as the base level boundary of the respondents' fair acceptance and readiness towards the online teaching and learning.

Descriptive statistics had been employed to the collected responses to gauge the means score and standard deviation of each evaluation aspects. The descriptive analyses result of the survey questions is displayed in Table 3 and Table 4 presenting students' and lecturers' responses respectively.

Table 3
Students' response towards distributed questionnaires (n = 57)

Item	Mean ($\bar{X}$)	SD (σ)
Section A. Demographic Profiles (Questions 1-4)	-	-
Section B. Learning & Teaching Preferences	**3.58**	**1.04**
5. I set goals and deadlines and strongly adhere to fulfilling it/them.	3.72	0.95
6. I keep track of my study and always on time.	3.53	0.99
7. I do not quit because of unfamiliar challenges or difficulties.	3.91	0.86
8. I learn easily from hearing lecturers, audio recordings or podcasts.	3.02	1.24
9. I learn easily from seeing, reading materials or videography contents.	3.74	1.19
10. I learn best when I try it out or figure things out for myself.	3.96	1.06
11. I have to study in a place with the least distractions.	4.40	0.90
12. I find it easy to ignore distractions around me when I read or work on assignments.	2.68	1.16
13. I plan my work, assignments and academic projects in advance.	3.60	0.93
14. When I study, people around me will help me to reduce distractions and not try to distract me.	3.28	1.17
Section C. Availability &Familiarity with Online Technology	**3.93**	**1.03**
15. I am fairly good at using the digital device in accessing the Internet and classes.	4.12	0.90
16. I am comfortable surfing Internet, searching for materials, bookmarking and downloading files.	4.07	0.93
17. I have connected to a fairly fast, strong and stable Internet connection to online learning.	3.72	1.17
18. I have comfortable digital devices in the online learning environment.	3.82	1.11
19. Which digital devices do you use to access online classes.		
Section D. Usefulness of Online Learning	**2.98**	**1.11**
20. I felt online learning had been effective for course learning.	2.67	1.26
21. I felt effective communication is important for online learning.	4.35	0.96
22. I felt online learning helps to increase the sense of community.	2.77	0.97
23. I felt online learning promotes active participation and in-class interaction.	2.56	1.30
24. I felt online learning could meet individual learning needs.	2.54	1.17
25. I felt the university has offered sufficient and effective resources to learn remotely from home.	3.00	1.08
26. I felt online learning is stressful.	3.84	1.31
27. I enjoy studying remotely.	2.84	1.09
28. I felt the educators/tutors are helpful while studying online.	3.12	1.04
Section E. Ease of Use of Online Learning (Contents & Pedagogic)	**2.95**	**1.11**
29. I felt the current online learning interface is easy to use.	3.28	0.95
30. I felt the current online learning environment replicated the necessary tools for effective learning.	3.26	1.00
31. I felt satisfied with the technology and software for online learning.	3.26	1.05
32. Please select the form of presenting course material that you had experienced with.	-	-

Item	Mean	SD
33. Which is your most favorable forms of presenting in terms of course delivery effectiveness, knowledge sharing and information retaining?	-	-
34. I felt the materials are conducted effectively via the online platform as compared with the traditional classroom.	2.37	1.32
35. I felt the course assessment conducted via the online platform is fair to gauge the understandings as compared to traditional classroom assessment.	2.60	1.23
Section F. Performance Review of Employed Digital Platform (Q36-Q40)	-	-

Table 4
Lecturers' response towards distributed questionnaires (n = 14)

Item	Mean ($\bar{X}$)	SD (σ)
Section A. Demographic (Questions 1-4)		
Section B. Learning & Teaching Preferences	**3.39**	**1.06**
5. I set teaching schedule and deadlines and strongly adhere to fulfilling it/them.	4.00	1.07
6. I keep track of the course delivery progress and always executed as planned.	4.07	1.03
7. I find it easy to adapt to unfamiliar challenges or difficulties.	3.00	0.93
8. I find it easy to teach by using audio recordings or podcasts.	2.86	1.19
9. I find it easy to teach by providing reading materials or videography contents.	3.79	0.94
10. I find it easy to teach by allowing students to try it out or figure things out for themselves.	3.21	1.15
11. I have to work/conduct classes in a place with least distractions.	4.29	1.03
12. I find it easy to ignore distractions around me when I prepare, work and conduct classes.	2.50	1.12
13. I find it easy to plan class activities, assignments and academic projects in accordance to the online environment as in traditional classroom environment.	2.93	1.10
14. When I work, people around me will help me to reduce distractions and not try to distract me.	3.21	1.08
Section C. Availability &Familiarity with Online Technology	**3.86**	**0.93**
15. I am fairly good at using digital device in accessing Internet and conduct online classes.	3.79	0.86
16. I am comfortable surfing Internet, searching for materials, bookmarking and downloading files.	4.36	0.72
17. I have connected to a fairly fast, strong and stable Internet connection to online learning and teaching.	3.64	1.23
18. I have comfortable digital devices in the online learning and teaching and teaching environment.	3.64	0.89
19. Which digital devices do you use to access and conduct online classes.	-	-
Section D. Usefulness of Online Learning	**3.00**	**1.15**
20. I felt online learning and teaching had been effective for course learning and teaching.	2.71	1.16
21. I felt effective communication is important for online learning and teaching.	4.36	1.23
22. I felt online learning and teaching helps to increase the sense of community.	2.79	1.21
23. I felt online learning and teaching promotes active participation and in-class interaction.	2.36	1.04
24. I felt online learning and teaching could meet individual learning needs.	2.50	1.24
25. I felt the university has offered sufficient and effective resources to teach remotely from home.	3.29	1.16
26. I felt online learning and teaching is stressful.	3.43	1.12
27. I enjoy teaching remotely.	2.93	1.03
28. I felt the students/learners are helpful while conducting online classes.	3.07	1.16
Section E. Ease of Use of Online Learning (Contents & Pedagogic)	**2.70**	**1.01**
29. I felt the current online learning and teaching interface is easy to use.	3.29	1.10
30. I felt the current online learning environment replicated the necessary tools for effective learning & teaching.	2.71	1.16

31. I felt satisfied with the technology and software for online learning and teaching.	3.00	0.93
32. Please select the form of presenting course material that you had experienced with.	-	-
33. Which is your most favorable forms of presenting in terms of course delivery effectiveness, knowledge sharing and information retaining?	-	-
34. I felt the materials are conducted effectively via online platform as compared with traditional classroom.	2.43	0.90
35. I felt the course assessment conducted via online platform is fair to gauge the understandings as compared to traditional classroom assessment.	2.07	0.96
Section F. Performance Review of Employed Digital Platform (Q36-Q40)	-	-

The mean score ($\bar{X}$) and standard deviation (σ) for both students and lecturers are summarized in Table 5. Firstly, the results depicted a moderate level of fitness (3.4 to 4.2) in terms of students' and lecturers' teaching and learning preference towards online learning. This depict that both students and lectures are fairly accepting online learning and have no major resistance towards this new learning method. Secondly, the acceptability towards the technology supporting online learning (i.e., e-learning platform) has also gained moderate level of fitness among students and lecturers as depicted in Table 5. However, the usefulness and ease of use of the e-learning platform is rated as having lack of fitness by students and lecturers at the University. The usefulness of the e-learning platform has a mean score of 2.98 and 3.00 based on students' and lecturers' responses respectively. On the other hand, the ease of use of the e-learning platform has a mean score of 2.95 and 2.70 as rated by the students and lecturers respectively. The results and findings of each category in Table 5 (i.e., Learning/Teaching Preference, Technology Accessibility, Usefulness, Ease of Use) are further explain in the following paragraphs to better understand the readiness level of students and lecturers towards accepting online learning.

Table 5
Mean score and standard deviation of the fitness level among students and lecturers towards adapting to online teaching and learning

Respondents	Learning/Teaching Preference	Technology Accessibility	Usefulness	Ease of Use
Students (n = 57)	x̄ = 3.58 | σ = 1.04	x̄ = 3.93 | σ =1.03	x̄ = 2.98 | σ =1.11	x̄ = 2.95 | σ =1.11
Lectures (n = 14)	x̄ = 3.39 | σ =1.06	x̄ = 3.86 | σ =0.93	x̄ = 3.00 | σ =1.15	x̄ = 2.70 | σ =1.01

4.1 Learning/Teaching Preference

The students' responses towards learning preference had recorded a moderate level of fitness in this aspect, with a mean of 3.58 and a standard deviation of 1.04 (refer to Table 5). Referring to Table 3 (Section B) The students' responses towards learning preference had recorded a moderate level of fitness in this aspect, with a mean of 3.58 and a standard deviation of 1.04 (refer to Table 5). Referring to Table 3 (Section B), the surveys had depicted that most students are reasonably self-regulated and resilient in the study, inferred from the questions of setting and adhering to study goals and deadlines (Q5 $\bar{X}$ = 3.72), keep track of the study (Q6, $\bar{X}$ =3.53). I find it easy to adapt to unfamiliar challenges or difficulties (Q7, $\bar{X}$ = 3.91). Most students preferred visual (Q9: I learn easily from seeing, reading, or videography content $\bar{s}$ =3.74) and hands-on experience (Q10: I learn easily when I try things out for myself, $\bar{X}$ = 3.96) for learning as compared with learning through podcasts or audio recordings (Q8: I learn easily from hearing lectures, audio recordings or podcasts, $\bar{X}$ = 3.02). However, as students

attending class from home, most students found distractions as a significant issue that is hard to be avoided (Q12: I find it easy to ignore distractions, $\overline{X}$ = 2.68) & (Q14: People around me will help to reduce distractions, $\overline{X}$= 3.28).

The lecturers' teaching preference had recorded an acceptable moderate level of fitness to online teaching and learning with a mean of 3.39 and a standard deviation of 1.06 as shown in Table 5. Referring to Table 4 (Section B), most lecturers scored high in setting and adhering to teaching schedule (Q5, $\overline{X}$=4.00) and executing and keeping track of course delivery (Q6, $\overline{X}$= 4.07). Visual materials are the preferred mode of teaching among lecturers in conducting classes. However, some lecturers had opined a slightly lower rating in adapting to unfamiliar challenges and difficulties (Q7: I find it easy to adapt to unfamiliar challenges, $\overline{X}$=3.00). The difficulties are mostly due to the new way of planning class activities for the online environment rather than the traditional classroom settings (Q13: I find it easy to plan class activities, assignments, and academic projects in online environment, $\overline{X}$=2.93). Furthermore, the issues of distractions and the needs for a conducive environment for online T&L are also seen to be an issue among lecturers (Q12: I find it easy to ignore distractions, $\overline{X}$=2.50) and (Q14: People around me will help to reduce distractions, $\overline{X}$=3.21).

4.2 Technology and Internet Accessibility

As depicted in Table 5, students possess moderate to good fitness of technology accessibility to conduct online learning (overall $\overline{X}$ = 3.93, σ = 1.03). Majority of the students are accessing online classes via several types of digital devices including desktop (14%), laptop (89.5%), tablet (12.3%), smartphone (70.2%) and Ipad (3.5%). Referring to Table 3 (Section C), the survey also revealed that most students are equipped with the necessary computer efficacy skills (Q15: I am fairly good at using digital device, $\overline{X}$=4.12 & Q16: I am comfortable surfing the Internet, searching for materials, bookmarking and downloading files, $\overline{X}$= 4.07), physical equipment (Q18: I have comfortable digital devices in assessing online T&L, $\overline{X}$=3.82), and Internet accessibility (Q17: I have connected to a fairly fast, strong and stable Internet connection for online T&L, $\overline{X}$=3.72).

On the other hand, good fitness to technology accessibility aspects was also recorded from lecturers, with an overall mean ($\overline{X}$) of 3.86 and a standard deviation (σ) of 0.93 as shown in Table 5. Laptops (92.9%) and desktops (35.7%) are among the most utilized digital devices among lecturers in conducting online classes, with tablets and smartphones recorded at 21.4%. Referring to Table 4 (Section C), results have shown that majority of the lecturers are relatively comfortable and confident with their digital efficacy to use digital device and surfing internets for teaching and finding relevant resources (Q15, $\overline{X}$=3.79 & Q16, $\overline{X}$= 4.36). The comfortability in using digital devices is found to be at adequate level (Q18, $\overline{X}$=3.64) as well as accessibility to stable Internet (Q17, $\overline{X}$=3.64).

4.3 Usefulness of the e-learning platform

A lack of fitness level was observed in the current employed e-learning system (students, $\overline{X}$=2.98; lecturers, $\overline{X}$=3.00) as depicted in Table 5. Overall, most of the responses (students and lecturers) are found to be discouraging due to the lack of interactive features that could promote in-class participation, interaction, and sense of community in the virtual classroom settings.

Referring to Table 3 (Section D), results revealed that majority of the students found that the current online learning platform is not as effective as going through traditional classroom settings. The students rated a lack of fitness level when it comes to promoting a sense of community (Q22, $\overline{X}$=2.77), in-class interaction and participation (Q23, $\overline{X}$=2.56), and meeting individual learning needs

(Q24, X̄=2.54). Results has also shown that students found studying online is rather stressful that include to complete the required coursework/summative assessments (Q26, X̄=3.84).

Results also depicted similar responses among lecturers as shown in Table 4 (Section D). The lecturers have rated the effectiveness of the e-learning platform at a lack of fitness level with a mean score (X̄) of 2.71. The rating in sense of the community (Q22, X̄=2.79), in-class interaction (Q23, X̄=2.36), and meeting individual learning needs (Q24, X̄=2.50) had shown unsatisfactory that relates to the e-learning platform.

Coppola *et al.,* [12] believed that the "machine-level interaction" or "non-human level interaction" of the virtual platform to be the one of the major challenges in online learning. Fein and Logan [13] described this condition as the digital inability to connect with students in an online environment. The use of a digital system like e-learning may not be as good as a real instructor that could be giving quick help, motivation, and advice. Students also need to be assisted by human instructors to make suitable adjustments and be given flexibility according to their ability. The unique establishment of strong physical bonds and interaction through verbal and non-verbal signals that often happens face-to-face are believed to be an essential element in any education process. However, these connections and elements are somewhat difficult to be established through the online learning platforms [3].

4.4 Ease of Use of the e-learning Platform

A lack of fitness level was also observed in the perceived ease of use of the current employed e-learning system (students, X̄=2.95; lecturers, X̄=2.70) as depicted in Table 5. This aspect particularly gauged respondents' responses towards the content delivery and pedagogic aspects of the e-learning platform. Generally, students and lecturers agreed that the current online learning interface is easy to use (Q29, students' X̄= 3.28; lecturers' X̄= 3.29) as shown in Table 3 and 4 in Section E.

It is found that students and lecturers have adopted several forms of presenting course materials. Table 6 presents the preferred forms of presenting course materials.

Table 6
Preferred forms of course materials on e-learning by students and lecturer

Respondents	PPT (brief information)	PPT (Detailed slides)	PPT with videos	PPT with prototype, videos, texts, and additional links
Students	12 (21.1%)	2 (3.5%)	5 (8.8%)	38 (66.7%)
Lecturers	0	1 (7.1%)	1 (7.1%)	12 (85.7%)

In online learning, having effective online resources are vital [14-16]. Learning content could be enhanced with various types of learning resources that include audio podcasts and videos and texts that are often designed to be student-centric and available to be saved and downloaded at any time and from anywhere [5,6,10]. Video recordings would allow multiple repetitions and learning attempts by learners at their own pace without the instructors' actual presence [5].

The adaptability, delivery, and technical compatibility of the course materials with the e-learning platform are essential to support online learning. However, the lack of fitness of the current e-learning system was reported mostly by the lecturers (Q30, X̄=2.71) as shown in Table 4 of Section E. Majority of the lecturers opined that this condition had resulted in poor delivery of the course materials as compared to conventional teaching (Q34, lecturers' X̄= 2.43). Remarkably, both lecturers and students have highlighted the poor online experience with courses requiring access to facilities in laboratory and hands-on activities that include to conduct experiments and testing. The lack of practical work and exposure had resulted in a poor impression and grasp of understandings towards

experiment-based subjects. This is denoted as the most significant drawback observed in the course assessment conduit, observed from students' and lecturers' responses. The rating of the Q35: I felt the course assessment conducted via online platform is fair to gauge the understandings as compared to traditional classroom assessment marked the lowest results (Q35, students' $\overline{X}$=2.60, lecturers' $\overline{X}$=2.07) by both group of respondents. The current e-learning system was also criticized for its lack of regulatory system to trace academic dishonesty during course assessment.

This study has revealed the responses gathered from students and lecturers to understand their perception towards online learning. It is hoped that the results and findings presented here shall allow the University to understand its current situation, benefits and challenges faced by both students and lecturers in adapting to the online teaching and learning approach. This is important as to ensure a conducive transformation to complete online learning that is as good as or better than face-to-face delivery.

5. Conclusion

In conclusion, the study has revealed a relatively moderate fitness level of the students' and lecturers' responses towards the employed online teaching and learning approach. The overall mean fitness for students was recorded at 3.36 (Learning Preference, $\overline{X}$ = 3.96; Technology, $\overline{X}$ = 3.93; Usefulness, $\overline{X}$ = 2.98; Ease of Use, $\overline{X}$ = 2.95). On the other hand, the lecturers overall mean fitness was recorded slightly lower at 3.24 (Teaching Preference, $\overline{X}$ = 3.39; Technology, $\overline{X}$ = 3.86; Usefulness, $\overline{X}$ = 3.00; Ease of Use, $\overline{X}$ = 2.70).

The respondents had reflected great fitness level in terms of the personal learning or teaching environment and the necessary digital devices and the Internet to utilize e-learning. However, significant improvement is encouraged towards improving the usefulness and ease of using the current e-learning platform. The absence of active interaction features and non-verbal cues between teachers and students has been the most reported issue of the current e-learning platform. Some other issues raised by students include the excessive workloads on projects converted online, communication difficulty, and the lack of motivation to study remotely away from the common learning group.

While there is a vast difference in e-learning experience prior to the COVID-19 pandemic, the study has found that the experience factor had a relatively positive relationship with the respondents' acceptance and adaptability to the e-learning system. Lecturers with more experience can better adapt to the pedagogic aspect and content design over the virtual environment while lecturers with little experience struggles to use the online platform and adapt to the change.

There are many valuable recommendations that could be done in this near future to improve online learning. Virtual reality (VR), augmented reality (AR), or other auxiliary tools are proposed to elevate online learning's interactivity aspects and hands-on experiences. VR and AR could replace laboratory, practical experiences, and experiment-based subjects with virtual and immersive environment. Other than that, new assessment tools and instruments and innovative types of summative and formative assessments for online learning are strongly urged to avoid academic dishonesty and to reduce the overloading and stress issues among students.

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