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Measuring Quality of Experiences towards Open and Distance Learning Implementation among Computer Science Students

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Abstract: The emergence of COVID-19 pandemic has caused a huge impact to all sectors in the world since its first hit at the end of the year 2019. One of the sectors that has been experiencing major changes due to this pandemic is the education sector as face-to-face teaching and learning has switched to a fully online and distance approach to accommodate the continuity of previous practices in making the objectives achievable. The implementation of open and distance learning (ODL) during the first semester raised various perceptions from both students and lecturers as many factors needed to be considered to ensure the sessions meet the lesson objectives. Therefore, this study aims to investigate the quality of experiences towards ODL among computer science students by assessing three major factors; learning materials in ODL, platforms being used, and the delivery methods used during ODL. Using an empirical approach where responses from students were collected using a structured questionnaire, the analyzed data then contributed new discoveries to this study. The result from the analyzed data

shows that students have gotten excellent and good quality of experiences during the implementation of ODL.

Keywords: Open and Distance Learning, quality of experience, computer science students, online teaching platform, ODL delivery

INTRODUCTION

The implementation of Movement Controlled Order (MCO) in Malaysia started in March 2020. MCO has affected many sectors as it has changed the daily routines of many. Limited face-to-face events and activities were allowed in order to prevent the spread of the COVID-19 virus. In the education sector, specifically for higher education institutions, online learning has been one of teaching and learning approaches that has been used for the past years but the implementation of MCO in Malaysia provides the opportunity for universities to strengthen the strategies being used and to ensure the continuity of the teaching and learning processes. In pursuing activities for the teaching and learning processes, lecturers need to know the experiences of the students during the implementation of ODL for the purpose of enhancing the quality of the new approach. Hence, this study was carried out to investigate the quality of experiences among the students towards the ODL implementation. The study also highlighted three factors that contributed to the quality of experiences for ODL; the learning materials provided, the platforms chosen for the execution, and the quality of the delivery method used in each session conducted.

OPEN AND DISTANCE LEARNING AND QUALITY OF EXPERIENCE

Before the outbreak of the COVID-19 pandemic, higher education institutions in Malaysia has already adopted an online learning approach either in combinations of face to face and online learning called blended learning or fully online learning which was specifically designed to accommodate distance learners. However, as the pandemic hits all countries, open and distance learning is fully employed to replace the traditional face to face approach thus giving new perspectives to lecturers and students in pursuing teaching and learning activities. Some universities face difficulties

in navigating and preparing the course and program to cater the distance education (Fidalgo et al, 2020). In UiTM, proper plans and strategies involving the university management and the lecturers were carried out to successfully accommodate the new teaching and learning approach while following the guidelines set by the government during the execution of MCO in Malaysia. To make the ODL more feasible, a variety of online platforms and tools are being introduced and explored to fulfil the needs and requirements of the programs and courses offered in UiTM.

2.1 ODL Platforms

ODL platforms are being utilized since they offer settings to conduct online sessions, to provide learning materials, to monitor students participation and to keep track of students' progress (Maqableh & Alia, 2021). A previous study by Hapompwe et al in 2021 highlighted two dominant categories of platforms being used as online learning tools during the Covid-19 pandemic; video conferencing platforms and Learning Management System (LMS) platforms. Video conferencing platforms such as Google Meet and Zoom offer students an interactive environment that is similar to face-to face sessions. However, it is subject to whether or not students have good devices and Internet connection while LMS gives a comprehensive learning environment with features such as content management and the ability to conduct discussions, online learning activities and collaborative-groupings among its users (Bradley, 2021). Another common online interactive platform being discussed in other studies is Microsoft Teams which provides live lectures and tutorial sessions as students get prompt and immediate clarification of the topics being discussed (Yuan, 2021).

The utilization of online commercial communication platforms are also accepted due to students' familiarity of using mobile applications such as WhatsApp and Telegram (Jones & Chacko, 2021). A research conducted by Saidi R.M et al in 2021 revealed that 81% of the respondents of their study felt comfortable and preferred WhatsApp as an ODL platform. The study involved 485 students and 74% of them were from science and technology streams. The utilization of commercial communication platforms to support ODL gives benefits to the approach as the platforms are not only easily accessed and user-

friendly, they also provide real-time responses in communication, yet they are more affordable compared to other online learning platforms (Wulandari et al, 2021). Other advantages offered by commercial communication platforms such as WhatsApp and Telegram are that the information about the learning materials provided by the lecturers are immediately noticeable by students. It is a suitable online discussion platform for groupworks among students as it can be accessed using mobile devices, and a convenient platform to share educational materials (Shobeiry, 2021).

For ODL implementation in UiTM, there are no restrictions on the choices of platforms as lecturers are encouraged to use any online platforms they deem suitable to carry out the teaching and learning activities as long as the learning outcomes are achieved and students get equal access to the platform chosen by their lecturers. As for this study, we had conducted ODL using Google Classroom and Google Meet to establish the ODL implementation. Figure 2.1 illustrates the ODL implementation using the platforms. The implementation of the courses which is Computer Organization and Programming Paradigm in Google Classroom is illustrated in Figure 2.2. In order to ensure the delivery of the ODL for courses, Google Meet has been used in this study and illustrated as in Figure 2.3. Google Classroom and Google Meet are selected for the ODL implementation as this platform provides a flexible platform to store and effectively manage the data, materials, assessments purposely for the ODL implementation.

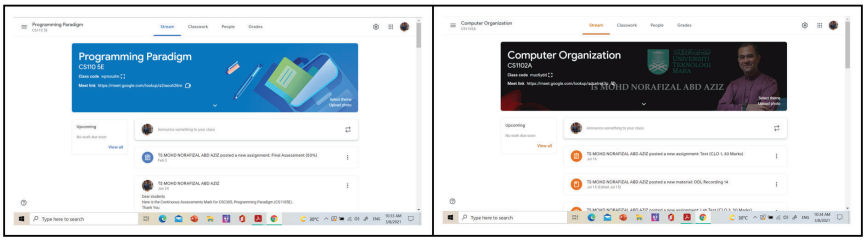

Fig. 1 The ODL platform for courses using Google Classroom

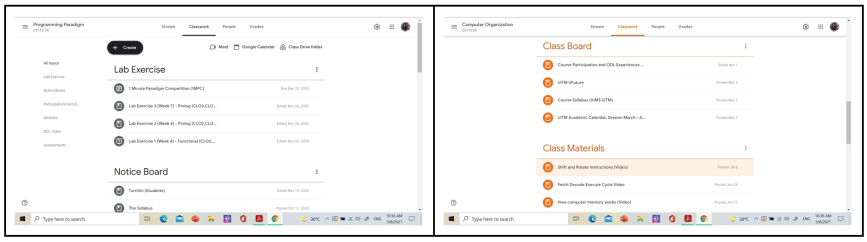

Fig. 2 The ODL contents for Programming Paradigm and Computer Organization course

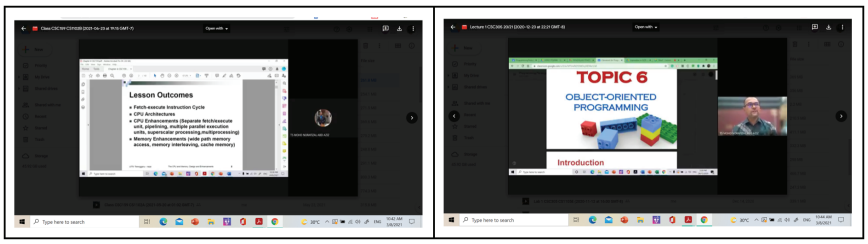

Fig. 3 The ODL delivery in Google Meet

2.2 Quality of Experience

Quality of experience is an analysis of human experience of cooperating with technology and business point of view which will lead to improvement of performance such as effectiveness, efficiency and satisfaction towards the usage of approaches or products being used (Memon et al, 2021). The experience of students while learning online is different compared to the predictable traditional face to face classroom approach (Maqableh & Alia, 2021).

Three factors influencing the quality of online teaching materials were being discussed to improve the students' experiences. The factors are the availability of pre-recorded videos provided by lecturers, technical quality of audio and video used, and accessibility of the learning materials via mobile devices (Jones & Chacko, 2021). The study also revealed that synchronous instructions provided by the lecturers are able to engage students compared to asynchronous instructions as the students prefer to have interactive learning sessions as compared to depending on the pre-recorded lectures prepared by the lecturers. However, result shows that there were positive feedback

from students towards the usage of pre-recorded videos as they found that good selection of contents, interesting and engaging videos can successfully convey lessons thus increasing students' motivation to continue watching (Yuan, 2021).

In accommodating students with a conducive online learning environment, there is no doubt that lecturers are facing a variety of challenges to make sure the learning activities carried out are as effective as traditional face to face sessions. A study was conducted to reveal the challenges faced by students to give clear perspective to lecturers in identifying the weaknesses of online sessions. Four common challenges faced by students are the unreliable internet connection, lack of skills in using online platforms, an unconducive learning environment at home, and the difficulties to access online learning platforms via mobile devices (Şenol, Lesinger, & Çağlar 2021). Two progressive actions taken by the lecturers to improve the situation were by selecting suitable online platforms to be used and adjusting the duration of the lesson module to approximately 20 to 25 minutes per session to retain students' engagement and focus.

By identifying the factors that affected students' quality of experiences and the challenges faced by both lecturers and students, major improvements could be made to enhance the quality of experiences towards ODL implementation in higher education institutions. This also indicates the importance of collecting responses from students as the experiences of the students vary from one another and it will aid in determining future improvements. Other than that, challenges of ODL implementation may vary according to the pandemic situation in Malaysia and all over the world.

METHODOLOGY

This study adopted the quantitative methodology where a self-examined questionnaire was used to assess students' experiences. This study was conducted during the second semester of ODL implementation using structured questionnaires and distributed to students after each ODL session ended from Week 1 to Week 14 of the semester. The data were gathered using Google Form and then being analyzed using Microsoft Excel as

shown in Fig.4 . The questionnaire set consists of three (3) sections; demographics information, ODL session and platforms with the experiences in various ODL implementation factors, and a section to evaluate students' learning outcomes for the particular sessions of ODL implementation. The demographics information includes the group information, type of ODL session, and platform used during the ODL implementation. The quality of experiences factors includes learning materials, the assessments provided, the leading platform used, and the other platform available for the ODL session, and followed by the delivery perspectives. In addition, these questionnaires also seek for the experiences on the network that support the ODL, including the connection availability, coverage, delay time, and faulty, which were also crucial to be determined. Students also provided feedback on the device's capabilities in supporting the ODL session, the cost, and online resources as well. The ODL also includes other resources available as the ODL will be implemented as flexible as it is for resource sharing, which may help the ODL implementation. The experiences data were collected in two semesters from the different parts of students taking the Diploma in Computer Science in UiTM Pahang, Raub campus.

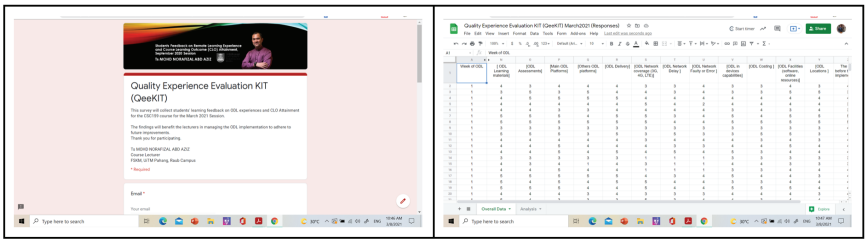

Fig. 4 Questionnaires as in Google Form and Google Sheet to store the data set

RESULT AND DISCUSSION

1332 responses from 137 students from the Diploma of Computer Science enrolled in the Computer Organization and Programming Paradigm course were collected in this study at the end of every ODL session conducted. The Computer Organization course is offered to students in Year 1, while the Programming Paradigm course is enrolled by students who are in their Final Year. Fig.5 depicts the percentage of students for each course.

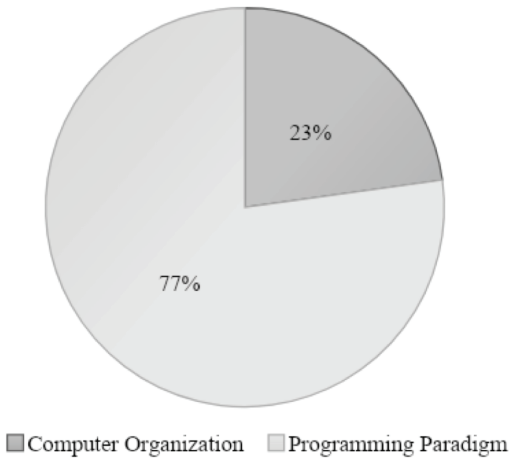

Fig. 5 Percentage of responses for each course

Students' Quality of Experiences towards ODL Learning Materials

The first factor that was evaluated is the quality of experiences towards ODL learning materials available at the platform being used by the lecturers. Learning materials in these courses are in Microsoft PowerPoint notes, lecture videos created by the lecturers, online worksheets for tutorial sessions, and the discussion boards to provide interactivity between students and lecturers.

Table 1. Quality of Experiences towards ODL Learning Materials

	Percentage				
	Unsatisfactory	Less than Satisfactory	Satisfactory	Good	Excellent
Please indicate your experiences for the following ODL implementation factors [ODL Learning Materials]	0.08%	0.45%	15.39%	54.35%	29.73%

The analysis from the responses collected in Table 1 conclude that 54.35% and 29.73% students were having good and excellent experiences respectively towards the ODL learning materials provided by their lecturers in these courses. These findings show that 84.08% of the responses are positive feedback on the selection of modules offered in the platforms since both courses are a combination of theoretical and lab practices to achieve

the course learning outcomes.

Students' Quality of Experiences towards ODL Platforms Used

Main platforms being used by students during ODL implementation in this study is Google Classroom which provides content sharing and learning activities while Google Meet serves as main video conferencing tools to support real-time interactivity between students and lecturers as shown in Figure 2.3. Other platforms such as UiTM Learning Management System (LMS); uFuture and UiTM MOOC, Whatsapp, Telegram, Youtube and a few web-based programming software were also being utilized to support the teaching and learning activities.

Table 2. Quality of Experiences towards ODL Platforms Used

	Percentage				
	Unsatisfactory	Less than Satisfactory	Satisfactory	Good	Excellent
Please indicate your experiences for the following ODL implementation factors [ODL Platforms]	0.08%	0.15%	15.32%	53.90%	30.56%

Table 2 shows that 53.90% and 30.56% of the total responses falls under the category of good and excellent which means that the students have positive experiences while using the ODL platforms selected for the ODL sessions. A few platforms were utilized for these courses to suit the lesson outcomes for each session, for examples lecture videos posted on the Google Classroom and the university's LMS for theoretical sessions, micro-videos created by lecturers and some are taken from YouTube for programming activities and web-based programming software to allow students to do hands-on practices for lab sessions and tutorials. Lecturers also use Google Meet to conduct real-time lecture sessions which enable students to communicate directly with lecturers and classmates. Table 3 shows the quality of experience based on the main platforms used for ODL sessions.

Table 3. Quality of Experiences based on Main ODL Platforms Used

	Percentage				
	Unsatisfactory	Less than Satisfactory	Satisfactory	Good	Excellent
Google Meet	0.08%	0.08%	7.13%	27.85%	17.49%
Google Classroom	0.00%	0.08%	7.36%	24.47%	12.61%
WhatsApp	0.00%	0.00%	0.68%	1.28%	0.38%
UiTM LMS (uFuture)	0.00%	0.00%	0.00%	0.08%	0.08%
UiTM MOOC	0.00%	0.00%	0.15%	0.00%	0.00%
Other	0.00%	0.00%	0.00%	0.23%	0.00%

Students' Quality of Experiences towards ODL Delivery

The ODL will emphasize more on the instructors' delivery, which is dependent on the instructors. However, the network's limitations, coverage, and other factors have affected the effectiveness of the ODL implementation. There are differences in delivery for different subjects, such as the technological and non-technical in the ODL to the interest of the ODL (Mathew et al., 2021), differences between the subject perspectives and the contents of the subjects taught. Therefore, it is essential to investigate the delivery from the experiences of the students' for the instructors to improve or at least improvised the teaching delivery method in the ODL implementation, which may be different from the traditional implementation before the pandemic.

Table 4. Quality of Experiences towards ODL Delivery

	Percentage				
	Unsatisfactory	Less than Satisfactory	Satisfactory	Good	Excellent
Please indicate your experiences for the following ODL implementation factors [ODL Delivery]	0.30%	0.53%	15.47%	53.15%	30.56%

Table 4 indicates the quality of experiences towards the ODL delivery. The result displays 53.15% and 30.56% of total responses indicates that respondents are experiencing good and excellent experience in the ODL session being conducted. These results also revealed that more than 99% of responses were recorded at satisfactory level and above which concludes that ODL is easy and accessible.

LIMITATIONS AND RECOMMENDATION

There are a total of three study limitations that have been identified throughout this study . The limitations are categorized as limited access to data, time constraints and conflicts arising from personal preferences. Since this study uses data collected from students, it is hard to ensure that all students responded to the survey within a certain time frame. This has impacted the study findings as the researchers have limited access to the data. The second limitation is time constraints. The time available to study a research problem is limited as study was conducted during an active semester which means researchers are involved in classes and other administrative tasks. Other than that, data collection needs to be conducted during an active semester in which students are packed with classes, assignments, tests and others. In terms of personal preference, the study faced limitations as students might be biased due to personal preference of ODL platforms even before answering the survey. This might be due to past experiences or external information (reading, hearsay and others). Responding to the limitations discussed, recommendations are proposed. It is recommended for future studies to ensure that all respondents chosen answers the survey questions of the study. This will impact the accuracy of findings presented. Surveys should also be conducted in a larger sample size from different backgrounds as it will contribute to more conclusive results. Besides that, a larger and diversified sample size will also ensure a diverse quality of experiences among students.

CONCLUSION

Global education systems are affected by the COVID-19 pandemic. Shifting from the traditional face to face approach to an open and distance approach was made compulsory to all higher education institutions. Both students and lecturers have encountered challenges due to the sudden shift but as the time goes by, the adaptation of the new approach is gradually improved. The results from this study provides benefits to lecturers in improving students' quality of experience towards ODL implementation. The findings also revealed the suitable platforms for conducting computer science courses which consist of theoretical and lab sessions and tutorials so that the course learning outcomes could be achieved. Based on the data analyzed, students show good and excellent experience on the usage of Google Classroom and

Google Meet which are deployed as the combination of synchronous and asynchronous delivery of ODL sessions.

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