



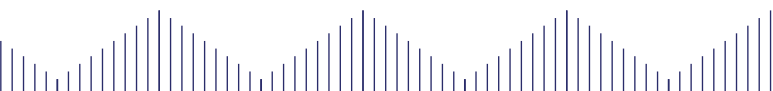
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Designing and Developing an E-Outing System as a Web-Based Tracking Tool Application

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Abstract: The existing outing system still requires a lot of manual effort. Based on the current system, students are required to write down student details including name, matric number, time and date of outing. They then need to get the approval from the College Residents' Staff (CRS). The process is time consuming. As an initiative, an e-Outing system is suggested as it will help to digitalize the process. This E-Outing System is a web based tracking tool application that helps the administrative staff in organizing and managing the students' outing records. The aim of this project is to create a web-based system that can manage outing applications and provide an integrated view of the records which help to reduce the time spent in filling out the manual outing application forms. Besides, this system will also notify the parents once the outing application has been approved, ensuring awareness of their child's activities on that particular day. The other problem identified is the wastage of space storage to keep the data. Thus, this system will provide an online database to store the students' information. This system is developed following the five stages in System Development Life Cycle (SDLC) which include planning, analysis, design, implementation and maintenance.

Keywords: web-based application, e-outing system, SDLC

INTRODUCTION

In this Industrial Revolution 4.0 (IR 4.0), the application of automated system is widely used in the information management process. With the introduction of IR 4.0, the world is facing huge changes in cultural, communication, work processes as well as economical aspects. In this IR 4.0 era also, technologies play an important role. Park (2017) discussed that the introduction of IR 4.0 has changed the way people live, with the introduction of new concepts of the manufacturing processes, decentralization and adopting of systems based on the information and communications technologies. Inline with the IR 4.0, the ICT applications and databases present unparalleled opportunities in managing student records which can lead to the reduction of paper-based systems.

Computerized information systems have justified its benefits in helping organization reduce the space required to store the data and reduction of costs due to more efficient time management (Azza, 2017). Hence, it allows user capture, and manages, as well as provides access to reduce paperwork over time. Currently, the process of managing students' in and out information in all UiTM branch campuses is done manually through a paper based system. However, with the increasing number of students, the manual system could no longer handle student information effectively. Besides, the web-based application has been used in many areas including e-commerce, information publishing, records management as well as communication. These web-based applications have been used to improvise the information management process from a manual to a computerized system.

Asogwa et.al (2015) observed that in universities, paper work is still going on concurrently in their administrative or academic transaction services, and in maintaining student's academic history and profile, despite revolutionizing the student information systems. As an alternative, using E-Outing will give benefits in terms of recording students' in and out information which at the same time makes it easier in retrieving the students information. It is observed that the key benefits of the E-Outing System to students revolves around the fact that it is a 24/7 web-based system which is user friendly, easy and cheap to use. Therefore, with the introduction of this E-Outing System, the students' outing records management will be better facilitated.

BACKGROUND OF THE STUDY

The web-based application will help the information management in the fact that organization becomes easier and accessible. The proposed system, which is the Electronic Outing (E- Outing) System, will help the College management office, Hal Ehwal Akademik Pelajar (HEP) (Student Affairs) in UiTM to manage the students' outing records.

2.1 Problem Statement

The current practice uses the paper-based system where it is time consuming since the process of outing requires the students to fill up the paper based form and get approval from the management. The process circulates all the way around the management since the process is not digitalized. Apart from that, there are also the possibilities of missing records since the number of records are growing. The existing system is completely manual where students have to write the details of the outings on forms, and the hardcopy of the records require large spaces to store. Paperwork can take up a significant amount of space, and this requirement will only get bigger as the number of documents grows. At present, web-based information systems have been widely developed to overcome the constraints of place and time of operation (Hidayat, 2017). The storage in the office requires more space to store student files if the number of students increases in that semester. Computerizing a paper system can create additional space, as there is no longer a need to store large volumes of paper records or files. It also makes it easier for the management and staffs to track the students outing information.

Thus, in order to overcome these problems, the E-Outing System is proposed to assist the management of students' outing information. Through this system, students no longer need to fill up the hardcopy form. This system enables students to fill up the outing form online and the management can review and approve the outing request via online too. The system will facilitate both the students and management in handling the outing process, while at the same time reduce the time needed for managing students' outing information.

2.2 Objectives

The objectives of the system proposed are:

- i. To develop a computerized system that will replace the manual system used by the college management in managing student outings.
- ii. To keep track of students' outing information activities
- iii. To facilitate administrative staff in organizing students' outing information

2.3 Scopes of the System

The targeted users for the proposed system include students, College Resident Staffs (CRS), Auxiliary Police and Parents. This study proposes the design and development of a system for a student outings that could be used by the College Management Unit at UiTM Machang branch. This system has the ability to monitor, track and collect data of the students who request for an outing.

With these features, the system will be useful and effective to the college management for the purpose of monitoring student outings. It would be easier for the authorized staff to approve or decline students' requests for outings through the online system. Therefore, developing this system will help increase the productivity and also improve some tasks. Transactions in the organization will also be systematically reliable. The proposed system consists of six (6) main modules.

The first module is the Registration Module. This module involves the process of new user registration. Users will fill up the form which will then be submitted for approval by the administrator. The second module is the Outing Application Module. In this module, the students can fill up the outing form to request for outing activities. The next module is the Approve and Decline Module. This module will be used by the management which is the College Resident Staffs (CRS) to approve or decline the students' outing request.

The next module involves the process of scanning the matric card. The auxiliary police will check the students' information regarding the

outing request status. This is then followed by the report generation module. The management can generate reports regarding students' outing activities by day, week, month or year. These reports can be printed to be presented to the top management. The last module is the SMS Notification Module. This module will be used by the parents. The proposed system will notify the parents regarding their children's outing activities. Once the outing request is approved, a notification by SMS will be sent to the parents. Hence, it will help parents to be aware of their children's activities in the college.

METHODOLOGY

Following Rosman et. al (2010), the E-Outing System is developed following several empirical stages. First, we conduct a review on the existing forms, procedures and reports. Second, interview sessions are conducted with the stakeholders which are College Resident Staffs (CRS) and students. Lastly, in order to have a structured process, the System development Life Cycle (SDLC) is used as a methodology in developing the E-Outing System. The SDLC comprises of five (5) stages which are planning, analysis, design, implementation and maintenance (Hoffer et al., 2017).

3.1 Review Existing Forms, Procedures and Reports

In developing the E-Outing System, the hardcopy forms currently used by the students to request for outings were analysed. Besides that, the current procedures and reports that are used by the management were also analysed, in order to understand the process of outing request activities. Previously, the students were required to fill up the outing request form which consists of information such as matric number, name, course, phone number, guardian's details, outing details and others. Every time the students need to go out, they need to fill up the hardcopy form which is time consuming and a waste of space since the number of forms keep growing.

3.2 Interview with stakeholders

Interview sessions were also conducted with the College Resident Staffs (CRS) and the students who are the residents of the college. The individual interview was conducted in order to identify the current process and issues of the existing system. It is also through these interview sessions that the stakeholders needs were identified.

3.3 System Development Life Cycle (SDLC)

The E-Outing System is developed following the SDLC Methodology. SDLC is a structured methodology that consists of five stages which are planning, analysis, design, implementation, and maintenance (Hoffer et. al., 2017).

3.3.1 Planning Phase

The planning phase involves aspects of project and product management that include the resource allocation, capacity planning, project scheduling, cost estimation and provisioning for the E-Outing System. In developing a system, planning is the key to its success. This phase includes the process of discovering the problems, collecting data from various sources and conducting research related to the system proposed. It also the part of the project that determines the project's overall direction through the creation of the project strategy.

3.3.2 Analysis Phase

The second phase is the analysis phase. The preliminary investigation was conducted in this phase in order to determine the nature of problems and the requirements needed for the new system. Hence, the interview session was conducted in order to understand the current process as well as to gather requirements. Besides that, it was in this phase that the existing forms, reports and procedures were reviewed.

3.3.3 Design Phase

Once the requirements were understood, the developers began to design the E-Outing System. In this stage, a detailed design was constructed and the hardware and software were identified. During this phase, a detailed diagram was drafted – the diagram includes Data Flow Diagram (DFD), Entity Relationship Diagram (ERD) and Contextual Diagram (CD). These diagrams will help to explain the data structure of E-Outing System. Apart from that, in the design phase, the user interface was designed. This was later used as a guideline in the development process. At the same time, the user interface helped to ensure that the system is user friendly and easy to use.

3.3.4 Implementation Phase

The implementation process is when a system's functions are implemented, and how it will be used by users. This phase is important as it ensures that the system will be implemented correctly and efficiently on the device involved. Coding from scratch is the main activity in this implementation process and the most important thing is that it fulfils the users expectations and avoids critical errors in the program to ensure that the system runs effectively. This stage involves the installation of the hardware and application like Adobe Dreamweaver and Wamp server. For hardware, the researchers used a barcode scanner to scan the students' matric cards. Furthermore, implementation phase is important to identify system function as well as to verify whether it works as expected and as documented in the requirements analysis phase. In this phase, the system was tested to detect, and subsequently eliminate, bugs or errors.

3.3.5 Maintenance Phase

Maintenance is the last phase in the SDLC. For maintenance of the E-Outing System, the researchers used corrective maintenance, adaptive maintenance and perfective maintenance. Once the system is implemented, the maintenance phase takes

place. In this phase, some updates were made and bug fixing was carried out.

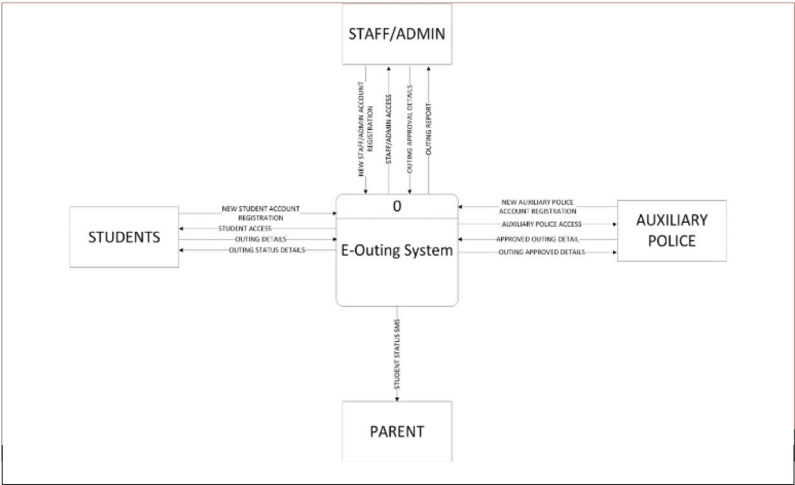


Fig. 1 Context Diagram for the E-Outing System

Figure 1, shows the context diagram of the E-Outing System where the flow of information between the system and entities which include Staff/ Administration, Students, Auxiliary Police and Parent can be seen.

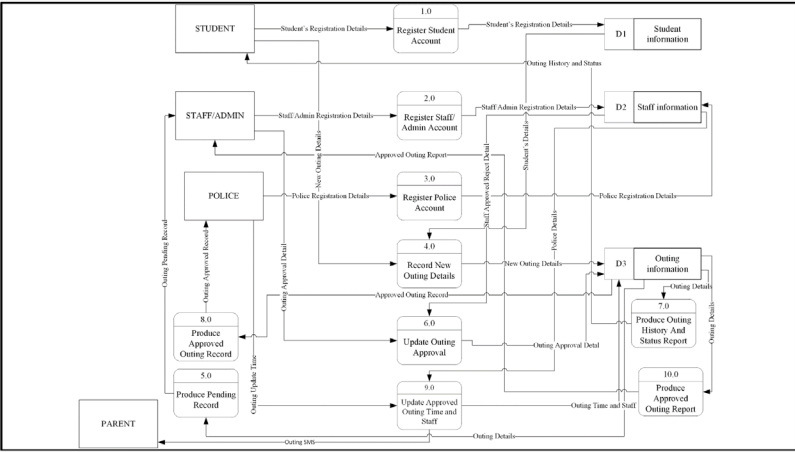


Fig. 2 Data Flow Diagram (DFD) for the E-Outing System

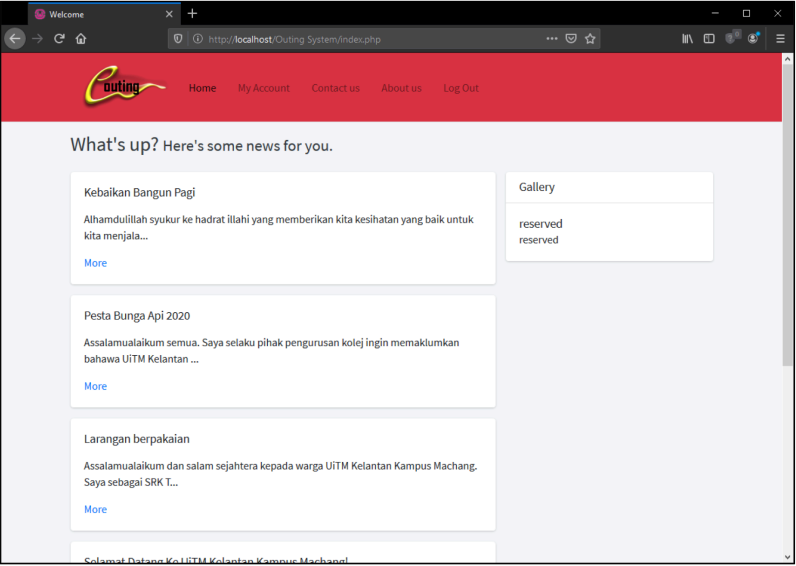


Fig. 4 Main Interface for E-Outing System

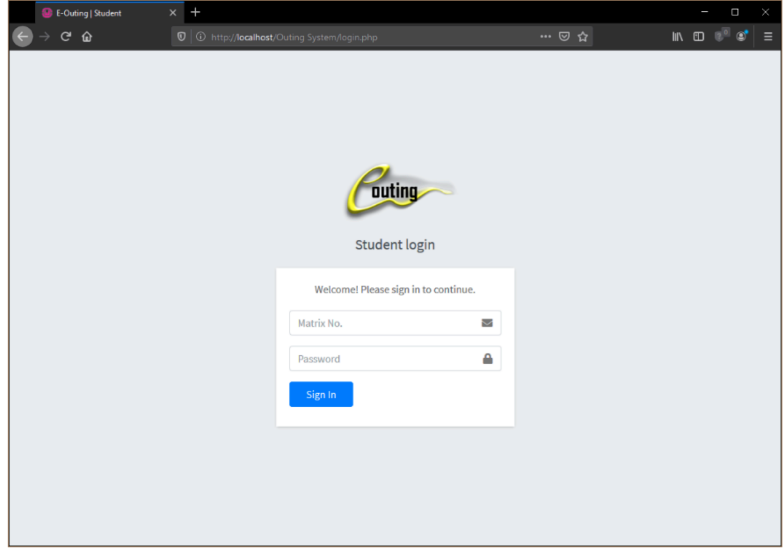


Fig. 5 Login Page for E-Outing System

Designing and Developing an E-Outing System as a Web-Based Tracking Tool Application

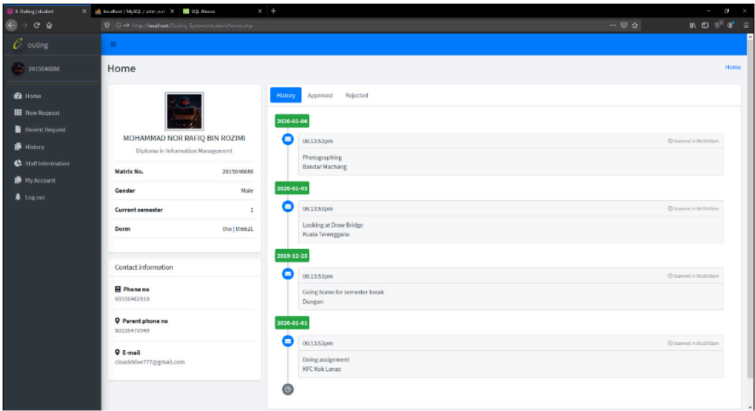


Fig. 6 Student's Information Page

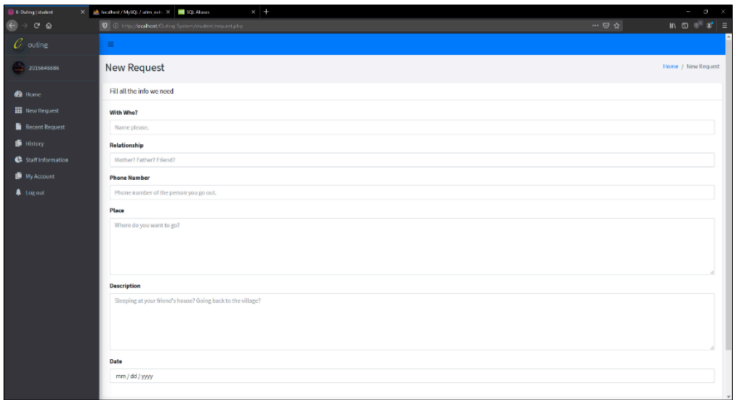
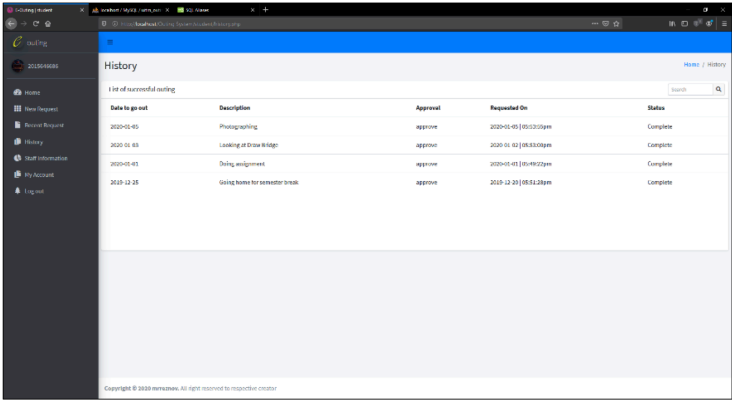
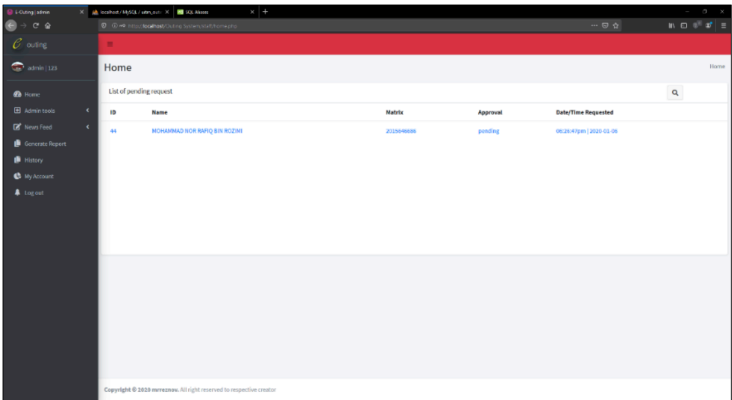


Fig. 7 Outing Request Application Form Page



Date to go out	Description	Approval	Requested On	Status
2020-01-05	Photography	approve	2020-01-05 10:03:03pm	Complete
2020-01-08	Looking at three bridges	approve	2020-01-02 10:03:03pm	Complete
2020-01-01	Doing assignment	approve	2020-01-01 10:04:02pm	Complete
2019-12-25	Going home for semester break	approve	2019-12-20 10:51:20pm	Complete

Fig. 8 Student's Outing History Page



ID	Name	Matrix	Approval	Date/Time Requested
64	MCCHARBAND FOR BAPQ BIR PIZZINI	2020-04-05	pending	06/20/2021 2020-01-06

Fig. 9 Management Outing Approval Page

Designing and Developing an E-Outing System as a Web-Based Tracking Tool Application

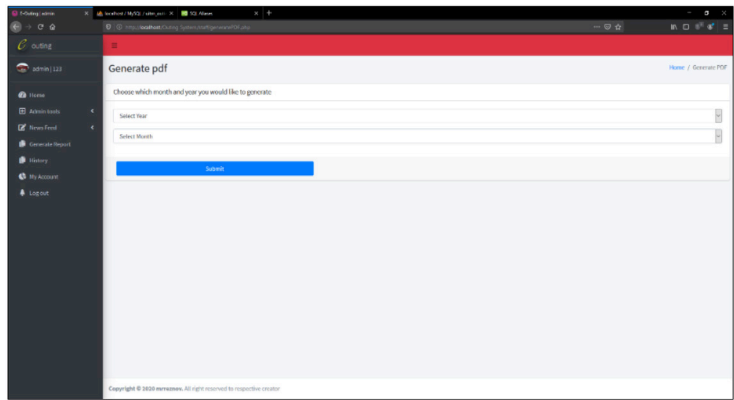


Fig. 10 Report Page

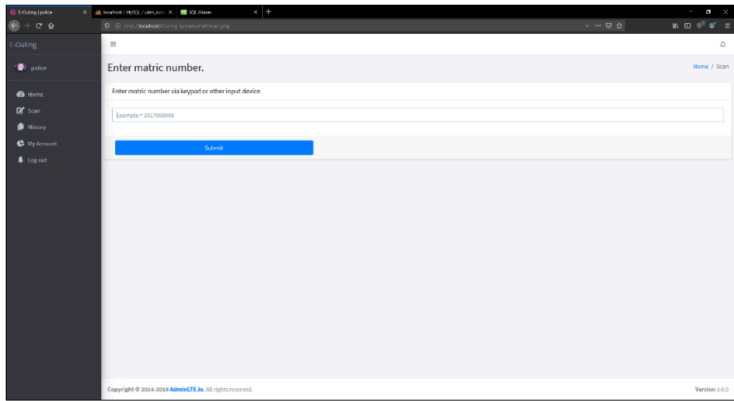


Fig. 11 Outing Application Evaluation Page for Auxiliary Police

CONCLUSION

In this paper, issues regarding record management were discussed. The E-Outing System is an information system that is developed with the aim to improve the procedures of student outing applications in UiTM Kelantan. However, the system could be implemented and commercialized to other campuses, universities and schools. The features of the system could be upgraded from time to time according the stakeholders’ needs.

The people and departments that will mainly benefit from this E-Outing System are the College Management Unit, Auxiliary Police Unit and students of Universiti Teknologi Mara (UiTM) Cawangan Kelantan. The system provides a user-friendly interface to help the retrieval and management of the student outing information easily. This is achieved through the configuration of the system with a database that has allowed the system to be able to store a very large record efficiently and effectively. Besides that, using this new technology can enhance the systems and make them very robust. The implementation of an E-Outing System will solve all the problems that occurred in the previous manual system. The system ensures all the data are stored safely and ready to be displayed accordingly. Furthermore, the system eases and expedites the overall outing process as the total time consumed in managing student outings is significantly reduced. As a result, the user is able to save a lot of time and energy which can be spent on other matters.

Lastly, the E-Outing System assists the College Resident Staff (CRS) in assessing, reviewing, and approving or rejecting an outing request. The students outing information can be easily monitored by staff. The system also ensures all the documents will be generated such as outing student list and report. These could serve as evidence should anything untoward happen to the students.

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This project would not have been possible without the support of many people. Many thanks to the team members for the continuous support and encouragement. Special gratitude is expressed towards Mr Azrul, the College Resident Staff (CRS) for helpful information and guidance during the project. Special thanks too goes out to our friends and respondents for the support and willingness to participant in this E-Outing System project. Last, but not least, we would like to express our gratitude to our family for the tremendous support and hope they had given.

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Padlet for MIS Course: Measuring its Usability and Quality in Teaching and Learning

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Abstract: Since the Covid-19 pandemic, most higher education institutions in Malaysia and elsewhere have embraced open and distant learning (ODL). Students must be engaged in the teaching and learning process for the learning process to continue. As a result, technology is on the approach of replacing traditional face-to-face classes with virtual classrooms. Students and lecturers are the most important stakeholders, and they must work together. The learning environment for the Management Information Systems (MIS) course in particular, must be engaging and enjoyable. Therefore, this study proposes Padlet as a learning tool for a comprehensive learning experience that is suitable for both synchronous and asynchronous teaching and learning. This study seeks to examine the quality and usability of Padlet from the perspective of lecturers and students. It also investigates their experience when they use Padlet in teaching and learning. The nature of Padlet itself offers interesting and fun learning. Based on the survey conducted among students enrolling in this course and lecturers teaching MIS, Padlet appears to be engaging, interesting, and easy to use as it provides a shorter and quicker way to access learning materials. Its simplicity offers a great way for teachers and students to collaborate.

Keywords: Open and Distance Learning, Management Information System, Padlet, Usability, Quality.

INTRODUCTION

Open and distance learning (ODL) is a term that refers to a teaching and learning process that relies on information and communication technology (ICT) rather than traditional face-to-face learning. With the world is fighting the severe Covid-19 pandemic, since March 2020, ODL continues to be adopted in most higher institutions in Malaysia since March 2020. This phenomenon has ushered in a new era in which technology is unavoidable. The only way for teachers and students to stay in touch is through technology.

Prior to ODL, lecturers used blended learning (BL) as part of every academic semester's curriculum delivery. Many academics have characterised blended learning in different ways (Hrastinski, 2019). BL can be implemented in a variety of ways as long as ICT platforms are used to achieve learning objectives. In an ideal world, BL allows students to have some flexibility in their education instead of being forced to follow strict and rigid learning practises. Blended learning was used in the Management Information Systems (MIS) course provided in all Faculty of Administrative Science & Policy Studies (FSPPP) programmes at UiTM Negeri Sembilan, Kampus Seremban, where students were assigned activities or assignments from any selected chapter. According to Pizzi (2014), BL necessitates a flipped classroom, in which half of the time is spent in face-to-face sessions and the other half is spent on self-instructed learning. However, during the pandemic, 50% of physical meetings are no longer possible. The system has been taken over by ODL, most likely for a quite a considerable duration.

Depending on the applicability of the course being taught, many platforms can be used in ODL. However, having too many platforms active at the same time might overload students and be difficult to manage. Online course materials can be stored in a single "location" for simple access, allowing for both asynchronous and synchronous learning. Furthermore, a learning process demands a collaborative setting in which instructors can participate and students can absorb information collectively (Hunt, 2005). As a result, this study recommends Padlet as a learning tool for a holistic learning experience that is appropriate for both synchronous and asynchronous teaching and learning, particularly in the MIS course. This study seeks to examine the usability of Padlet in the MIS course teaching and learning. Secondly, it takes to assess students' satisfaction using this tool by looking

at their experience when they use Padlet. Last but not least, is to measure the quality of Padlet from lecturers' perspectives expanded across UiTM campuses in Malaysia, offering this course. Based on a study conducted with students enrolling in the course and lecturers teaching MIS, Padlet appears to be engaging (Lowe & Humphrey, 2018), fascinating, and easy to use since it gives a shorter and faster way to access learning materials. Its simplicity makes it an excellent tool for teachers and students to collaborate.

This paper is organised as follows: in the second section, available online tools for teaching and learning are presented. Then, it further discusses the concept and features of Padlet in the existing literature followed by Padlet used in the MIS course. In the third section, the research method used will be discussed, and results of this study will follow suit. Finally, this paper ends with the conclusion, limitation, and recommendation.

TEACHING AND LEARNING USING ONLINE TOOLS

For online teaching, there are a variety of well-known and lesser-known teaching technologies. These tools were first launched in the education sector a few years ago and are utilised when both learners and educators are unable to meet in person. The whole point to using these tools is to supplement traditional teaching methods. However, with a global pandemic looming, education sectors will have no choice but to fully utilise these instruments.

This section focuses on online tools and their usefulness in general, with these tools being classified as dynamic learning management systems (LMS) that are commonly used by the new generation (Martins et al., 2019). Most online tools are allowed, and lecturers select the most appropriate platform for their teaching procedures based on the course's nature. Students will be disappointed if they use the wrong tools (Bettinger, Fox, Loeb, & Taylor, 2017). It is therefore critical to adapt the right tools to everyone's disposal so that no one is left behind and learning can be enjoyable and engaging. The applicability should ideally be determined by the form of online learning, which includes both synchronous and asynchronous learning.

There are two types of online learning: synchronous and asynchronous eLearning. Asynchronous learning refers to learning that occurs outside

of class hours and without direct connection with teachers. Synchronous, on the other hand, offers live online classes led by teachers and supported by appropriate communication technologies. Table 1 lists the supported communication technologies that are available for both online learning (Lim, 2017).

Table 1 Mode of online learning and communication tools

Communication Tools	Synchronous Learning	Synchronous Learning
Video conferencing	Yes	No
Web conferencing	Yes	No
Audio conferencing	Yes	No
Live chat	Yes	No
White boarding	Yes	No
Application sharing	Yes	No
Discussion forum	No	Yes
Web logs	No	Yes
e-mail messaging	No	Yes
Social media messaging	No	Yes

Each communication technology has its own set of capabilities and drawbacks. (Lim, 2017) examines the usability and limitations of each synchronous and asynchronous tool. In general, communication technologies used in synchronous learning mode are designed to mimic traditional classrooms, where learning is driven by teachers and students, making it interactive. In addition, as compared to asynchronous, synchronous learning allows students to engage and contribute (Lim, 2017), and students have a genuine feeling of belonging in the classroom (Hrastinski, 2019). However, managing a large group of students and dealing with technical breakdown during real-time sessions can be difficult (Lim, 2017).

2.1 Padlet

Padlet is a popular Web 2.0 application for teaching and learning. It's a free online service that facilitates open and distance learning (ODL) and it gives instructors a platform to post and share class materials.

The site is useful for generating ideas and exchanging viewpoints on a variety of issues. Padlet is portrayed as ‘Padlet: You are Beautiful’ since its concept and usage are so easy. Padlet, as its name suggests, is a collaborative software that allows anyone to share their material (Sese, 2021), digital “post-it” notes (Ellis, 2015), and a virtual wall (Luftova, 2015).

Padlet has a variety of features for lecturers to choose from, including an online bulletin board, a wall, and a canvas, where lecturers can create a wall with a variety of information about their courses, such as ideas, images, videos, links, and documents, and collaborate with their students by sharing (Edwards, 2020). This wall will then serve as a one-stop conversation hub in the classroom. Comparing having many platforms at the same time to sharing a collection of course materials with students in a single platform would help them manage a course better. Students can simply click the Padlet link provided by their lecturer and begin collaborating during class right away (Ellis, 2015). Padlet improves student involvement in the classroom and is suited for both synchronous and asynchronous eLearning (Ellis, 2015), whereas Anwar, Nugroho, & Nurhamidah (2019) claims that Padlet may be used in a variety of settings.

Apart from eLearning, mobile learning (mLearning) has quickly emerged as a preferred method of learning and accessing knowledge for integrating various modes of learning (Gupta, Khan, & Agarwal, 2021). That said, not only Padlet can be accessed via a web browser, but if students do not wish to carry their laptop, they can integrate mLearning where they can download the Padlet app, which is available in GooglePlay for Android users and the AppStore for iOS users. Both views, desktop and mobile app are shown in Fig. 2 and Fig. 4.

2.2 Padlet for Management Information Systems (MIS)

Management Information Systems (MIS) is one of the information and communication technology (ICT) courses offered to students enrolling in the Faculty of Administrative Science & Policy Studies. This course is divided into nine chapters that cover the fundamental

principles and theories of information systems (IS) in organisations, as well as their application in everyday activities such as ethical and social issues, telecommunication, and ecommerce. For each chapter, students are given lecture slides as well as other supporting materials such as video clips and extra notes. The nature of open and distance learning (ODL) requires lecturers to give instructions prior to or during online lectures.

For MIS, students are usually given a meeting link ahead of time, and lectures are held once a week for about fourteen weeks. Most lectures and ‘meetings’ with students are scheduled according to the timetable set for the lecturers, albeit ODL. When lecturers give lectures alone with little interaction with students, the session can become “boring” (Ellis, 2015). It is difficult to assess students’ comprehension in an entirely virtual environment. However, lecturers become more creative by utilising a variety of teaching approaches that are appropriate for ODL. To avoid students feeling “isolated,” lectures can be delivered both synchronously and asynchronously outside of scheduled class times (Lowe & Humphrey, 2018).

2.2.1 MIS contents organisation in Padlet

Padlet (www.padlet.com) provides a variety of templates, including wall, stream, grid, shelf, map, canvas, and timeline. Fig. 1 depicts the templates that can be used before creating a Padlet.

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Make a padlet

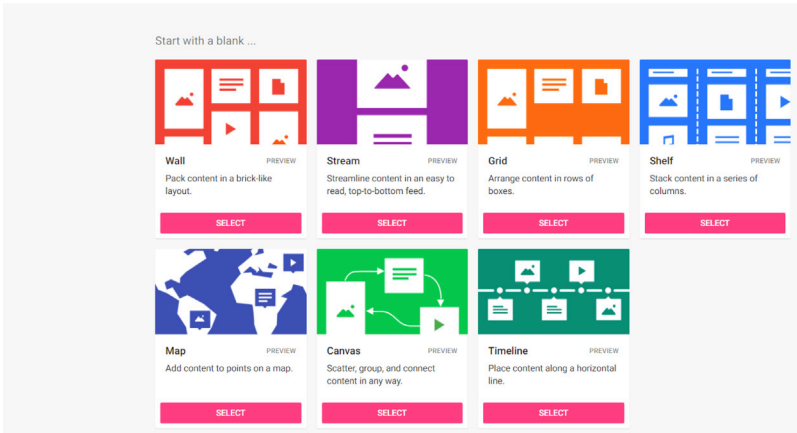


Fig. 1 Padlet template (www.padlet.com)

Choosing the right template and organising the contents is critical for creating a livelier environment for ODL teaching and learning. As shown in Fig. 2, lecturers can include three padlets for free in a dashboard, which is technically intended for a single email account, viewed from the desktop and mobile apps respectively. The MIS course makes use of shelf templates that are set up in multiple column shelves, ideally for all nine chapters. Each column in this template represents a chapter, with the contents stacked on top of each other. The arrangement of the MIS course chapters, and their contents is depicted in Fig. 3, showing from a desktop and Fig. 4 from the view of mobile app. There are slides included, video clips attached, and discussions can be held by enabling the comment feature in the settings.

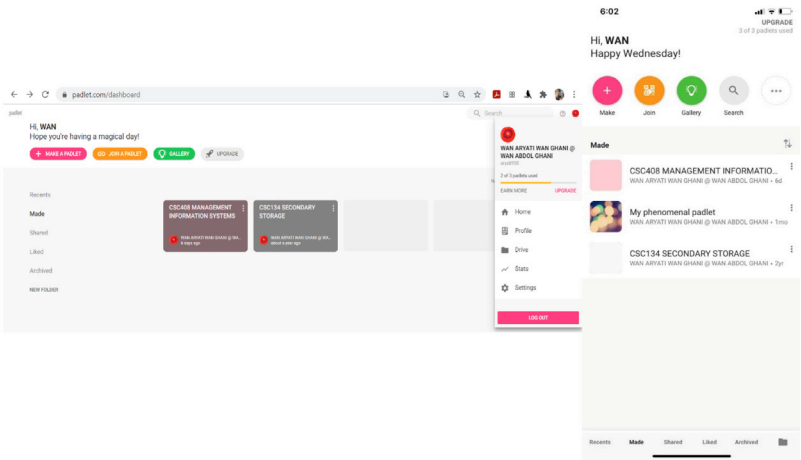


Fig. 2 A user dashboard in Padlet

Apart from course materials, tutorials and class projects can also be added to the same Padlet, and students can post and start a discussion with their fellow classmates. This tool would encourage student-to-student and lecturer-to-student interaction (Ellis, 2015; Lim, 2017; Lowe & Humphrey, 2018).

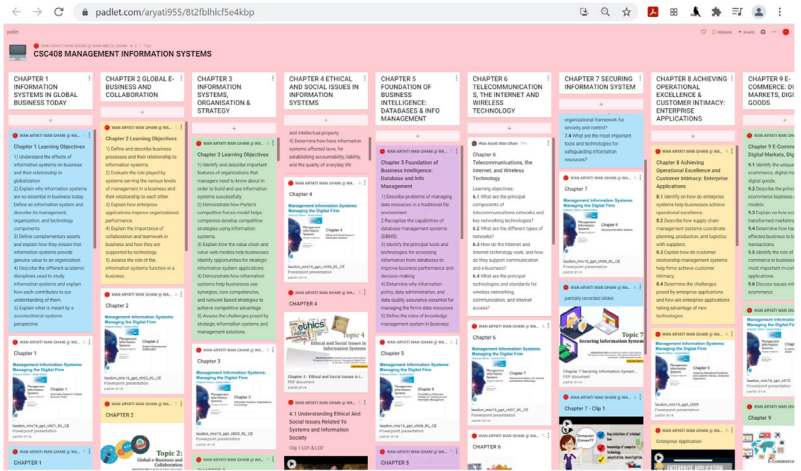


Fig. 3 Chapter and content arrangement in the MIS Padlet from desktop view

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Fig. 4 Chapter and content organisation in the MIS Padlet from mobile app view

Having had an organised layout for Padlet, it is important to seek feedback on its overall design in terms of quality criteria. The Learning Object Review Instrument (LORI) was coined by Leacock & Nesbit (2007) as a guide for “eliciting ratings and comments from learning resource evaluators.” The feedback received will be used to improve the current Padlet for future use.

RESEARCH METHODOLOGY

Participants in this survey included lecturers who have taught this course as well as students enrolled in the Management Information Systems (MIS) course for the academic year of March – August 2021. This survey included 49 male and female students from AM225 Bachelor of Corporate Administration and AM226 Bachelor of Environmental Administration. For each objective, two separate survey tools were used: Google Form and Poll Everywhere. The first objective is to investigate Padlet's usability for learning engagement, and the second is to collect students' experiences with Padlet.

Finally, thirteen lecturers took part in a separate survey. This survey was conducted primarily to meet the third objective of this study, which is to measure the quality of Padlet from the perspectives of lecturers, where Padlet is used as a complement to MIS lectures. The Google Form questionnaire has three sections for collecting responses from lecturers at the end of the semester. Microsoft Excel was used to analyse the responses.

3.1 Google Form survey

The first goal is to examine Padlet's usability in terms of its effectiveness, as well as student satisfaction. A four-point Likert scale was used to allow students to express how they associate Padlet's effectiveness with each usability, namely Very Ineffective, Ineffective, Effective, and Very Effective. Padlet's usability for the MIS course is measured in four major categories: easy to understand, easy to learn, easy to operate (user-friendly), and attractive.

Besides investigating students' satisfaction with Padlet's usability, this study also aims to assess their level of satisfaction when using Padlet. A five-point Likert scale was used to represent the level of satisfaction. The scale was represented as follows: Very Satisfied, Satisfied, Neither Satisfied nor Dissatisfied, Dissatisfied, and Very Dissatisfied.

The Google Form questionnaire used to assess Padlet quality from the perspectives of lecturers was divided according to the demographic

profile of the respondents, followed by the five Padlet qualities to be evaluated using a five-point Likert scale represented as Poor, Fair, Neutral, Good, and Excellent. This section evaluates five qualities: content quality, learning goal alignment, motivation, presentation design, and reusability. The qualities are based on the Learning Object Review Instrument (LORI) (Leacock & Nesbit, 2007).

The final section of the questionnaire consists of three questions: the first assesses lecturers' satisfaction with the use of Padlet for this course, and the second assesses lecturers' willingness to recommend this Padlet to their students for the upcoming semester. The last question is an open-ended question designed to elicit comments, suggestions, and recommendations for the Padlet from lecturers.

3.2 Poll survey

The second objective is to shed light on students' learning experiences when they use Padlet. Students were asked to answer three simple open-ended questions about their experiences learning the MIS course using Padlet in their studies in an open-ended survey conducted using Poll Everywhere (<https://www.polleverywhere.com/>).

The three open-ended questions were posted in Poll Everywhere for students to freely answer without restriction. Before students can attempt the survey, the website generated a link that was shared with them. When the survey was conducted in week 13, the students had completed learning all the chapters in this academic semester. The following are the open-ended questions:

- i. Please leave your feedback regarding Padlet as one of the learning tools used in MIS course.
- ii. What do you think about the arrangement of the course material in Padlet?
- iii. Share your experience when you use Padlet to revise/study the MIS course, and what do you like the most about Padlet?

FINDINGS

Following the data analyses based on the survey data collection, the results and discussion are presented as follows.

4.1 Participants' Demographic

This study was carried out on 49 students enrolled in the Management Information Systems course. The AM225 and AM228 programmes each had 22 and 27 students, respectively. Based on the analysis, the students who participated in this survey were mostly female, with a total of 39, and only 10 male students. Fig. 5 shows the students' demographics. 13 lecturers from five campuses took part in this survey. The data is tabulated in Fig. 6 below.

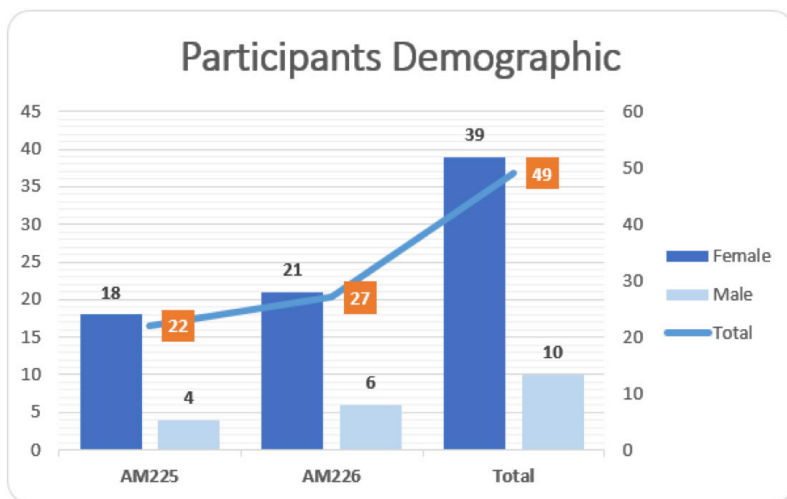


Fig. 5 Students' Demographic

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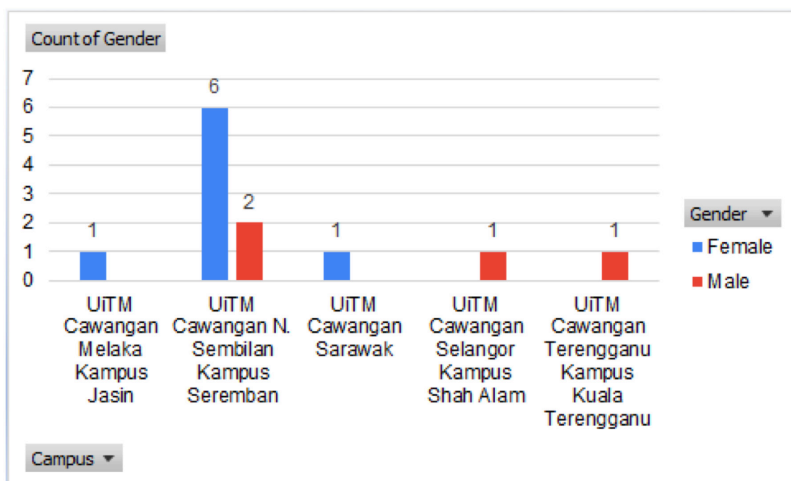


Fig. 6 Lecturers' Demographic

4.2 Padlet usability in teaching and learning

This section discusses the results of the Google form questionnaire regarding the usability of Padlet in the MIS course. From the analysis, Padlet, which is used in the MIS course teaching and learning, receives positive feedback from the majority of the students. Based on the descriptive analysis, students rated Padlet's usability as "generally effective." On top of, all students were able to better understand the course contents for chapters, when learning from real-time online lectures, as presented in the Padlet . Similarly, the results of the ease in learning using Padlet analysis show that it is 100% effective. Padlet was perceived as ineffective by only 2.04% of 49 participants for the statements 'Easy to Operate' and 'Attractive', respectively. However, in these measures, the small percentage of ineffectiveness had no effect on the rest of the students. The rest of the students gave Padlet a thumbs up, with 97.95% describing it as user-friendly and appealing.

Table 2 Padlet Usability in the MIS course

Level of Effectiveness/ Padlet Attributes	Very Ineffective	Ineffective	Effective	Very Effective	Mean
Easy to understand	0	0	38.78%	61.22%	3.61
Easy to learn	0	0	42.86%	57.14%	3.57
Easy to operate as in user-friendly	0	2.04%	36.73%	61.22%	3.59
Attractive	0	2.04%	40.82%	57.14%	3.55

Table 2 summarises the analyses of Padlet usability in MIS course teaching and learning. Overall, the results indicate that Padlet’s usability is generally effective.

4.3 Satisfaction on the use of Padlet for the MIS

This study seeks to assess students’ satisfaction with Padlet, in addition to looking at its usability in the MIS course. Similarly, the results show that 63.27% of students are very satisfied with this tool, while 26.73% are satisfied.

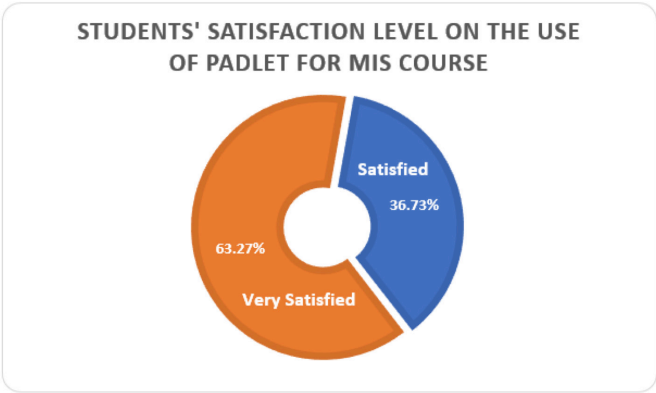


Fig. 7 Students’ satisfaction on Padlet usage.

Overall, all of the students are happy with the use of Padlet in the MIS course to supplement real-time online lectures. This demonstrates how

Padlet can help students with both synchronous and asynchronous learning.

4.4 Students’ Experience using Padlet

This survey had 21 students who took part in it. The three open-ended questions (shown in Fig. 8) were analysed using a word cloud generator within the Poll Everywhere setting. The study generated three representations of visual word frequency based on the responses of all participants.

This survey began by asking students to provide feedback on Padlet, one of the learning tools used in the MIS course. The word cloud analysis reveals that students’ feedback is positive, as no negative words appeared in the frequency of the word. This would shed some light on students’ experiences when using the Padlet tool in their learning process.

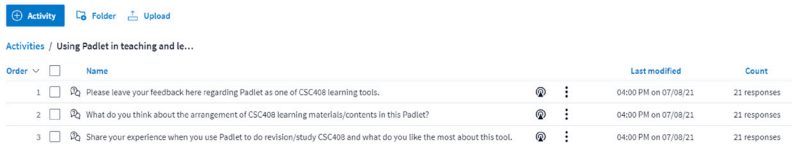


Fig. 8 The three open-ended questions posted on Poll Everywhere

The second question in this online poll survey was about the layout of the course materials in Padlet, which can be related to students’ experiences when navigating through the Padlet. Based on this question, Poll Everywhere generated a word cloud. The most frequently used words are ‘organised’ and ‘easy.’ It demonstrates that the students have no problems using the Padlet to study for the course.

The third word cloud displayed in Fig. 9 is associated with the final section of this open-ended survey. It specifically asked students to share their experiences using Padlet for revision and what they like best about this tool. It appears that the word ‘interesting’ makes the best of other words.

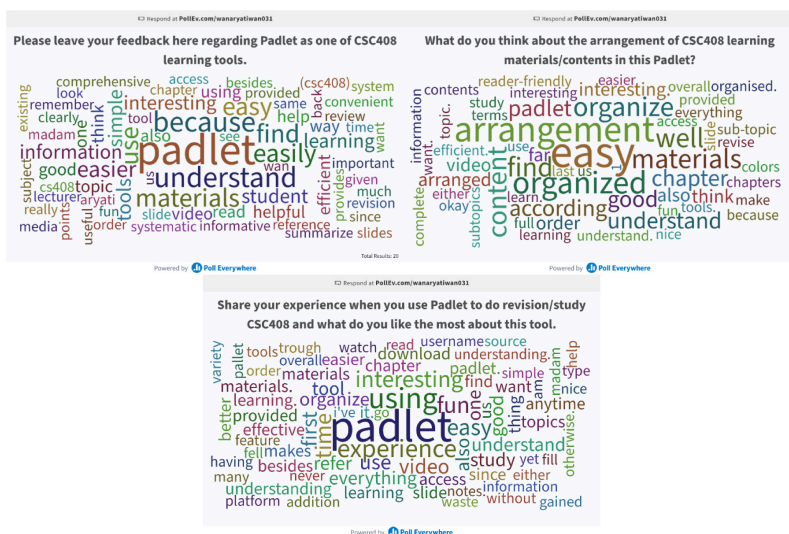


Fig. 9 Word Clouds – Visual Representation of Students’ Experience when using Padlet

Based on the responses received, this survey can comprehensively describe how students used Padlet in the MIS course throughout the academic semester. Overall, the word frequency orchestrated in the word cloud shown in Fig.9 could indicate that the students had a positive experience when using Padlet to study the course because they were able to find a collection of learning resources materials in one place.

4.5 Measuring the Quality of Padlet from lecturers’ perspectives

Leacock and Nesbit (2007) present several quality attributes suitable for evaluating eLearning platforms, five of which were chosen for this study: content quality, learning goal alignment, motivation, presentation design, and reusability. The results of the data analysis are shown in Table 3 below. Participants were asked to rate their responses with a proposition on a graded 5-point Likert scale: Poor, Fair, Neutral, Good, and Excellent. This result shows that Padlet is perceived to be

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of significantly outstanding quality, with a total percentage of 76.92 percent for both Good and Excellent. For judging Padlet with poor quality, the mid-point response category, which is neutral and fair, carries a small weight percentage of less than 30%.

Table 3 Padlet quality based on each attribute from lecturers' perspectives

Attributes	Percentage				
	Poor	Fair	Neutral	Good	Excellent
Content Quality	0%	7.69%	7.69%	30.77%	53.85%
Learning Goal Alignment	0%	7.69%	15.38%	23.08%	53.85%
Motivation	0%	7.69%	15.38%	30.77%	46.15%
Presentation Design	0%	7.69%	15.38%	30.77%	46.15%
Reusability	0%	7.69%	7.69%	23.08%	61.54%

Lecturers are mostly satisfied with Padlet. Based on the analysed data, when they were asked about the level of satisfaction on a scale of 1 to 5, the mean shows 3.8. The gain score implies that Padlet significantly satisfies most lecturers. Table 4 shows the analysed result.

Table 4 Level of satisfaction when using Padlet

	1	2	3	4	5	Mean
What is your level of satisfaction on the use of Padlet website/application for CSC408 course?	0	0	2	6	5	3.85

CONCLUSION

In view of all information presented in the preceding section, it is possible to conclude that Padlet is an excellent tool for supplementing ODL teaching and learning of the Management Information Systems course. Asynchronous online meetings may not be completely effective (Iyer & Chapman, 2021). Padlet would provide a better way to support both synchronous and asynchronous eLearning, given its usability and the fact that students are undeniably satisfied.

In addition, the findings of this study support the ideas of Ellis (2015); Fuchs (2014); Lowe & Humphrey (2018), who stated that Padlet appears to be engaging, interesting, and simple to use because it provides a shorter and faster way to access learning materials. Interestingly, the students had a great time navigating all the chapters in a Padlet because its simplicity allows teachers and students to collaborate with one another.

Furthermore, most lecturers perceived Padlet as significantly good quality. The level of satisfaction is also relatively high. However, it would be best to look at other attributes suggested by Leacock & Nesbit (2007) or perhaps in other research papers in enhancing and maintaining Padlet for use for every semester.

The current findings contribute to an expanding body of literature on Padlet in general. However, additional research on the use of Padlet would be worthwhile and interesting if this study could be expanded into many other disciplines beyond the social science program.

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Designing & Developing e-College (e-CRS) as a Web Based Application Tool

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Abstract: This paper discusses the designing and developing of the e-College System (e-CRS) as a web based application tool for registering student's room and fee payment at UiTM Machang campus. This system can replace manual registration and long queues, saving time and money. The System development Life Cycle (SDLC) is used as a methodology in order to have a clearer stage for each phase involved. The stages comprise of planning, analysis, design, implementation and maintenance. The College administration department can easily record the number of students by using this system, so it is easier for students to apply virtually. The administrative staff can also trace student records efficiently, making it easier for future reference. This online application tool is very important, especially in the times of the Covid-19 pandemic.

Keywords: e-college system, e-CRS, SDLC

INTRODUCTION

Nowadays, in each university, accommodation, such as rooms, is compulsory for students to stay in, especially for those who live far from their hometowns. The situation is very much the same for UiTM Machang Kelantan students. The E-College Registration System (e-CRS) is a useful system for students to enter college, so that they can follow their classes

more closely. The student is facilitated by this system in registering for college accommodation, finding out the results of their preferred room and making the payment for the college fees. Students do not need to queue at a crowded place such as the college office just to register and know their approval status, especially during this pandemic covid 19 outbreak, which first started in Wuhan, China in December 2019. On 11 March 2020, the World Health Organization (WHO) (2020) declared Covid-19 a global pandemic. This incident changed the landscape of every aspect of human life globally. This is supported by Gewin (2020) and Ciglaric & Vidmar (2014) where the education sector too was affected during the pandemic. As a result, national schools were closed and higher education institutions (HEIs) cancelled all their campus events. With the creation of this system, students only need to register for accommodation from home, subsequently protecting them from being infected with the Covid-19 virus.

This system can also store the data of students who have registered for college accommodation where it will be more organized and easier to trace compared to manual data storage. This can make it easier for the college administrative staff because it can save their time and energy. Without proper data management, it would be hard for a university to manage their students. Student Online admissions are a vital part of any university's running because students are what keeps a university alive. The student admission is one of the most important activities within universities as they cannot survive without students. A poor admissions system can mean fewer students being admitted into a university because of mistakes or the huge response time needed.

The university is one of the places which highly utilizes the computer system, where a systematic management is needed in their daily routine. Besides, people nowadays would prefer using computers to do their work or assignments because it is mobile, and tasks are accomplished in a shorter time and easier way (McKinsey and Company 2020 and Internet World Stats, 2020). Technology in the IR 4.0 era is vital, as mentioned by Park (2017) and it has changed the way people live with the introduction of new concepts in manufacturing processes. This includes the decentralizing and adopting of new systems based on the information and communications technologies opportunities in managing student records which then leads to

the reduction of paper use, as opposed to paper-based systems. The process of enrolling in a college and fee payment in UiTM Machang campus is currently carried out manually. Basically, the method used is not able to handle a large volume of data. The e-CRS system replaces the manual registration and long queuing up as practiced before. So, time and money can be saved as well. The college administration can also trace student records easily for current and future references.

BACKGROUND OF THE STUDY

This paper discusses the designing and developing of the e-College System (e-CRS) as a web based application tool for registering student's room and fee at UiTM Machang campus, Kelantan and will be used by the College Admissions' department.

2.1 Problem Statement

Currently in UiTM Machang, for college registration, students have to register manually at the college office to get a room. This also equates extensive queueing time. The registration process which includes payment for the room takes a long time to complete. The College Administrative staff cannot provide students with rooms unless they register with the college first. It is obvious then that the available data are not well organized, and this makes it difficult to trace student information. So, the e-CRS system was developed for the college unit in UiTM Machang, Kelantan for the purpose of registering student rooms together with the payment during the pandemic outbreak.

The e-CRS is proposed to assist the management of students at the college department. Through this system, students no longer need to fill up the hardcopy form and queue at a crowded place as practised before. This system enables students to fill up the information form online and the management can review and approve the requested information. The system will facilitate both the students and management. In addition, it will reduce time in managing particular information.

2.2 Objectives

The objectives of the system proposed are:

- i. To shorten the the process of college registration as practised before.
- ii. To properly organize the data stored by the college administrations for future reference as well as safekeeping.
- iii. To develop a system that requires less face-to-face registration.

2.3 Scopes of the System

The targeted user for this system are students whereby they can register easily and can save their time without having to go to the college office. This is especially convenient for students who live a considerable distance from the university. They do not have to sacrifice time registering at the college office because with this system they only need to register from home and attend college when the semester starts. Besides, the college administration staff who are involved in this system will also have their own roles- they would be responsible in controlling the college approval process applied by each student and checking the college payment status.

METHODOLOGY

System development Life Cycle (SDLC) is used as a methodology in order to have a clearer stage for each phase involved. Based on the information by Hoffer, George & Valacich (2017), the stages comprise of planning, analysis, design, implementation and maintenance. We had evaluated a few existing systems to know the problem of the system in order to improvise to a new system that is much more user-friendly. Based on the current systems evaluation we could identify the pros and cons of the system, and areas that needed improvement. We could also see much clearer, the problems which occur from the current system. Moreover, for the e-CRS system we have included any software and hardware which are most suitable to use in building the system. Next, we collected the user requirements by using several methods such as interview. Individually interviewing people gives valuable information about the operation and issues of the current system and future systems' needs (Hoffer, George & Valacich 2017). The college staff were also observed at selected times to see how data are handled and

see what other information was needed by them to do their jobs, which would subsequently enable us to develop a better system that would be significant to the user (Rosman, 2010).

In the design phase, we chose to start with the data flow of the system that will describe more about the process of our system. Our system design is continued by designing and creating an Entity Relational Relationship Diagram (ERD) and Data Dictionary (Metadata) that will explain about the structure of the database system that will be conducted. We are also created an interface of the system such as input, output and dialog box to make it easier for the user to use, and understand it even faster. Besides, during this phase we had also created the interface of the systems to make sure the criteria of the systems is user friendly to users to interact (Tylor, 2015).

During the implementation phase, the project became clearer since coding and testing were done here. This phase entails the actual building of the project's outcome. This is the period during which the project becomes apparent to outsiders, who may believe the project has just begun. The implementation phase is the action phase, and it is critical to sustain momentum throughout this stage. Besides this, in this phase we use PHP programming language to code the system. According to Yabing & Chen (2017) the empirical study made use of publicly available data sets illustrating prominent open-source Web applications. Moreover, during the process of coding we also used a few functions for example, the 'Insert' and 'Update' function to make sure the students and the college administrator could update the system and insert their needed data. We also constructed buttons such as 'student profile updates' for the students to insert their additional information, 'college registration' for the students to register their college request, and 'college status' for the students to state their preference of the status of their registration - for example to know their approval status, number of room and their college name. Other buttons constructed were 'college payment', for the student to update their payment after receiving their status approval, and the 'contact us' as well as 'about us' buttons that show some information on the college administration. The administration account also contain a few buttons: for example, 'list of students', 'college student's status' and 'college payment', which enable the administrative staff to see the reports of all the students that have registered and made a request for college accomodation (Ciglaric & Vidmar, 2014 and McFarland, 2018).

After the product is fully operational, the SDLC's maintenance phase begins. Software maintenance might involve software upgrades, repairs, and software patches if the software breaks (Ransom,2020 and Hoffer, George & Valacich (2017). During this phase, we have made the final alteration of the system, fixed a few problems that caused errors and also organized the design of the systems. Besides, we also presented the systems to the users, including administrative staff, for them to know the functions of the system and how the system operates.

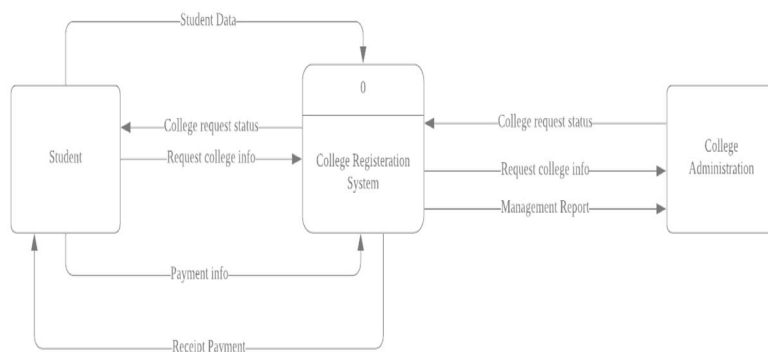


Fig. 1 Context Diagram for e-CRS

Figure 1 shows the context diagram of the e-CRS where we can see the entirety of this system involving both the students and the college administrative staff.

Designing & Developing e-College (e-CRS) as a Web Based Application Tool

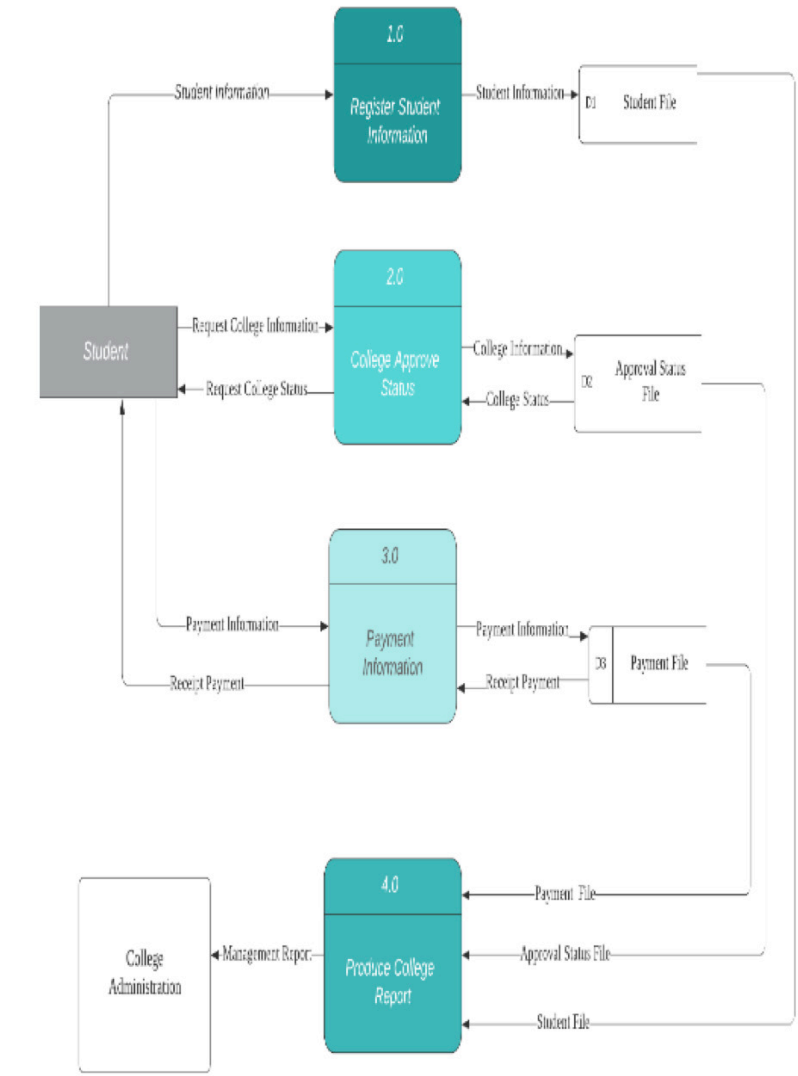


Fig. 2 Data Flow Diagram (DFD) for e-CRS

In figure 2, the flow of data within the system is clearer and more detailed.

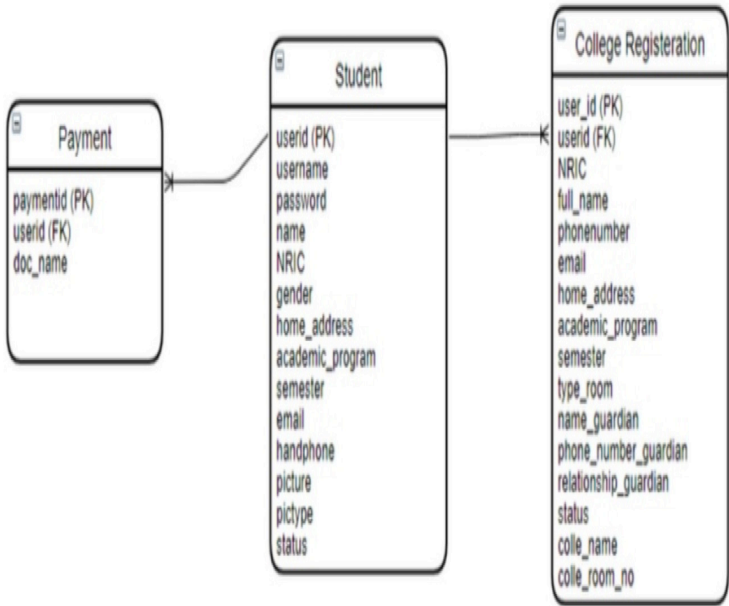


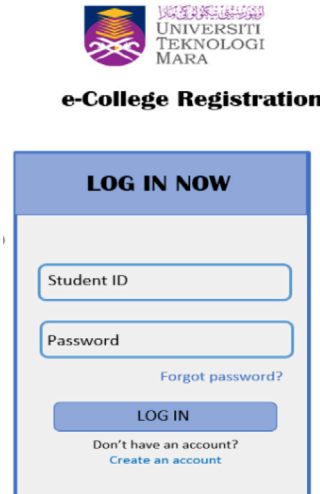
Fig. 3 Entity Relationship Diagram (ERD) for e-CRS

In figure 3, the relationship between tables is shown - it comprises of the payment, student and college registration table together with their attributes.

INTERFACE FOR E-CRS

Here are the main interfaces of the e-CRS, starting from the registration form (student’s view).

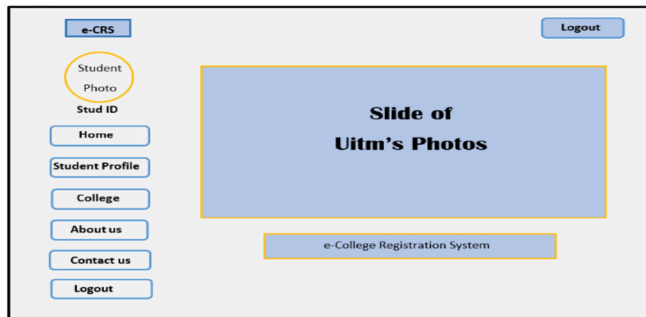
Designing & Developing e-College (e-CRS) as a Web Based Application Tool



The image shows the login page of the e-College Registration system. At the top, there is the logo of Universiti Teknologi MARA (UiTM) and the text "e-College Registration". Below this, there is a blue header with the text "LOG IN NOW". The main content area is white and contains a "Student ID" input field, a "Password" input field, and a "Forgot password?" link. Below these fields is a blue "LOG IN" button. At the bottom, there is a link "Don't have an account? Create an account".

Fig. 4 Log in Page of the e-CRS

Figure 4 shows how students can log in by inserting their information, such as student ID.



The image shows the menu inside the e-College Registration System. The menu is located on the left side of the page and contains the following items: "e-CRS", "Student Photo" (circled in yellow), "Stud ID", "Home", "Student Profile", "College", "About us", "Contact us", and "Logout". The main content area is white and contains a blue header with the text "Slide of Uitm's Photos". Below this header is a blue box with the text "e-College Registration System".

Fig. 5 Menu inside the e-CRS

Figure 5 shows the menu inside the e-CRS once the student logs on to the system. The menu contains buttons such as Home, Student Profile, College, About Us, Contact Us and Log out.

The screenshot shows the 'e-CRS' interface. On the left is a sidebar with a 'Student' profile icon (circled in yellow) and links for Home, Student Profile, College, About us, Contact us, and Logout. The main area is titled 'STUDENT PROFILE' and contains a form with the following fields: Student ID, NRIC, Full Name, Phone Number, E-mail, Address, Academic Program, Semester, and Current Academic Session. A 'SUBMIT' button is located at the bottom of the form.

Fig. 6 Student's Information in the e-CRS

In Figure 6, the e-CRS asks for student detail information

The screenshot shows the 'e-CRS' interface. On the left is a sidebar with a 'Student' profile icon (circled in yellow) and links for Home, Student Profile, College, About us, Contact us, and Logout. The main area is titled 'REGISTRATION FORM' and contains three sections: 'All the student's details' (with a note that details are recorded in the database), 'Room option' (with radio buttons for Single room, Room for two, Room for three, and Room for four), and 'Guardian information'. A 'SUBMIT' button is located at the bottom of the form.

Fig. 7 Room option in the e-CRS

In Figure 7, there are choices for rooms available. Basically the students just need to click on the option needed.

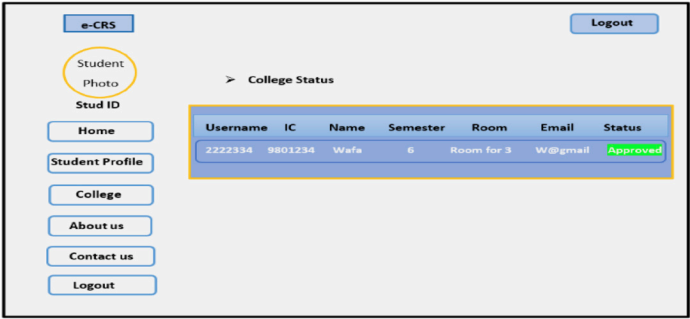


Fig. 8 College Status Information in the e-CRS

Later on in figure 8, the college status will be displayed.

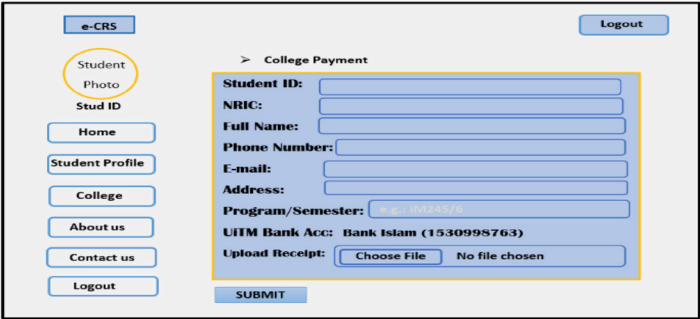


Fig. 9 College Payment Method in the e-CRS

Lastly, in figure 9 the college payment method is displayed in the e-CRS

CONCLUSION

The main purpose of this system is to develop a user-friendly college registration system for UiTM Machang, Kelantan students to use, subsequently helping them and university college departments to better and systematically conduct student data for future retrieval. The student information also can be traced and kept in a more organized manner. The system will help students learn about college availability, rooms, room types and college fees. In addition, this also helps the management to organize student information. It will also allow the university administration to track and manage student records. This registration system gives a lot of benefits, as compared to the old paper-based registration method. The most obvious benefit is associated with the fact that this system is a comprehensive online registration system which is convenient and fast. The online registration system eliminates the need to manually fill in paper forms which then have to be sent to the registration office. When using the online registration system, students only need to register at their convenience and the information is submitted immediately.

The information sent by the participants will be immediately loaded into the database. The online registration system is also highly secure because the form submission is done through a secure platform. The information collected by the database will also be stored on a highly secure server, leaving no space for unauthorized access and violations from third parties. Form submission and payment details will be completed through encryption methods. However, if paper is used, the information available on the paper form is vulnerable to leaks of confidential details. Paper forms need to be destroyed safely to prevent unnecessary information access. At last, there is a solution – the e-CRS, an online registration application system which can provide great benefits needed by the college staff and students in UiTM Machang.

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Designing & Developing e-College (e-CRS) as a Web Based Application Tool

Open and Distance Learning: Investigation on Quality of Experience among Final Year Computer Science Students in UiTM Cawangan Pahang

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Abstract: COVID-19 pandemic gave a big impact to all sectors in the world when it first hit at the end of 2019. The Education field is one of the worst affected sectors by the pandemic – having to experience major changes where all traditional face-to-face teaching and learning in classroom environments have changed to a fully online and distance approach. This new shift in approach had to be carried out to pursue the continuity of previous educational implementation in making the learning objectives achievable and concurrently preventing the spreading of the COVID-19 viruses. In UiTM, the first implementation of open and distance learning (ODL) in mid-March 2020 offered various perceptions from both students and lecturers as many factors needed to be considered to ensure the sessions meet the educational needs. Therefore, this study aims to investigate the quality of experience towards ODL among computer science students by assessing four major factors; learning materials provided by lecturers, online platforms being used, delivery methods and device capabilities during ODL. Using a quantitative methodology where responses from students were collected using a structured questionnaire, the analysed data

then contributed new discoveries to this study. The analysis results reveal that the students rated their satisfactions towards the quality of experience during the implementation of ODL where the four factors discussed in this study were concerned, as 'good' and 'excellent'.

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

INTRODUCTION

The implementation of the Movement Controlled Order (MCO) in Malaysia which started in March 2020 has affected many sectors as it changes daily routines where face-to-face events and activities were limited in order to prevent the spread of the COVID-19 viruses. In the education field, specifically for higher education institutions, online learning has been one of teaching and learning approaches being used for the past years but the implementation of MCO in Malaysia gives the opportunities to universities in strengthening the strategies to ensure the continuity of the teaching and learning processes. Before the full implementation of ODL in UiTM, The Blended Learning (BL) approach had been introduced and implemented to empower the online and flexible learning and mostly conducted using the university's Learning Management System (LMS), the UFuture portal, previously known as the i-Learn 3.0 portal. In pursuing activities for the execution of the ODL sessions, lecturers may consider assessing the experiences of the students during the implementation to gradually enhance the quality of the new teaching and learning approach. Hence, this study was carried out to assess the quality of experiences among the students towards the implementation of ODL. The study also highlighted four factors that contributed to the quality of experiences for ODL; the learning materials provided, the platforms utilized, the quality of the delivery method and the device capabilities used by students during the ODL sessions for this computer programming course.

OPEN AND DISTANCE LEARNING AND QUALITY OF EXPERIENCE

Before the outbreak of the COVID-19 pandemic, higher learning institutions in Malaysia already offered an online learning approach in the form of either a combination 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 hit all countries, open and distance learning was 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 find 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, and continue to be, carried out to successfully accommodate the new teaching and learning approach while following the government's guidelines during the execution of MCO in Malaysia. To make the ODL more feasible, varieties of online platforms and tools are being introduced and explored to fulfil the needs and requirements of the variety of programs and courses offered in UiTM. The chosen platforms must be suitable for the course as different courses come with different requirements to achieve the learning outcomes. However, by using and introducing too many platforms to support one particular course in ODL sessions, might be difficult to manage and also overwhelm the students (Ghani & Noradzan, 2021).

2.1 ODL Platforms

Educational institutions face difficulties in deciding the best online platform for students and lecturers as there are a lot of online platforms available to support online learning and ODL. Varieties of platforms are being utilized since they offer settings to conduct online sessions, provide learning materials, monitor students' participation and 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; the Learning Management System (LMS) and the video conferencing platforms. 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 while video conferencing platforms such as Google Meet and Zoom offer students an interactive environment that imitate the face-to face sessions provided they have good devices and Internet connection (Bradley, 2021). This is in line with the study by Mahmood in 2021 which stated that a feature that supports video conferencing needs to be added to provide the real-time interaction between students and lecturers in the LMS of the university where the study was being carried out. Another common online interactive platform being discussed in other studies is the 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 is 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 the 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, but also provide real-time responses in communication, while being 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 is being immediately noticed by students, they are suitable online discussion platforms for groupworks among students as they can be accessed using mobile devices, and they are convenient platforms to share educational materials (Shobeiry, 2021).

There is no restriction on the choices of platforms to execute ODL sessions in UiTM and lecturers are encouraged to use any online platforms in carrying out the teaching and learning activities as long as the course learning outcomes are finally achieved and all students manage to access the online platforms used by their lecturers. As for

this study, the two main platforms used to conduct most ODL sessions are Google Classroom for classroom environment and setting and also Google Meet for video conferencing feature. The implementation of the courses which is Programming Paradigms in Google Classroom platform is illustrated in Fig. 1. Another illustration in Fig. 2 shows the ODL contents available for the course such as notes, videos and lab exercises using the chosen platform. For the video conferencing sessions, Google Meet is the main platform being used to carry out lecture hours where all students can be part of the sessions as it also allows real-time interaction. The Google application has been selected for the ODL implementation for this course since it provides flexible features to

store and effectively manage the students' and class data, materials and assessments which were specifically designed to accommodate ODL requirements.

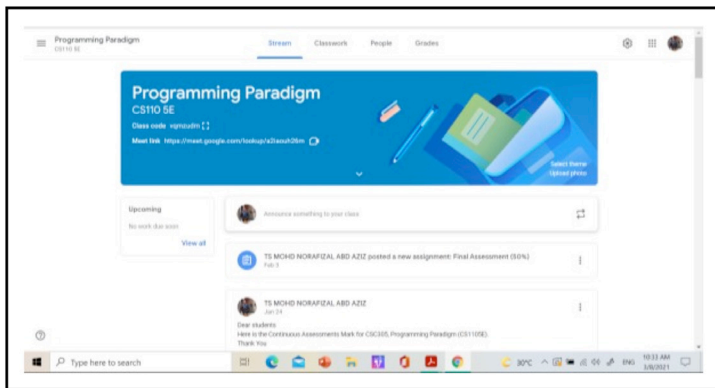


Fig. 1 The ODL platform for Programming Paradigms course using Google Classroom

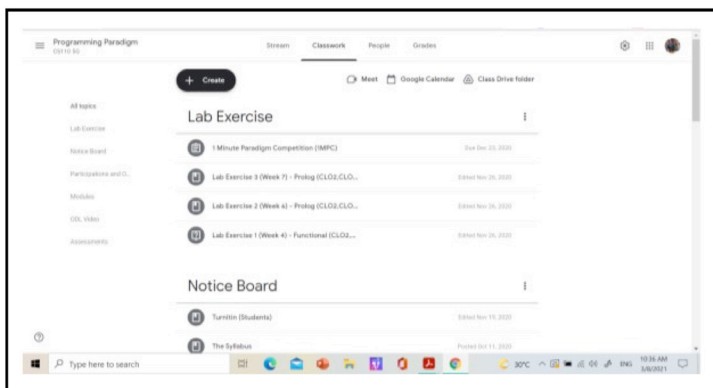


Fig. 2 The ODL contents for Programming Paradigms

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 satisfactions 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 compared to depending on the pre-recorded lectures prepared by the lecturers. However, there is a result that shows the positive feedback of students towards the usage of pre-recorded videos as they found that good selection of contents, as well as 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 can be carried out as effectively as traditional face to face sessions previously. A study was conducted to reveal the challenges faced by students so that it will give clear perspectives to lecturers in identifying the weaknesses of online sessions. Four common challenges faced by students are the unreliable Internet connection, lack of skill in using online platforms, unconducive learning setting at home, and the difficulties to access online learning platforms via mobile devices (Şenol, Lesinger, & Çağlar 2021). These challenges also aligned with the finding by Maqableh & Alia in 2021 as 61.3% respondents in their study were also having technical issues such as poor Internet connectivity, inadequate devices besides the lack of digital literacy to access the online platform for online sessions. Two progressive actions taken by the lecturers to improve the situation were 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 together with the challenges faced by both lecturers and students, major improvements can be made and significantly enhance the quality of experiences towards ODL implementation for higher learning institutions. This also indicates the importance of experiences from the student's perspectives to acknowledge the continual improvements needed as the challenges of ODL implementation will vary according to the pandemic situation not only in Malaysia but also all over the world.

METHODOLOGY

This study adopted the quantitative methodology where a structured questionnaire was used to assess students' experiences. This study was conducted during the second semester of ODL implementation 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 were

then analysed using Microsoft Excel as shown in Fig. 3. The questionnaire set consists of three (3) sections; the first section is the demographics information of the respondents, followed by a set of questions to evaluate students' quality of the experiences during ODL, and the last section is to evaluate students' learning outcomes for the particular session 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 main platform used, and other platforms available for the ODL session, and the delivery perspectives. In addition, the questionnaire set also investigates students' accessibility to the network and Internet connection to support ODL, including the connection availability, coverage, delay time, and faultiness, which were also crucial to be determined. The students were also required to give feedback on the device's capabilities in supporting the ODL session including the costing, as well as the online resources available. The experiences data were collected from students enrolled in a computer programming course during their final year of pursuing a Diploma in Computer Science in UiTM Cawangan Pahang, Raub campus.

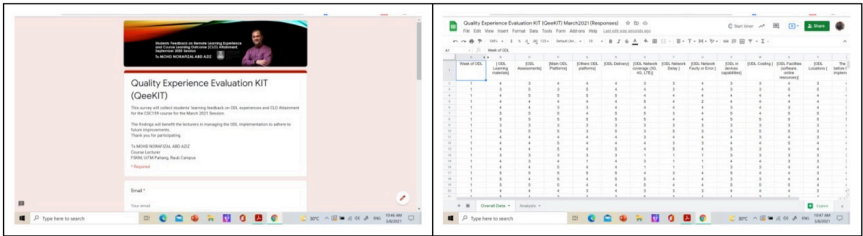


Fig. 3 Questionnaire as in Google Form and Google Sheet to store the dataset

RESULT AND DISCUSSION

1028 responses were collected from 83 students at the end of every ODL session conducted. Two groups of final year students involved in this study were from the Diploma of Computer Science program enrolled in the Programming Paradigms (CSC305) course. The Programming Paradigms course highlights the fundamental concepts in computer programming

and students are exposed to a few programming languages and software to support each paradigm. Basically, the course requires the students to understand the theoretical studies during lecture sessions and be able to use programming skills for the lab sessions.

In this study, there are four main factors evaluated to measure the students' quality of experience towards the ODL sessions conducted. The factors are; learning materials provided by lecturers, online platforms being used, the delivery, and the device capabilities to get connected to the ODL sessions. The first factor evaluated is the quality of experiences towards ODL learning materials available at the platforms 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 summarizes the analysis of four factors that contributed to students' quality of experiences towards ODL sessions. The results show that the respondents in this study experienced 'satisfactory' and above levels for all factors evaluated.

Table 1. Quality of Experiences towards ODL Sessions

	Percentage				
	Unsatisfactory	Less than Satisfactory	Satisfactory	Good	Excellent
Learning Materials	0.00%	0.39%	15.56%	55.25%	28.79%
Platforms	0.00%	0.19%	15.47%	53.99%	30.35%
Delivery	0.29%	0.68%	14.98%	54.18%	29.86%
Devices Capabilities	0.10%	0.58%	18.87%	55.35%	25.10%

The analysis from the responses collected in Table 1 concludes that 55.25% and 28.79% students had 'good' and 'excellent' experiences respectively towards the ODL learning materials provided by their lecturers in these courses. These findings show 84.04% of 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.

The main platforms being used by the students during the ODL implementation in this study were Google Classroom, which provides content sharing and learning activities, and Google Meet, which serves as the main video conferencing tool to support real-time interactivity between students and lecturers as shown in Fig 4.

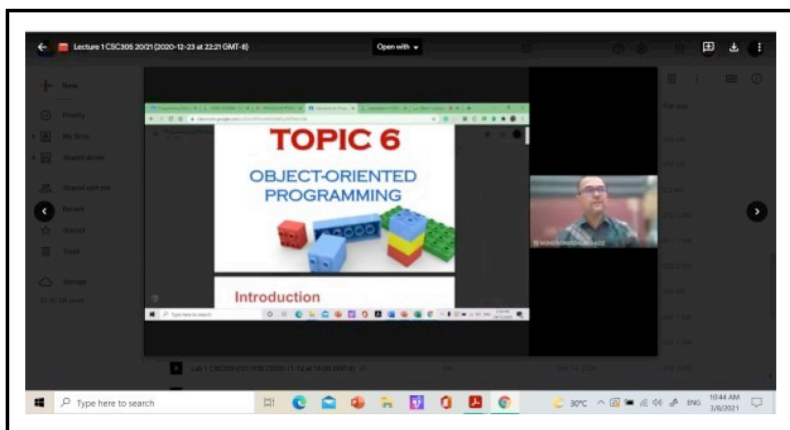


Fig. 4 The ODL delivery in Google Meet

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. The analysed result shows 53.99% and 30.35% of total responses were experienced good and excellent quality of ODL platforms used for ODL sessions. A few platforms were utilized for these courses to suit the lesson outcomes for each session - for example, 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 that enable students to communicate directly with lecturers and classmates. Fig. 5 below shows the quality of experience based on the main platforms used for ODL sessions. As mentioned above, the main platform being used in this study is Google Classroom to provide online

classroom environment where all learning materials can be accessed, and online activities and assessments can be monitored. Another platform being utilized in this study is Google Meet that serves as a video conference tool to support real-time interaction. 72% of the total number of respondents were satisfied and very satisfied with the sessions conducted using this platform and 83% were satisfied and very satisfied with video conference sessions using Google Meet. The reasons that might influence the results are; Google Classroom and Google Meet can also be accessed using mobile devices and personalized at their own devices, learning materials are available prior the sessions conducted and there is very minimum downtime to access the online classroom. Further study can be conducted to examine the success factors contributing to students' satisfaction towards the selected platforms.

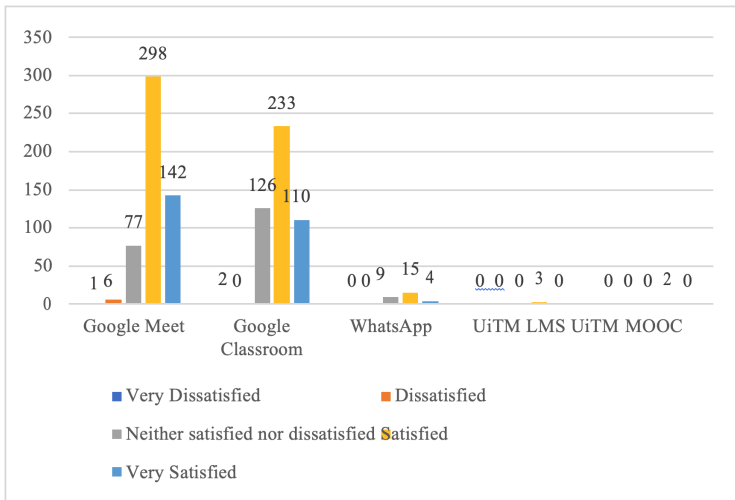


Fig. 5 Quality of Experiences based on Main ODL Platforms Used

The third factor discussed in this paper is the quality of lecturers' delivery during ODL implementation. ODL highlights more on the lecturers' delivery as each lecturer has a different style of delivery. However, the network's limitations, coverage, and various factors will affect the effectiveness of the ODL implementation. There are differences in delivery and these depend on several factors - the different types of subjects, such as the technical and non-technical subjects in the ODL, to the interest of the ODL (Mathew et al., 2021), differences from the subject perspectives and contents of the

subjects taught. Therefore, it is essential to investigate the delivery from the experiences of the students for the lecturers to improve and enhance the teaching delivery method in the ODL implementation, which may be different from the traditional implementation as before the pandemic. The result displays 54.18% and 29.86% of total responses experiencing good and excellent experience on the delivery of ODL sessions being conducted.

To complete the investigation on the quality of experiences, the last factor evaluated is the device capabilities since all students are required to use their own devices for ODL compared to previous face-to-face class where they can use computers and facilities at the laboratories in campus. 55.35% and 25.10% of students responded that they have good and excellent device capabilities for ODL implementation. Device capabilities include the hardware and the software being used for programming courses they enrolled in. A study conducted in the Department of Perspective Geometry and Graphics in one university in Russia involving 140 students also indicates high level of device capabilities among university students which includes the computing, printing, scanning devices as well as the quality and the speed of their Internet connection (Ignatiev et.al, 2021).

LIMITATION AND RECOMMENDATION

Throughout this study, three main study limitations have been identified. The limitations are categorized as limited access to data, time constraints and conflicts arising from personal preferences. Since this study used data obtained from students, it is hard to ensure that all students responded to the survey within a time frame set. This has impacted the study findings as it caused limited access to data by the researchers. The second limitation is a conflicting limitation - time constraints. The time available to study a research problem is limited as the study was conducted during an active semester which means that the researchers were involved in classes and other administrative tasks - however, in order to obtain, rich and meaningful data, the study needed to be conducted during an active semester in which students were busy with classes, assignments, tests and others. In terms of personal preferences, the study faced limitations as students might be biased due to personal preferences of the ODL platform even before answering the survey. This might be due to previous personal experiences or external information (reading, hearsay and others). This study also cannot produce

convincing results about overall computer science final year students, since it involved a small number of respondents enrolled in only one course.

Responding to the limitations discussed, these recommendations are proposed. It is recommended that future studies ensure that all respondents chosen respond to the questionnaire set distributed in the study. This will impact the accuracy of findings presented. The survey should also be conducted in a bigger sample size from different backgrounds as it will contribute to more conclusive results. Besides that, a bigger and better variety of sample size will also ensure a more diverse quality of experiences among students. Questionnaires should also be distributed to students those using other platforms besides Google applications, especially for UiTM LMS and UiTM MOOC that

serves as the official university platforms for ODL. Further improvements on ODL can be made for the upcoming semesters to expand the students' quality of experiences as the new norms are progressively taking place, where ODL will be continually implemented as the country enters the endemic phase.

CONCLUSION

The effect of the COVID-19 pandemic on all global education systems has made the shift from traditional face to face to open and distance approach compulsory in all higher learning institutions. Both students and lecturers 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 can give 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, as well as tutorials in order to achieve the course learning outcomes. Based on the data analysed, students show good and excellent experience on the usage of Google Classroom and Google Meet, which are deployed as the tools when engaging in a combination of synchronous and asynchronous delivery in ODL sessions. The results discussed in this paper also revealed that most responses were recorded at satisfactory level and above, thus subsequently concluding the fact that the four factors presented are adequate in contributing to good and excellent

quality of experiences during ODL for the students.

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Importance-Performance Matrix of Analysis on Factors Influencing Language Ability among Malaysian Higher Learning ESL Learners

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Abstract

There has been extensive research in the field of second language acquisition resulting in the introduction of various methods to help individuals learn ESL. In Malaysia, for example, different methods to empower graduates with English language skills have been introduced and discussed. One of the issues addressed is related to the limited exposure to ESL due to the changes of the English language status in Malaysia during the pre and post-independence era. A theoretical framework developed emphasizes five factors in the learning process which include implicit and explicit exposure to ESL, the cognitive learning dimensions (CLDs) consisting of motivation and memory strategies as the mediating variables, and language ability as the outcome. The question on what factors should be given priority has been raised in this study to ensure the result on the language ability is optimal. 460 responses were collected from undergraduate students in different public and private higher learning educations in Malaysia. 445 were analyzed in PLS-SEM for structural model analysis. Hypotheses testing revealed that all four factors have a positive relationship, and the Importance-Performance Matrix Analysis (IPMA) shows that explicit exposure is the most important factor while motivation has the lowest importance. Memory strategies, among other variables, should be given the priority for further research due to its second highest importance in the framework but contributing the least to language ability performance. One of the reasons is due to the practice of rote memorization among Malaysian ESL learners which should be transformed into an effective memory strategy in ESL learning.

Keywords: IPMA, memory strategies, language learning, language acquisition, exposure to ESL

INTRODUCTION

The history of the English language in Malaysia began with the British era, and it has gone through different phases since the country's independence in 1957. In the broadest strokes, the history can be divided into three phases. The first phase took place before and during the early days following of independence (before the name was changed to Malaysia) in 1956-1957. The second phase occurred following independence and lasted until 1996. The third phase followed from 1996 until the present, where the English language was reintroduced as the medium of communication in higher learning institutions in the attempt of making Malaysia an education hub. The change of the English language status in Malaysian education from the medium of instruction to only a subject with reduced teaching and learning hours per week resulted in the decline of English Language mastery (Foo & Richards, 2004; Gaudart, 1987; Gill, 2002; Too, 2017; Vethamani, 2007). In addition to the decline of the language mastery is the limited competency in English communication skills among Malaysian graduates that has consequently become a significant reason for their unemployment (Darmi & Albion, 2016).

Hazlina (2016) in her report on new graduates revealed that despite outstanding academic performance, they still struggled with their use of English for workplace communication, document writing and reporting. This hitch has impacted Malaysian economic stability. Poor English proficiency among graduates has major implications for the Malaysian economy as it is a skill required in order to be competitive in the global market. Furthermore, English proficiency in the business world attracts foreign talent and investment (Darmi & Albion, 2016). Throughout the years in the formal English classroom, Malaysian students have been exposed to various kinds of language input including vocabulary and grammar. Many early researchers (Clark, 1993; Cruse, 1986; Huckin et al., 1993; Laufer, 1997; Nation, 1990, 2006; Stern, 1983; Wallace, 1987) agreed that vocabulary is the most important component in a second/foreign language learning because words are the building blocks of language from which the units of logical and explicable structures such as sentences, paragraphs and whole texts are formed. There is an adage that goes "while without grammar very little can be conveyed, without vocabulary nothing can be conveyed." Grammar is considered the second most important component

affecting SLA (Richards, 2002; Shortall, 1996; Thompson, 1996). Grammar rules are required to put words into a precise arrangement in order to convey meaning. Vocabulary and grammar, among other things, can be obtained through incidental and intentional exposure to ESL. It is reckoned that each kind of exposure has a different impact on language performance. In addition, the cognitive processes in language learning requires that students to be motivated in making their decisions for effective memory strategies that will help their language ability progress.

LITERATURE REVIEW

There are significant discrepancies in the use of English as the medium of learning between the pre and post-independence era. Before the independence, schools initially had British teachers who taught using the Standard British English, but as the number of private and mission schools increased, there was a need for more teachers which resulted in the employment of local English language teachers and people began to adapt to the 'nativised English'. With time, English became the language of informal communication among local students. Lowenberg (1986) stated that this is due to its prestige and ethnically neutral status. During this time, English was also used as the primary language for transport, commerce, and mass media including imported films for entertainment (Thirusanku & Md Yunus, 2014). Once Malaya gained its independence from the British in 1957, the status of the English language in Malaysia changed (Too, 2017) and Bahasa Melayu was adopted as the national language.

According to Tsui and Tollefson (2004), the adoption of Bahasa Melayu as the national language marked the second phase relating to the role of English in Malaysia. Bahasa Melayu was adapted as the national language as a means to engender a national identity among people of diverse cultural backgrounds. The policy of pushing Bahasa Melayu to replace English was also an element in the power struggle between the Malays and the increasingly influential Chinese and South Asians in the country during that period (Thirusanku & Md Yunus, 2014). Gill (2002) pointed out that replacing English with Bahasa Melayu was an unavoidable step for the government in order to give room for the full development of Bahasa Melayu. The most important step taken in the attempt to implement the new language policy was to convert all English-medium schools into Malay-

medium schools beginning in 1969 and reaching completion in 1973 (Gill, 2005). Henceforth, Bahasa Melayu was recognized as the national language (Jernudd, 2003).

The third phase began when the government aimed to make Malaysia an education hub (see Education Act, 1996). This aim restored the role of English as the medium of instruction in higher education institutions. This decision was made in order to attract international students to study in Malaysia. The re-introduction of English as the medium of instruction in public universities in Malaysia began to commence in 2005, and only in courses like Mathematics, Science and Technology (Middlehurst & Woodfield, 2004; Too, 2017). The status of English in Malaysian education, and especially in higher education institutions, has continued to be a topic of interest for researchers particularly in the context of English language proficiency among Malaysian students and graduates. The history of the English language in Malaysia is not only centered on different phases and changes to the status of English, but it also discusses the change in the exposure to English language both inside and outside the classroom. In the first phase, students were exposed to native English teachers, and these students acquired the language via daily communication. Subsequent English exposure also came from the workplace where English was the main medium of communication. Compared to the reality today, the amount of exposure to English in school is limited to a few hours a week, with little to no encouragement to apply the language outside the classroom. Apparently, the transition in the status of English over time has impacted the amount of English input Malaysians receive.

2.1 Exposure to ESL: Implicit and Explicit

Al-Zoubi (2018) defined exposure to language as the contact that learners have with the target language. To be sure, the English teacher plays a role in providing learners with sufficient exposure and opportunity to practise the language in various contexts. Researchers believe that learning English should be encouraged both inside and outside of the classroom and through the appropriate techniques. The general consensus among researchers is that ESL exposure plays an essential role in language acquisition and that it encourages students to learn the language easily and more successfully (Al-Zoubi, 2018).

There are two types of language exposures discussed by previous researchers; namely, incidental and intentional exposure. These said exposures are also called implicit and explicit learning. While some researchers (Krashen, 1982, 1999, 2000; Truscott, 1996; Zobl, 1995) are critical of the role of explicit language learning in L2, others (N. Ellis, 2002; Ellis, 2002; Hinkel & Fotos, 2002; Seliger, 1979) believe that it has a facilitating role. The earlier group of researchers agreed that the emphasis should be centered on exposure to the target language via social interaction with native speakers which can directly improve language proficiency (Peregoy & Boyle, 2005). D'Ydewalle and De Bruycker (2007) added that learners could also learn words and phrases while sitting on their computers at home while playing games. These are examples of the implicit or incidental learning of language that commonly takes place outside the classroom. Incidental learning also refers to the memory encoding of a word or expression without the intention to commit the knowledge to memory (Hulstijn, 2013). Explicit exposure to the target language, by contrast, typically takes place in a formal classroom setting, where learners deliberately arrive and are fully conscious of the language lesson at hand and the fact that they are being taught (Al Zoubi, 2018) with the intention to commit the element to memory; this is intentional learning. Researchers are committed in finding the answers related to the effective ways to learn and develop ESL skills among non-native learners.

Despite the debate among research groups regarding implicit and explicit language exposure, the main focus is mutually positioned on providing a dynamic experience in language learning in order to influence language performance. Language performance or ability is a different area of study from language learning, while the process of language learning is the most vital part in language learning. Following exposure to ESL in primary and secondary schools, English is used as the main medium of communication in most Malaysian public and private universities in order to prepare students with adequate English skills for the workplace. Theoretically, after going through years of English lessons, students should be getting better at English language perception and production, and they should have a better grasp of English language acquisition. In practice, however, many of them are not able to perform in English classes or any course that

requires them to read, write, and present in English. Despite 10 years of formal English courses in school, higher education students and graduates are still repressed by affect factors (Darmi, 2013) including lack of motivation and lack of interest in learning English (Thang et al., 2012).

2.2 Motivation

Motivation is a significant factor affecting SLA (Pajares & Urdan, 2006; Raoofi et al., 2012) and is a commonly discussed component of language learning. Indeed, learning interest and motivation are essential factors in successful language acquisition (Al Zoubi, 2018; Alizadeh, 2016; Anjomshoa, 2015). Researchers in this area have been placing primary concern on describing, quantifying, and relegating the role of motivation in theoretical models of the language cognition process (Adwani & Shrivastava, 2017; Liu, 2015; Ushioda, 1996). Consequent to scholars' interest in the role of motivation on language learning, various theories have been established to explain its role in different contexts. While prominent researchers like Bandura refer to motivation as one of the dimensions bridging the transition between observation and outcome, Weiner (1990) highlights motivation through the lenses of behavioral theories that explain extrinsic motivation (i.e., reward), and cognitive theories that explicates intrinsic motivation (i.e., goals). However, Gardner's (1985) indication as cited by Xu (2008) considers motivation in language learning as goal directed and defined it as "the combination of effort plus desire to achieve the goal of learning the language plus favourable attitudes toward learning the language;" this definition is relevant to the present study. Currently, there is limited literature on the effect of motivation on Malaysian graduates' language performance.

Chilingaryan and Gorbatenko (2015) explained that while behaviorists posit that motivation is influenced via positive social models, desired rewards, and the avoidance of unpleasant consequences, cognitivists posit that motivation is influenced by interesting stimuli, meaningful content, comprehensible input, and freedom from threat or risk. In the English classroom, teachers should motivate students by providing

interesting material and creating an appealing and non-threatening classroom atmosphere (Zaman, 2015). This is because students with a positive attitude and desire to learn will have an increased likelihood of attaining their goals. Beyond conceiving motivation as the combination of desire and effort to learn (Gardner, 2012), motivation also begets strategy choice (Oxford & Nyikos, n.d.). Granting that, motivation and learning strategies have interplaying roles as mediators between language input and learning outcome.

2.3 Memory Strategies

Language learning strategies are indeed another factor that contributes to language learning success. Razak and Babikkoi (2014) found that the three strategies directly related to language learning (cognitive, memory, and compensation) are secondary to Malaysian ESL learners from the local public secondary schools. These strategies include practices that ensure storing, processing, and retrieval of the target language. In contrast, affective, meta-cognitive, and social strategies as indirect learning strategies are more popular among the learners. Although researchers found memory strategies as secondary to Malaysian students, memorization practice is common among students from Asian cultures (Thang, 2003). Nevertheless, rote memorisation should be seen as a disturbing feature. This research, however, has revealed that the memorization was normally accompanied by an attempt to understand the content (e.g., Kember & Gow, 1990; Biggs, 1996; Marton et al., 1996; Watkins, 1996; Hess and Azuma, 1991). Additionally, Thang (2003) found that memorisation is more dominant among Malaysian distance learners relative to on-campus students. Memory strategies in general involve the mental processing of the new information (Balini & Jeyabalan, 2018) received from observation (language input). Considering the connection of memory strategies with mental activity, it can be assumed that memory strategies mediate the relationship between motivation and ESL performance among Malaysian higher education students. It is predicted that 'student A' who is motivated to acquire ESL skills has a better chance to succeed when he/she applies memory strategies.

2.4 Importance-Performance Matrix Analysis

Based on Thornton and Houser (2005), Sulzberger (2009) and Darmi, and Albion (2013), exposure to the target language (implicit and explicitly) should be considered as another important factor affecting SLA. In addition to teaching vocabulary and grammar, learning ESL through extensive exposure with the removal of psychological barriers will improve learners' motivation to progress by taking up effective memory strategies based on the kind of exposure they have received inside and outside the classroom. Based on the study of the learner's implicit (and explicit) exposure to English and their responses on learners' motivation, memory strategies, and finally the result of the relationships on language ability, an Importance-Performance Matrix Analysis (IPMA) is viewed as significant to discover the factor that should be given the highest attention to in order to achieve the desired language performance among the future graduates.

METHODOLOGY

This cross-sectional study involved 460 undergraduate students from public and private higher learning institutions. Initially, the sample size decision was based on Cohen and Krejcie & Morgan, with the suggestion of 206 to 384 respondents. Due to the large population size, and resources accessibility, 460 responses were recorded. Proportionate stratified sampling method was carried out and four strata were identified; Strata I and II were male and female undergraduates in public institutions, Strata III and IV were male and female undergraduates in private institutions, while questionnaire survey was used as the survey instrument. The number of responses after the screening process was 445. The data were coded and keyed into Statistical Package of the Social Science (SPSS) for the analysis of validity, reliability, and demographic profiling. Next, the data was transferred into SmartPLS 3.0 for structural model analysis using PLS-SEM.

DATA ANALYSIS

The importance-performance matrix analysis (IPMA) is also called the importance-performance map analysis, and impact-performance map analysis. It is an extension to the standard PLS-SEM results. It provides

reports of path coefficient estimates by adding dimension to the analysis, and accounts for the average values of the latent variable scores (Fornell, Johnson, Anderson, Cha, & Bryant, 1996; Höck, Ringle, & Sarstedt, 2010; Kristensen, Martensen, & Grønholdt, 2000; Slack, 1994). The IPMA procedure contrasts model total effects on the specific target construct, which in this case is language ability, with the average latent variable scores of this construct's predecessors (i.e., implicit exposure, explicit exposure, motivation, and memory strategies).

Hair et al. (2017) explained the use of unstandardized total effects to interpret the IPMA where a one-unit increase of the predecessor's performance increases the performance of the target construct by the size of the predecessor's unstandardized total effect, provided that other variables remain equal. Accordingly, the results from the IPM analysis are interpreted into the IPMA chart in Figure 5.17 and Table 5.18. The results show that a one-unit increase of EE, MEM, IE, and MOT increases LA performance by 0.501, 0.449, 0.211, and 0.194 respectively. Therefore, among the predecessor constructs, explicit exposure (EE) had the highest importance, followed by memory strategies (MEM) and implicit exposure (IE). Motivation (MOT) had the lowest importance based on the results.

Table 2: Importance-Performance Matrix Analysis Results

	Importance	Performances
EE	0.501	76.041
MEM	0.449	72.534
IE	0.211	79.802
MOT	0.194	77.236

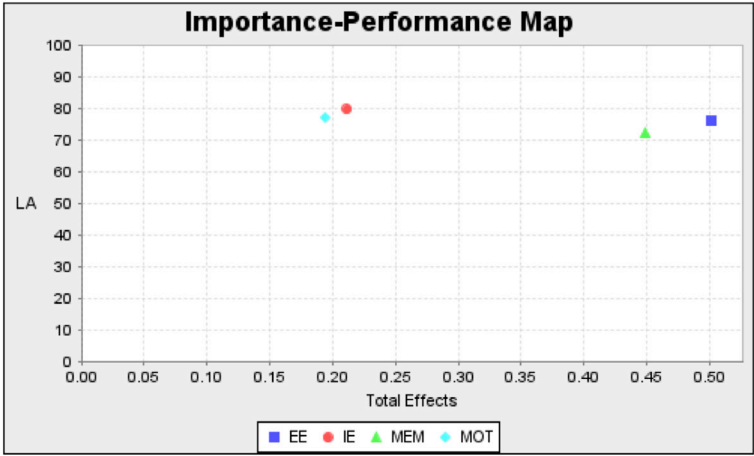


Figure 1: Importance-performance Matrix Chart

Although IE has the highest performance (79.802), its importance is ranked third. This shows that giving attention to the performance improvement of the implicit exposure would have little impact on the language ability due to its lack of importance, followed by motivation which has the second highest performance but the least important for the target construct. In contrast, despite having the highest importance, EE is ranked third in performance based on the mean value of the latent variable score (76.041). Therefore, it is worthwhile to invest into the performance improvement of explicit exposure which has the highest importance for the target construct, as it would have large impact in changing and improving LA. Additionally, MEM should also be considered for performance improvement since it has a considerably high importance for language ability and the lowest in performance (72.534).

DISCUSSION

Among the challenges faced by local graduates are the limited job appointments and the requirement for English competency. Other than the high unemployment rate attributed to their lack of English language proficiency, there are other social and national economy concerns such as the increase of low household income families which can affect the life quality

of the new generation as the future of the country. Despite the formal English language classes provided in the primary up to tertiary level education, the struggles among graduates in writing and speaking the language are evident. To overcome the issue, various studies to understand language learning and second language acquisition have been published such as Krashen's SLA theory, the five factors affecting SLA (vocabulary, grammar, L1 interference, self-efficacy, and motivation), Theory of Expectancy Value, and the Structure Building Framework as a guide to describe a few cognitive processes and mechanisms in language learning. In addition, various approaches have been proposed and applied such as Oxford's Language Learning Strategies where memory strategy is one of the strategies. In response to the reality faced by Malaysian graduates, a framework based on different theories discussed in the literature review was proposed which includes five important variables in language learning and acquisition. The theoretical framework emphasizes four factors in the learning process which include implicit and explicit exposure to ESL, motivation, and memory strategies in order to progress in language ability (result). However, the question on what factors should be given the priority has been raised in this study in enhancing the learning effectiveness. Hypotheses testing revealed that all four factors have positive relationships, and the IPMA analysis shows that explicit exposure is the most important factor, followed by memory strategies, implicit exposure, and motivation. Implicit exposure gained the highest performance despite being less important compared to explicit exposure and memory strategies. The findings indicate that the two factors that are worth to be considered for further development are explicit exposure and memory strategies sequentially. Interestingly, the importance of memory strategies as one of the important attributes for language ability among Malaysian ESL learners is anticipated based on the current scenario of learning style using rote memorization, and English language competency of the higher education students. Although there are limited discussions on the practice of rote memorization in ESL learning among Malaysian students, findings from other studies carried out in other Asian countries such as Hong Kong (Kember, 2000; Marton et al., 1996; Watkins, 1996, 2001), Indonesia (Niswati, 2016) and Thailand (Sinhaneti & Kyaw, 2012) are believed to be applicable to Asians from other contexts such as Malaysia. Additionally, the focus on these studies on rote learning was mostly on vocabulary learning, but these studies also suggest that the choice to apply rote learning to memorize words in English is influenced by several possible factors such

as the cultural/education background, ESL/EFL environment, traditional habit, national examination demand, and failure to discover the best way that works for individuals (Sinhaneti & Kyaw, 2012).

There has been a common misunderstanding among the teachers and learners that rote learning for memorization is merely repeating aloud without understanding. Therefore, further studies and development of memory strategies knowledge and practice should be carried out on Malaysian ESL learners. Besides that, as the highest importance factor in this study, explicit exposure to ESL is a common practice among English language instructors especially at the primary and secondary levels of education. Apparently, as delivering sufficient exposure to the target language in a diverse contexts, and from different speakers to the learners (Al Zoubi, 2018) is one of the most central roles of an ESL teacher in the classroom, the teachers can show practical examples of the language by being proficient at it, besides encouraging the learners to apply the natural input from televisions, websites, books, magazines, etc. As stated in the literature review, the exposure to the language is not limited to only inside the classroom - the different forms of outside classroom language exposure can also be explicit exposure.

CONCLUSION

The fundamental contribution of this study is in the exploration of the most important factor in the relationships among different variables proposed in different reputable theories in language learning and second language acquisition, theories of motivation, as well as language learning strategies. As the most important factor but low in performance as indicated in the IPMA, memory strategies in language learning process especially among the ESL learners in Malaysia should be further researched. The cognitive theory where this study is developed from suggests that the learning process involves thinking, and the learner is an active information processor. Therefore, the source of knowledge, or known as language input is required as the stimulus to instigate the cognitive process, without which there will not be any information to process. This also proves that the right and effective learning module for the specific learners is essential to prompt efficient learning strategies. As the language input stimulates motivation through the evaluation of expectancy-value, it inspires the choosing and implementation of memory strategies as the information processing technique to reach the

ultimate goal of the learning process which is to achieve language ability. Structure building framework by (Gernsbacher, 1991, 1997) was reviewed to understand how memory development works, while rote memorization and memorizing for comprehension should be distinguished for the best quality of language learning to achieve the learning outcome. Understanding the differences between the two types of memorization is important as it influences material development by ESL instructors, where materials that promote memorizing with comprehension is more preferable than rote memorization, especially in the context of long-term learning.

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Arts, Mathematics and Sciences Students' Attitudes toward Online Learning during the Pandemic

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Abstract: The unusual coronavirus (COVID-19) outbreak in Malaysia has necessitated considerable modifications in how children are educated. As well as avoiding their friends and family, students had to become used to studying online. Remote learning has become the norm to prevent the spread of the highly contagious disease. The sudden outbreak has forced educators to transition to online modalities of instruction, notably at the university level. On the other hand, some pupils are open to online learning. But other people are apprehensive about switching from traditional to online study. Education professionals may be able to help make virtual education more engaging and efficient. The goal of this study was to see if Arts, Sciences and Mathematics students from the The Faculty of Education at Universiti Teknologi MARA (UiTM), Puncak Alam, Selangor, had different attitudes about online learning during the COVID-19 outbreak. The questionnaire was administered using Google Form to 201 students in semesters 1 to 8. The data were examined both descriptively and inferentially using SPSS. Inferential analytics include analysis of variance (ANOVA) and mean and standard deviation. Students' perceptions about effectiveness towards online learning platforms were found to be positive. There is a significant difference between Arts & Design, Mathematics and Sciences in terms of e-learning effectiveness during COVID-19. This shows that those groups had different views on the effectiveness of e-learning during COVID-19. Finally, when comparing the three programs' acceptance of e-learning during pandemic

COVID-19, the results demonstrate no major differences.

Keywords: Attitude, Online learning

INTRODUCTION

COVID-19, like many other aspects of everyday life, has had a major impact on students, teachers, and educational organizations all over the world. According to Toquero (2020), the pandemic prompted a worldwide movement by schools, colleges, and universities to close campuses for students to adhere to social distancing procedures. It was noted that transitioning from a traditional education environment to distance and interactive learning could not change overnight. This rapid transformation is currently plagued by various barriers and challenges (Crawford et al., 2020). Furthermore, this pandemic struck unexpectedly; it has now lasted a year, but the pandemic has yet to display signs of abating. As a result of this phenomenon, educational institutions all over the world have opted to create online learning materials for students from all academic fields using the technical resources that are already viable (Kaur, 2020).

This is not the first time that educational policy instruments had been suspended. SARS coronavirus (SARS-CoV) outbreaks in 2009 caused negative impacts on conventional education practices in several countries around the world. In fact, it is not only SARS-CoV - the H1N1 flu outbreaks too have had led to a negative impact on the educational curriculum (Cauchemez et al., 2014). As a result, COVID-19 prompted academic experts to reconsider traditional face-to-face instruction, and they started to see distance learning as a viable option for completing the classroom period for three to four months, minimizing the risk of infection for students before returning to traditional practices (Kaur, 2020). There are hundreds of organizations that offer online courses, but there are two problems that need to be addressed. To begin with, little is known about the impact and efficacy of online education from a macro perspective (McPherson & Bacow, 2015). Second, the efforts to efficiently teach digitally is likely to vary depending on a wide range of learning priorities that guide academic goals (Liguori & Winkler, 2020).

The acts we take are becoming more unified as the world becomes more united. COVID-19's pandemic did not stop at national boundaries. It has affected people of all ethnicities, educational levels, income levels, and genders. There are no exceptions when it comes to education. Students from privileged backgrounds may be able to seize opportunities if they are financially supported by their parents and are willing and able to learn. Those from low-income backgrounds, on the other hand, sometimes remain sick when their schools must close.

The focus of this study is on students' attitudes toward accepting online learning during a pandemic. COVID-19 is a virus that infects people. This problem is too fresh for the whole world to influence group fatality. This virus infection can cause a variety of illnesses, including common and severe colds, as well as respiratory disease. Human-to-human transmission has been verified. That is why having a Movement Control Order (MCO) is crucial. This order has had an impact on the education system listed, requiring all educators to find alternative solutions to ensure that the lessons will continue, as educators must adhere to the syllabus at all costs.

The crisis has brought to light the many flaws and disparities in our educational systems' internet access and computers needed for online learning. Furthermore, a supportive environment is needed to focus on learning, followed by expectations and knowledge. The prime minister's order on the MCO, which was issued in March 2020, caused conventional schooling to be interrupted by national school closures. Children and students have had to rely more on their own resources to continue to learn affectively via the Internet, television, or radio during this period, while the educational community has made considerable efforts to maintain continuity of learning. Teachers have had to adapt to modern pedagogical standards and implementation styles for which they may or may not have been trained. Learners in the most similar classes are at risk of falling behind because they lack access to digital learning resources or the capacity and commitment to learn on their own.

Furthermore, the COVID-19 pandemic has had a huge impact on higher education, as universities have closed their doors and countries have closed their borders in response to the MCO initiatives. Although higher

education institutions were quick to replace face-to-face lectures with online instruction, these closures influenced learning and exams. The crisis, on the other hand, is one of the issues that has arisen because of the popularity of university education, which includes networking and social opportunities as well as educational content. Universities will have to update their learning environments to maintain the required consistency, so that digitalization expands and complements student-teacher and other relationships.

Teachers are also crucial in ensuring that learning can flow in both directions. Students are represented by the teachers. The situation and circumstances that students face when participating in distance learning also differ. Not all students live in the same area with good access, adequate funding to keep data working, and a welcoming atmosphere. When it comes to universities, students come from all over the country, whether they live in rural or urban areas. As a result, incorporating e-learning at an early stage would have an emotional effect. This study focuses on Arts and Math's students, and examines how people's attitudes about Arts and Math's learning have changed because of the pandemic. The study's aim is to determine students' attitudes toward acceptance of online learning during the COVID-19 pandemic among Arts and Mathematics programmed in The Faculty of Education.

LITERATURE REVIEW

Online learning is another choice for educators and students to acquire information. This method of research employs a computer and an internet link for teaching purposes, which has resulted in a significant increase in the need of these two tools (Cole et al., 2017; Halverson & Smith, 2010; Kontos, 2015; Tynan, Ryan, & Lamont-Mils, 2015), as they make it easier to create online courses (Anderson & Dron, 2011). To be a viable medium and obtain high-quality education on a wide range of topics, online courses require a large audience of learners, as if there are no audience, online learning cannot be applied so the goal cannot be met. The same is true for face-to-face learning: if no students are interested in receiving information from educators, the information process cannot be considered effective. This method of learning necessitates two levels of collaboration for the process to run smoothly. Furthermore, online learning can include a variety of approaches to learners with diverse training and needs (Tudor, Stan, &

Paisi-Lazarescu, 2015). When studying online, the environment allows for individual and collaborative work, which is supported by a range of resources and learning methods. It highlights the key contribution of online resources to promoting social engagement in a learning environment by reducing students' reliance on teachers as a source of information where students rely on teachers (Beldarian, 2006; Simpson, 2006). In a nutshell, online learning focuses on how students look for information on their own rather than relying on teachers. This method may be student-centered learning, in which students solve problems on their own with the aid of the instructor.

2.1 Advantages and Disadvantages of Online Learning

Online learning is a network that allows students to be tested from anywhere and at any time using internet-connected gadgets. It appears to be easy, as students can assess anywhere with a good internet connection, and students can easily comprehend information at their fingertips. The effectiveness of online learning has been examined by several researchers. By exposing learners to views and content through technical resources rather than face-to-face interaction, social relationships are formed that can provide a foundation for growing their self-confidence and self-image. Furthermore, continuing to play in online learning can aid students in developing their imagination and allowing them to think beyond the box by using a variety of applications. Since one of the institution's goals is to create creative and inventive students, the students can meet the requirements, and help make the country's name a recognized one by using this approach. Indeed, online learning has made a significant contribution to interactive learning (Maborito 2004; Tudor et al., 2015).

Although distance learning through online learning has many advantages, some students prefer face-to-face learning for a variety of reasons. They can feel isolated and disconnected in an online class. For many students, the inability to respond quickly and successfully to questions or tasks is frustrating (Fletcher & Bullock, 2015). Students' trust may be harmed if they fail to use nonverbal contact with their instructor or peers, such as facial expressions or body language. When discussing technical problems, it is possible to become even more

frustrated, particularly if professional help is not available. Online courses need a high level of self-discipline (Drange & Roarson, 2015; Mabrito, 2004; Worley & Tesdell, 2009), and the digital text may be more difficult to read because it needs focus (Mabrito, 2004). It is possible that students have trouble staying focused for long periods of time. There are also sometimes differing views about the accuracy and validity of online resources required for online learning, compounded by the fact that face explanation is not always readily available, especially with the use of pre-recorded lessons.

2.1.1 Effectiveness Of ODL

Most organizations' key consideration in achieving their goals and objectives is effectiveness. Nonetheless, during the Covid 19 pandemic, higher learning institutions should not overlook the need of conducting online distance learning (ODL) efficiently. It is also well understood that ODL's institutional and administrative effectiveness and productivity are crucial in determining student development, retention, and outcomes. There are numerous dimensions to interactivity (Murphy et al., 2001). The importance of interaction in ODL has been highlighted by a few authors (Anderson, 2003; Boyle & Wambach, 2001; Dzakiria, 2004, 2008; Muirhead, 2001). In the instructional philosophy, interaction, according to Tait (2000), provides a mechanism for students to obtain feedback. Because positive learning development is determined by feedback, it can be argued that the more interaction made, the better it will be for the students, the learning process, and the teaching process. According to Dzakiria (2012), three types of interaction are necessary in the ODL process. (1) Interaction between learners- the learner-learner interaction can be defined as interaction between two or more students. Participation, response, and feedback are all important factors for the ODL process to be successful. (2) Interaction between the learner and the tutor/ lecturer. The learner-tutor interaction that takes place between the course's learners and tutors is designed to aid the learner's knowledge of the course's material and contents. (3) Interaction between the learner and the interface. Computer skills, ICT

experience, easy access to technology, and many other factors influence learner-interface interactions. Lack of acquaintance with technology, for example, has been identified as a negative obstacle to teaching (Moore & Kearsley, 2012).

2.1.2 Ease of ODL

According to Alseweed (2013), e-learning was created to make traditional teaching-learning procedures easier, and it entails the use of electronic devices such as computers, cellphones, and tablets to deliver online learning materials. A prominent issue of current research has been addressed on how technology might boost cognitive processes in knowledge production among instructors, because of improved acknowledgment of social interaction in professional learning (Zhang et al., 2017). In addition, several prior researches on the use of educational technology have identified the ability of the learners, their computer skill and experience, and their attitudes toward specific technologies as crucial determinants (John, 2015; Surej, 2015; Tran and Glowatz, 2014). Dumford and Miller (2018) also point out how the usage of online examinations may have a harmful effect on students' abilities to get formative feedback.

2.1.3 Interest and Adoption Of ODL

There are many alleged benefits and uses of online learning, which is one reason why there is so much talk about it. The following are a few of the most important: its efficiency in educating students, its usage as professional development, and its cost-efficiency in combating rising costs. Postsecondary education costs, credit equivalence at the postsecondary level, and the ability to provide a world-class education to anyone with a broadband connection are all issues that need to be addressed (Bartley & Golek, 2004; De la Varre, Keane, & Gratton-Lavoie & Stanley, 2009; Lorenzetti, 2013).

Online learning has been applied all around the world in the last

year. This type of learning is simple to use because learners and educators do not need to meet while the information is being provided. This strategy includes a variety of sources that learners can use instead of relying on an instructor. An educator's role is to assist pupils in solving problems rather than simply acting as a helper who the teacher must assign to solve their problems. Online education has grown at a breakneck pace during the last two decades (Allen & Seaman, 2013). According to the annual online learning survey, the number of college students in the United States who took at least one online class increased from 1.6 million in 2002 to 6.7 million in 2001. (Allen & Seaman, 2013). In comparison, this figure for the United States was not necessarily a global phenomenon (Barbour, M. et al., 2011).

Waleed Mugahed Al-Rahmi, Mohd Shahizan Othman, and Mahdi Alhaji Musa (2014) published *The Improvement of Students' Academic Performance by Using Social Media Through Collaborative Learning in Malaysian Higher Education in Asian Social Science*, Vol 10. In the context of the study, the subject of the impact of social media on academic performance and the prospect of using social media as an effective instructional tool to improve academic performance arose. According to the findings of this study, social media has a good and significant impact on collaborative learning in terms of peer, instructor, and collaborative learning interaction. Researchers used a quantitative methodology to conduct this study, and survey questionnaires were distributed to 120 undergraduate and postgraduate students in July 2013. This study discovered that academics who used social networking for collaborative learning applied five factors that improved the academic performance of students who were satisfied in higher education. According to the findings, social media happiness can increase kids' academic achievement by 80 percent. In a word, this research presents a new method for improving student performance that might be used to environmental and cultural issues.

Shahin (2008) studied the relationship between student characteristics, such as learning styles, and their perceptions

and satisfactions in higher education web-based courses. This study surveyed 279 students in five schools using Kolb's learning styles inventory and Walker's distance education learning environment instrument, as well as demographic questions. Moore's Transactional Distance Theory's three dimensions are linked to Kolb's two-dimensional perspectives of individual learning styles, according to the study. The study suggested that courses be designed to accommodate a variety of leaning styles on all dimensions of transactional distance.

The impact of ICTs on open and remote learning (ODL) in the Philippines is discussed by Bandalaria (2008). The researcher looks at how ICTs have influenced the development of ODL in the Philippines, as well as the distinct phases or generations of distance education in the Philippines, which are defined by the main technology used for instructional content delivery and student support services. He also discussed the numerous ICTs utilized in ODL and how they are used to different aspects of this method of delivery. He also looked at how quality of education is ensured in a technology-driven system of teaching and learning, which included using the "quality circle approach" in the development of courses and learning packages, as well as the provision of appropriate technologies to perform academic processes and achieve institutional goals.

Lastly, Mutlu (2005) conducted a descriptive analysis of the design and development of E-learning services in the Turkish open education system. The researcher concluded that the structure of the Open Education E-learning services is flexible to the point where students can study effectively while adhering to distance education regulations, follow books, television programs, and practice software, ask academic facilitators questions and receive responses, and take trial exams to evaluate their efforts. Nartgun (2007) conducted a diagnostic investigation on the perceptions of Open University students on the difficulty of distance education application. The open faculty students (n=45) who attended its classes were the subjects of this study. Data was gathered through interviews, which revealed that

students valued open learning the best because they worked in different offices. They also mentioned that most of the students had positive feelings towards the university. They did, however, report having difficulty studying on their own and believing they would have difficulty obtaining work in the future.

Switching from traditional to online learning would have an impact on students' attitudes. Previous research has been used as a guideline and to narrow down the concerns in this study. The researcher has explored the types of learning and online learning throughout this chapter. Some previous researchers may have discussed student preparation, perception, attitudes, and obstacles when dealing with online learning. Even though the students and study backgrounds differed throughout the studies undertaken, most of the previous research showed a favorable result for virtual classroom or online learning.

One of the research papers highlighted that most students would prefer online learning for a variety of reasons, including the ability to be more flexible, independent, and efficient with their time, as one of the advantages of online learning is the ability to perform it at any time and in any location. As a result, the purpose of this study is to investigate the attitudes of Arts, Math, and Science students in the Faculty of Education, Universiti Teknologi MARA (UiTM), in accepting online learning during the COVID-19 pandemic. When an unexpected event arises, the findings of this study can be valuable in building a better curriculum. Finally, this chapter has examined relevant studies regarding forms of learning, which can be considered an important factor in ensuring that education progresses smoothly and that students continue to absorb knowledge.

RESEARCH METHODOLOGY

The procedure or process by which a researcher begins to collect statistics and information to meet the research's objectives is known as research methodology. The goal of this study is to investigate the attitudes of Arts, Math, and Sciences students of The Faculty of Education, Universiti

Teknologi MARA (UiTM) Puncak Alam, Selangor, towards online learning during the COVID-19 pandemic. There are three sorts of questionnaires, according to Cohen et al. (2000): semi-structured questionnaires, unstructured questionnaires, and structured questionnaires. Respondents must complete the questionnaire based on the following response provided by the researcher. In general, an unstructured questionnaire is also known as an open question since it allows respondents to choose any appropriate response. The respondent's ability to state his own answer will not be affected by this form of quiz. The last form of questionnaire is a semi-structured questionnaire, which includes both structured and unstructured questions. For the purpose of this study, a structured questionnaire was employed to observe Arts, Math, and Sciences students' attitudes regarding online learning among students of the Faculty of Education at Universiti Teknologi MARA (UiTM) Puncak Alam, Selangor.

3.1 FINDINGS

Data analysis, according to Chua (2016), is the process of translating raw data into new functional information. In a study, it is critical to respond to the research question. The data from the Google form will be transferred into the Statistical Package for Social Science (SPSS) program throughout this study. The program will assist the researcher in keeping track of the information for each individual respondent. A total of 250 people took part in this study, with the Google form containing approximately 30 items. IBM SPSS software was used to examine the data.

Table 1. Data Analysis Procedure.

Section	Statistical Tool(s)
Demographic Data.	Descriptive Analysis
Sciences, Arts & Mathematics students' attitudes in terms of their interest and adoption of computer towards online distance learning.	Descriptive Analysis

Difference between Sciences, Arts and Mathematics students' attitudes in using online distance learning.	Analysis of Variance (ANOVA)
Acceptance of online distance learning between Sciences, Arts and Mathematics students.	Analysis of Variance (ANOVA)

DATA ANALYSIS

The analysis of this research indicated that there is a high level of attitudes amongst Arts, Math and Sciences students toward online learning during the COVID-19 pandemic. Comparing attitudes in terms of their interest and adoption of computer towards online distance learning, it showed that it was discovered that item two recorded the highest mean out of six items. Most of the students from these three programs agreed that it is difficult to favor online learning over traditional learning due to little face to face interaction among students and teachers. Next, an ANOVA test was conducted to compare students' attitudes in effectiveness using online distance learning with respects to programs. The results show that there are significant differences across the programs. Post hoc test was also conducted by the researcher to observe the significant differences. All pairs except for the Sciences students compared with that of Mathematics' are significantly different from each other. Furthermore, for the next research question, the researcher had also conducted an ANOVA test to compare on the acceptance of online distance learning between Sciences, Arts & Mathematics students. The result showed there was no significant difference from each program

Table 2. Summary of Finding.

Section	Findings
Demographic Data	Gender – There were 81 (40.3%) of male and 120 (59.7%) of female students.

Arts, Mathematics and Sciences Students' Attitudes toward Online Learning during the Pandemic

Year of Study – The researcher found that year three were the highest percentage of respondents answering the online survey; 60 (29.9%). This is followed by 52 (25.9%) of the respondents from year 2. The next data for year of study were respondents from year 4 with 48 (23.9%) of students that answered the online survey and this continued with respondents from year 1; 23 (11.4%). The last data for years other than the ones mentioned were 18 (9.0%) which is the lowest frequency of respondents in year of study.

Programs – For the Mathematics program, there were 37.8% respondents with 76 students answering, Sciences program; 33.8%% respondents with 68 students answering and Arts and Design program; 28.4% respondents with 57 students answering, respectively.

Interest toward Online Learning – There are 88 (43.8%) of the number of respondents who have moderate interest toward online learning followed by 75 (37.3%) of the number of respondents who have high interest toward online learning. Lastly 38 (18.9%) of respondents feel low interest toward online learning.

Experience Having Online Learning Before Pandemic –107 (53.2%) of respondents said they had experienced online learning before the pandemic while the other 94 (46.8%) respondents said they had never experienced online learning before pandemic.

Sciences, Arts & Mathematics students' attitudes in terms of their interest and adoption of computer towards online distance learning.

Students strongly agreed that is difficult to favor online learning on a regular basis due to little face to face interaction among students and teachers. This is the highest mean score for this section.

Difference between Sciences, Arts and Mathematics students' attitudes in effectiveness using online distance learning.	The result show that there are significant differences between all pairs of different programs except for Sciences (ED247, ED248, ED260) and Mathematics (ED249).
Acceptance of online distance learning between Sciences, Arts and Mathematics students.	The result show that there are no significant differences in terms of their acceptance for online distance learning across the respondents' programs.

4.1 Differences between Sciences, Arts & Mathematics students' attitudes toward the effectiveness of using online distance learning

The results are different as compared to the Arts and Design programs; the students do not agree or partially agree on the effectiveness in using online learning. This can be supported by an article which mentions that a post-digital perspective on online learning observes that it has created an unbridgeable gulf between subject matter, technology capabilities and individual experience (Fawns, 2019). Instructional techniques and administration are critical in ensuring that students get the most out of the alternatives provided by online educational systems (Anderson et al. 2011). Remote emergency education, made possible by Covid-19, is frequently updated on the fly, with no assurance that infrastructure support will be available or sufficient. Although there was a lack of suitable infrastructure, a significant portion of the first guidance and assistance provided to non-expert online professors was centered on the technology tools that were accessible at each university and regarded adequate to ease the transition (Rapanta et al., 2020). The increasing use of mobile devices has increased the number of e-learning platforms available to students. The integration of virtual communities with online learning through a mobile platform will increase student participation, resulting in improved learning results

for everyone involved. Students, institutional leaders, and government officials can all benefit from this perspective on how to resolve the situation.

Table 3 represented the descriptive statistics for Sciences, Arts & Mathematics students' attitudes in using online distance learning. Research question 2 seeks to determine whether the three programs differ significantly toward online distance learning. Based on the descriptive analysis below, the highest mean for students' attitudes in using online distance learning is from the Art and Design program (mean= 2.8202, SD= .99553) followed by the Mathematics program (mean=2.4178, SD= .95319) while the lowest mean is from the Sciences program (mean= 2.1140, SD= 1.21148).

Table 3. Descriptive analysis for Sciences, Arts & Mathematics students' attitudes in effectiveness using online distance learning

				95% Confidence Interval for Mean				
					Lower Bound	Upper Bound		
Art and Design	57	2.8202	.99553	.13186	2.5560	3.0843	1.00	5.00
Mathematics	76	2.4178	.95319	.10934	2.2000	2.6356	1.00	5.00
Sciences	68	2.1140	1.21148	.14691	1.8207	2.4072	1.00	5.00
Total	201	2.4291	1.08963	.07686	2.2776	2.5807	1.00	5.00

Table 4. ANOVA for Sciences, Arts & Mathematics students' attitudes in effectiveness using online distance learning

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	15.480	2	7.740	6.904	.001
Within Groups	221.978	198	1.121		
Total	237.458	200			

For the second tabulation of data, Table 4 showed the ANOVA for Sciences, Arts & Mathematics students' attitudes in using online distance learning with respects to different programs. Based on the data below, there are statistically significant differences in terms of their attitudes for online distance learning between these three programs ($F = 6.904$, $df = 2$, $sig. = .001 < .05$). The Post hoc test results shown in Table 4.2.3 below indicate that all pairs except for Sciences compared with Mathematics are significantly different from each other ($sig. = .031 < .05$).

4.2 Acceptance of online distance learning between Sciences, Arts & Mathematics students.

An ANOVA was carried out to determine the acceptance of online distance learning between Sciences, Arts & Mathematics students with respects to different programs. Based on the data below, there were no statistically significant differences in terms of their acceptance for online distance learning between these three programs ($F = .568$, $df = 2$, $sig. = .567 > .05$). Online training is an important component of practical preparedness, while it is not the most important. Institutions should invest more than ever before in the professional development of their faculty, to keep their instructors up to speed on the most effective tactics and approaches for utilizing online technologies. The expansion of online learning in tertiary education will continue to accelerate, and schools will work together more systematically to pursue the most beneficial aspects of technology-based learning (Daniel, 2020). Because of the lack of direct or person-to-person contact in e-learning contexts, the educator's reviews and comments are extremely valuable resources. Instead of focusing on self-efficacy, researchers should move their attention to the use of technology, and students should feel more confident in their abilities to effectively perform, interact, study, and complete a full online course. Previous research show that students' perceptions of their own abilities in online learning, as well as their level of engagement with the content and their interactions with their instructors, are all critical factors in their overall happiness with their education and perceived learning. The findings further highlight

the importance of self-efficacy in the context of online learning.

CONCLUSION

To summarize, all the instruments employed in this study provided the answers to the research questions and achieved the objectives outlined in the previous section. As a result of this investigation, and from the data collected, it can be deduced that:

- i. Arts, Mathematics and Sciences students in the Faculty of Education have low attitudes in online distance learning.
- ii. Students have statistically significant differences between programs in terms of effectiveness in using online learning. Arts, Mathematics and Sciences students in the Faculty of Education have different perceptions or attitudes toward the effectiveness of online learning.
- iii. Students in different programs have no statistically significant differences toward the acceptance of online learning. In other words, they have similar attitudes toward online learning.

The researchers found that item number 2 which is “It is difficult to favour online learning on regular basis due to little face to face interaction among students and teachers” has the highest mean score across the items while the lowest mean score from this section is item number 1, “It is difficult to understand online learning without getting acquainted with appropriate guidance”. From the students’ view, students were encouraged to be more self-sufficient in their ability to recognize orientation signals and operate without the use of micro-scaffolding. Because of the use of efficient communication and the efforts to increase student involvement, online education necessitates a more complete evaluation than traditional teaching. To become the master of his or her education process and to grow increasingly independent, the student must first become the master of his or her education process (Rodriguez & Cano, 2007). The relevance of interaction has been underlined by several different researchers throughout history. For web-based learning to be successful, thoughtful design, active participation of learners, and great communication skills are required. The belief in one’s own ability to succeed is a critical aspect in student achievement and fulfillment. Comparing students with higher self-efficacy to students with lower self-efficacy, students with higher self-efficacy do

not view challenging tasks as complexities to be eliminated, but rather as a motivation and opportunity to grow their competency; this may increase learning performance and success, which in turn may lead to greater satisfaction with the results obtained (Alqurashi, 2019). In comparison to more recent studies, earlier studies purported to uncover a significant correlation between one's own self and technological advancement. The researchers also discovered that students who were enrolled in the face-to-face course performed significantly better than students who were enrolled in the online course, which was given in a more convenient and versatile manner due to the convenience and adaptability of the online course.

All educators should revise their educational skills to deal with the difficulties ahead. Institutions, instructors, and students should all try to seek out different learning environments to repair the damage created by Covid-19's disruptions to learning routes. The most essential thing to remember in this situation, however, is that no matter what web tools or applications have been used, while seeking to handle an educational challenge, we must be cautious not to cause a larger problem for ourselves or others. In addition, when seeking to ensure a student's academic success, we should not overlook the psychological and social or socio-emotional elements of learning, which require a more comprehensive view. The most essential thing to remember in this situation, however, is that when attempting to resolve an educational issue, we must be cautious not to exacerbate the situation by utilizing additional internet tools or services. Furthermore, in our efforts to assure the academic success of students, we must not overlook the psychological, social, and/or socio-emotional aspects of learning, which necessitate a more in-depth understanding. In future research, it may be necessary to make a comparison between completely online courses and blended courses to evaluate how the results differ. When comparing outcomes in future research, it is important to consider the demographic characteristics of the students. In other words, when attempting to ensure a student's academic growth, we should not disregard the psychological, social, and/or socio-emotional elements of learning, which require a more holistic approach. Studies with learners on e-learning activities during the Covid-19 outbreak should be carried out as a starting point for further research into online learning in the future. Because the outcomes of students' online learning experiences during the pandemic are not the same as those of related studies conducted prior to the global epidemic, it is necessary to

differentiate between the two types of research.

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The Impact of Different Types of Teaching Videos on Learning Satisfaction and Cognitive Load

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Abstract : The development of information technology provides a variety of ways for humans to acquire knowledge. Among the more common information technology used in teaching and learning is the video. This research explores the concept of teaching videos of declarative knowledge and the influence of different types of teaching videos on learners' learning satisfaction and cognitive load. It first sorts out the related research of instructional videos through literature research, and attempts to comprehensively consider the manpower, material resources, and technical difficulties invested in the production process of several common types of instructional videos summarized through literature research. They are classified into three categories, namely low cost, medium cost and high cost. Then, the impacts of three common but different types of teaching videos with different production processes on the learning effect of learners are studied. The study is in an experimental environment, with college students as the research object, strictly controlling the number and time of video viewing by learners, first pre-testing the subjects, and then letting the subjects learn the video followed by a post-test. The data analysis results show that in an experimental environment, the impact of three different types of instructional videos – i.e. PPT screen recording, picture-in-picture fusion and studio recording - on the retention test, transfer test and cognitive load of learners had no significant difference. However, in terms of learning satisfaction, the studio camera group has the highest learning satisfaction, while the PPT screen recording group has the lowest, with the studio camera group having a significantly higher score than the PPT recording group. $F(2,68)=3.267$, $P=0.044$. Based on these findings, this article provides a reference for the

design and development of future declarative knowledge instructional videos from the level of instructional video resource construction, so that instructional video designers and developers will discuss how to ensure the learning effect while better reducing the teaching in the process of making the video. At the same time, due to the limitation of research time, this research still has some shortcomings, which requires more rigorous and comprehensive argumentation in the future.

Keywords: teaching video, cognitive load, learning satisfaction

INTRODUCTION

Since the end of the 1990s, society has undergone significant changes due to the amazing development of information technology. Education has to keep up with the trend of the times, applying computer technology, digital multimedia technology and network technology to the field of education. New teaching learning methods are also gradually being introduced, especially in recent years, with the development of MOOC, micro-classes, and flipped classrooms. A large number of open educational resources have appeared in people's vision, and the construction of open educational resources has also attracted the attention of educators.

The mass media that presents teaching content with audio-visual technology are called teaching videos (Nicolau, 2019). As a kind of educational resource, it is welcomed by everyone because it is more vivid than images and words, and more intuitive than sounds. Especially driven by modern information technology, instructional videos have become the first choice for many people to learn online and offline. Universities, organizations and educational institutions invest a lot of funds, equipment and resources in the design and development of instructional videos every year. Consequently, a large number of teaching videos of different forms have sprung up. With the increase in the number of teaching videos, a variety of video types and presentation forms naturally appear. (Pisarenko, 2017)

Different types of instructional videos use different production methods, and the corresponding investment costs are also different. According to calculations, the time input and output ratio of studio recording video is about 8:1 to 100:1, which means that it takes about 8 to 100 hours to make a

one-hour video in the early stage. The production process of recording-type instructional video is relatively simple. It takes about 4 to 8 hours to make a 1-hour instructional video. With such a high cost in producing such videos, it is important to learn what the learning effect is. Reasonable allocation of education funds, while ensuring the effect of learning and minimizing the cost of education information construction is also an issue that we need to continue to pay attention to. Based on this, this article will study the impact of three different types of instructional videos on the learning effect of learners from the perspective of production costs.

It should also be mentioned that in recent years, there has been a lot of research on the presentation and organization of instructional video content (Swarts, 2012.;Chorianopoulos, 2018). For example,Wang Jian and other scholars from China discussed the impact of four different presentation forms of instructional videos, namely, videos with explanatory subtitles, videos without subtitles, pictures with explanatory subtitles and pictures without subtitles, and their impact on learners' online autonomous learning (Zhang, 2009). Some scholars have taken cognitive psychology as the starting point for their research, and explored the influence of teaching videos that present teachers' image in different ways on students' information processing, cognitive load and learning effect. In order to study the role of teacher image in teaching video learning, Zheng Jun and others used eye movement technology to explore the learning gaze of the teacher image area and text PPT area Zheng 2012. In recent years, foreign scholars have conducted research on instructional videos mainly in conjunction with related knowledge of psychology. For example, Bhat et al. (2015) used the learners' access data and learning data as the basis to analyze the learning situation of the learners when they watched two different forms of teaching videos: the teacher and the picture fusion and the teacher and the picture overlap. Chen et al. discussed the impact of three forms of instructional videos of classroom recording, picture-in-picture fusion, and three-split screen on the mental performance, cognitive load, emotional experience, and academic performance of learners with different cognitive styles (Chen et al., 2015) Wang et al. studied the influence of teacher image on learners' learning performance, attention distribution, cognitive load and learning satisfaction (Wang et al., 2017) In addition, there are scholars who classify them from the perspectives of the difficulty of production, production cost, and the relationship between teachers and teaching content. For example, Li

Qing and others comprehensively considered the technical support required in the video production process, the input of the production staff and the use of equipment, etc., and divided the current videos in the MOOC into three categories: simple, medium, and complex, and summarized each type of instructional videos included in each grade (Li, 2016). Yu Qingqing and others took the production of “Crowd and Network” course video as an example, aiming to reduce the production cost of instructional videos and improve efficiency, and explored a new method of recording videos, which helps alleviate teachers’ psychological pressure of the lens and improves the efficiency of video production, thereby achieving the purpose of reducing the time cost of video production and improving work efficiency.

In summary, the research on instructional video has made good progress, but there are few studies that take the production cost of instructional video as a starting point. In fact, in the actual development, design, and production, whether the cost of instructional video has been reciprocated is also a question we should be concerned about. Therefore, this article will take the cost of video production as the starting point, and through experimental research, explore the video learning effects and video effects of three teaching videos (PPT screen recording, picture-in-picture fusion and studio recording) of different production forms on learners to see the impact of learning satisfaction and cognitive load.

LITERATURE REVIEW

With the development of MOOC, micro-classes, flipped classrooms, etc., instructional video, as the main form of teaching content, has also become a hot spot for scholars in the field of educational technology. In the past few years, scholars have paid more attention to the application and production of instructional videos. For example, Jensen analyzed several common instructional video production methods based on their own practical experience, and put forward a series of improvements based on actual problems. (Jensen, 2015). Koumi in response to the problems of simple composition and monotonous composition of the teaching video, put forward suggestions for different scenes or shooting angles of the video pictures Koumi 2006. In addition, Susantini (2016) also put forward suggestions for improvement in response to the problems existing in the current teaching video. The above research is all about the design and

production of instructional videos. With the increase in the frequency of instructional video applications, the research on instructional videos has become more and more abundant.

2.1 Research on the Image of Teachers in Teaching Videos

Nowadays, there is endless empirical research on the problem of teacher image, but controversy continues. Secules studied the impact of four forms of teaching videos with no teacher image, a large teacher presentation ratio, a middle teacher presentation ratio, and a small teacher presentation ratio on the learning situation. The results show that the teaching video has a teacher image than a society without a teacher image (Secules, 1992). The sense of existence is low, the teacher presentation ratio is lower than that of the large and small ratios, and the learning effect of the image of a teacher is better than that of no teacher. Wong studied the impact of four videos, including operating recording with teacher image, graphic explanation with teacher image, operating recording without teacher image, and graphic explanation without teacher image, on learners' cognitive load, social presence, and learning immersion (Wong, 2012). Finally, it was concluded that the learning effect of operation recording with a teacher is better than operation recording without the image of a teacher, the learning effect of the graphic explanation with a teacher is better than the graphic explanation without the image of the teacher, and the learning immersion of the graphic explanation teaching video is the worst. Knowledge load and social presence have no significant impact. Pi & Yang used eye movement experiments in his master's thesis to study the impact of teachers' presentations in micro-course teaching videos on micro-course learning. His research results show that: 1) When learning declarative knowledge, there is a good teacher's image. When learning procedural knowledge, whether or not there is a teacher image has no significant impact on the learning effect; 2) Presenting the teacher image at the upper right of the video has a better effect on the learning effect of the micro-course (Pi & Yang, 2020). The study by Kizilcec et al. (2014) also found that the appearance of teacher images in instructional videos can play a role in attracting learners' attention. In addition, some other researchers conducted comparative experiments on the text in the online course and the three common

forms presented by teachers, and the results showed that there was no significant difference between the three groups. In addition to the above studies, some scholars have obtained relatively negative results. For example, Mayer (2014) believes that the effect of not showing the image of the teacher on the screen is better than that of showing the image of the teacher, because the facial expression and body language of the teacher will affect the learner and interfere with the learning state. Research by Lyons et al. also shows that the appearance of a teacher image will reduce the learning effect.

We mainly study the production cost of instructional videos. The instructional videos used in the above research are analyzed from the perspective of production cost. We can find that, compared with instructional videos without teacher image, instructional videos with teacher image cost more production, the production process of intermittently presenting the image of the teacher is slightly more complicated than the teaching video that continuously presents the image of the teacher; and the different presentation ratio of the teacher's image does not cause a difference in production cost. Therefore, according to the above research, we can find that different forms of instructional videos produced by investing different production costs in the process of making videos may affect the learning effect.

2.2 Research on Subtitle Design in Teaching Video

Subtitles originally refer to the text form of dialogue voices in movies or TV programs, generally appearing at the bottom of the video, and are designed to help the hearing impaired obtain the dialogue information of the film and television works. It is an important part of the film and television works. In recent years, scholars have begun to study the problem of subtitles in instructional videos. For example, Metruk used the survey method as the main research method to investigate the necessity of explaining the existence of subtitles in online instructional videos. The results show that college students believe that it is necessary for the explanation subtitles to appear, and when watching the video, college students will choose to use the explanation subtitles (Metruk, 2018). In addition, in the follow-up research, 131 college students from normal universities were also used

as the research object to conduct empirical research on the three forms of full subtitles, keyword screens, and no subtitles in online teaching videos. The research results show that there are explanatory subtitles. It is more helpful to improve learners' retention test and transfer test scores; compared to the full appearance of the explanation captions, the effect of presentation in the form of keyword screens is better, and the redundancy effect in the cognitive theory of multimedia learning is also corrected. (Bouki, 2001). Hinderliter's research has also reached a similar conclusion. They studied three common caption designs in online instructional videos: no captions, full captions, and summary captions, and used an eye tracker to record the visual cognitive process of learners. The results show that the type of knowledge presented in the video is different, and the impact is slightly different. When the knowledge content is declarative knowledge, full captioning can help learners capture more knowledge content, but the learning quality of summary captions is the highest; When the knowledge content is procedural knowledge, summary captions are not only conducive to the acquisition of the number of learning, but also conducive to the improvement of learning quality, and full captions will interfere with the learning effect of learners (Hinderliter, 2021). In summary, regarding the design of subtitles in instructional videos, we can see that learners have a positive attitude towards adding explanatory subtitles to instructional videos. And with the emergence of barrage, trying to include barrage in the production of instructional videos is also a new development trend in the future. However, from the perspective of production costs, adding explanatory subtitles or applying bullet screens to instructional videos will cost more production costs. This also indirectly shows that the production cost of the instructional video may have an impact on the learning effect.

2.3 Research on the Presentation Form of Instructional Video

With the increase in the number of instructional videos, the presentation methods of instructional videos have become more and more diversified. Schneider (2020) explored the existence of clues as well as studied the impact of different types of cues in instructional videos on learning, particularly learners' cognitive load, learning effect, learning satisfaction and attention. She added three

different cues: visual cues, verbal cues, and visual-verbal combination clues in the instructional videos. The research results show that, in terms of learning effect, whether in a laboratory environment or in a real teaching environment, instructional videos containing clues can improve the learning effect, but the promotion effect of maintaining knowledge only appears in the laboratory environment, and the promotion effect of knowledge transfer is reflected in both environments, especially the promotion effect of the teaching video of visual and verbal combination clues is the most significant. Calhoun et al. (2007) also reported on the three presentation forms of teaching videos in classroom recording, picture-in-picture synthesis, and three-split screen recording. Empirical research has been conducted on the impact of performance. The experimental results show that in terms of academic performance, the video format of classroom recording and picture-in-picture can promote learning more than the video format of three-split screen recording. In terms of concentration, three-split screen recording, the video is more able to attract the continuous attention of the learner, but it also makes the learner have the highest cognitive load. In the thread experience, there is no difference between the three different video types. Lai et al. (2013) conducted research on how to highlight the important and difficult content in the teaching video screen, and used eye movement test as the main research method. When there are important and difficult points in the instructional video, not adding mouse guidance helps learners to internalize the understanding of the knowledge; when there are no important and difficult points, it is better to add mouse guidance; at the same time, it is better to put important and difficult points on the right side of the video screen. With the advent of the “Internet +” era, instructional videos have also begun to develop towards sharing and openness. The interactive functions in the videos have brought new learning experiences to learners.

During the learning process, the learner can realize the interaction between the learner and the video by operating the mouse, and the results show that the performance of the students who study through the interactive teaching video is better than the students who do not use the interactive video for learning (Schaffer, 1986). Alkhatib (2018) used screen recording software to design three interactive mini-video

resources with different interaction times and text prompts. In order to facilitate the study and use of the participants, the examiner also shared these video resources to the 360 cloud platform for learners to learn, and analyzed the learning results. Through data analysis, it was found that no matter how many interactions there are, there is no text prompt in the instructional video. The learning effect is better than that with text prompts; regardless of whether text prompts are added to the video, instructional videos with more interactions will enable learners to obtain better learning results. In summary, we find that teaching videos in different presentation forms have different effects on learners' learning effects. From the perspective of production cost, it is found that different presentation forms of instructional videos will cause different costs.

METHODOLOGY

3.1 Purpose and Hypothesis

Can high-cost instructional videos bring better learning effects to learners? We measure the effect of a teaching video, mainly from whether it produces a good learning effect, whether it brings learners a higher learning satisfaction, and whether it can take up less cognitive resources of the learner during the learning process. Although we continue to pursue high-quality graphics in the process of making instructional videos, we have not conducted empirical research on this. This study adopts the learning videos of the “feeling” of psychology knowledge, and the researchers spent different costs to produce three different types of teaching videos to study the impact of different video types on learning satisfaction and cognitive load. Among them, learning the effects include retention tests and migration tests. This experiment focuses on exploring the following two questions: (1) In an experimental environment, and through an empirical study, what are the impacts of three different types of teaching videos on learners' learning satisfaction, and cognitive load? (2) Do teaching videos produced at higher costs give learners higher learning satisfaction and lower cognitive load?

H1a: Different types of instructional videos will have different effects on learners' learning satisfaction.

H1b: Different types of instructional videos will have different effects on the cognitive load of learners.

3.2 Participants

The subjects in this study are undergraduates majoring in Educational Technology and English from Anhui University. These students have taken the public course “Modern Educational Technology”, and all the subjects voluntarily participated and had been informed of the experiment process in advance. The independent variable of the experiment is the video type. Participants in the experiment are randomly divided into three groups by drawing random numbers. Among them, the participant who drew the number 1 is the first group. During the experiment, they should watch video 1, which is a PPT. For Screen-recording instructional video; the participants who drew the number 2 were selected as the second group. During the experiment, they watched Video 2, which is a picture-in-picture fusion instructional video. Participants who got the number 3 were in the third group and watched video 3, which is a studio-recorded instructional video. The total number of subjects was 75, of which 4 were eliminated due to incomplete questionnaires or abnormalities. In the end, there were 71 valid data. The number of subjects in each group was 25, 24, and 22, respectively.

3.3 Instrumentation

The experimental materials are three instructional videos with different presentation forms. Their knowledge content is the same, but the cost invested in the production process is different, so the production process is also different. First, the video-recorded instructional video is selected from the “Feeling” of the National Open University “Five-minute Course Network (www.5minutes.com.cn)”. The original video is 6 minutes and 12 seconds long. The remaining length of the final video is 5 minutes and 48 seconds. The teacher explained the knowledge content in a rigorous and humorous way, and also interspersed with the lively performances of the actors to help understanding. Later, dynamic text effects, sound effects, and video effects were added to

the screen. This video is a typical studio-camera teaching video. The production process of this type of instructional video is: (1) Write text manuscripts based on knowledge content; (2) Choose a shooting location and arrange personnel to shoot; (3) Post-production staff edits the video as needed, and add text effects and video animation effects to the video. The entire process from design to development of the video requires at least one teacher, two camera staff, and one editing staff, and the production process requires effective communication between the teacher and the personnel in each link, and also requires a special venue, which is usually fully equipped in the studio. Therefore, it is a high-cost instructional video.

The PPT screen-recording teaching video in the experiment is made based on the video-recording. The first step is to make a PPT. The PPT is designed and made according to the teaching content. The PPT has both pictures and texts. The presentation of knowledge is logical, and the slides also have a simple switching effect. Subsequently, the sound in the video-recording video is decomposed, combined with PPT to show and record the screen, and the screen-recording teaching video effect is obtained. The production of this type of instructional video has been called: (1) Making PPT; (2) Recording PPT with sound. The entire production process can be completed by a teacher. On the whole, screen-recording teaching videos require very little time, manpower, material resources and money. Therefore, it is a low-cost instructional video.

In order to eliminate the interference of the teacher's image in the three types of teaching videos on the teaching effect, the picture-in-picture fusion teaching video in this study is based on technical means where the teacher's picture in the studio-recorded teaching video and the screen-recorded teaching of the PPT in the video is synthesized. The production process of this type of instructional video is: (1) make ppt; (2) record PPT; (3) record teacher image; (4) synthesize the teacher image with the recorded PPT. The entire production process requires at least one teacher, one camera crew and one post-editing crew. However, unlike the video-recorded instructional video, it requires less technical difficulty. Therefore, it is a medium-cost instructional video.

3.4 Procedure

The experiment was carried out in the computer room of Anhui University. After entering the computer room, the subjects randomly selected the computers that could be used. Then, by drawing random numbers, the subjects were randomly divided into three groups, and the first group was drawn with the number 1, Watch video 1; the second group is drawn to number 2 and video 2 is drawn; the third group is drawn to number 3, and video 3 is drawn. After the groups were determined, the examiner will read out the instructions and handed out a prior knowledge questionnaire to the subjects. The pre-test was conducted to understand the subject's prior knowledge level for 10 minutes; after the pre-test was completed, the examiner conducted the pre-test knowledge questionnaire. The allocation of the type of video that the participant should watch was determined by the random number drawn. Each video was watched twice in a row. The first time is equivalent to learning, and the second time is equivalent to review. The video duration is 5 minutes and 48 seconds. After the viewing, the two groups of subjects immediately completed the retention test and the transfer test. After completing the post-test questionnaire, the test subjects were then given the learning satisfaction scale and the cognitive load self-rating scale in turn. The entire experiment lasted about 50 minutes.

ANALYSIS AND DISCUSSION

In order to unify the unit scale of test scores, the scores of the subjects' prior knowledge test, retention test and transfer test were divided by the full scores of each test to convert them into correct percentages. The author first compared the average scores of the three groups on the pre-test, the retention test, and transfer test. The results are shown in Figure 1. From the data in the figure, we find that in the pre-test, the score of the PPT screen recording group is slightly higher than the other two groups; in the maintenance test scores, the picture-in-picture fusion group has the highest score, followed by the PPT screen recording group, and the studio video recording group had the lowest score; in the transfer test scores, the picture-in-picture fusion group scores were slightly different from the studio video recording group

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scores, and the PPT screen recording group scores were lower than the other two groups. In order to understand the specific differences of the dependent variables, SPSS was used to analyze the results of the pre- test, the retention test and the transfer test respectively.



Figure 1 Comparison Charts of Test Scores in Three Test

Descriptive statistics on the pre-test results and the results are shown in Table 1.

Table 1: Prior Knowledge Test Scores (mean/standard deviation)

Groups	N	Pretest	
		Average	Standard deviation
PPT	25	26.10	14.360
Picture	24	19.05	8.769
Studio video	22	21.21	15.672

According to the average scores of the subjects shown in the table, there is little difference in the average scores of the pre-test scores in each group. Next, we use the prior knowledge test as the dependent variable and the video type as the independent variable to perform one-way analysis of variance. The results of the analysis of variance are shown in Table2. The data results show that the prior knowledge and experience of the three groups of subjects

are not significant. Difference ($F(2,68)=1.830$, $P=0.168>0.05$). It can be seen that the previous knowledge levels of the three groups of subjects are the same, and there is no significant difference between the groups, so the subsequent research results will not be affected by the difference in the previous knowledge level.

Table2: The Results of the Analysis of Variance in the Pre-test Transcript

	Square	DF	Mean square	F	Sig
Between groups	639.292	2	319.646	1.830	.168
Within groups	11875.160	68	174.635		
total	12514.452	70			

The test was independently reviewed by two reviewers. The Pearson correlation coefficient of the score is 0.930 ($P=0.000$). The result of the correlation coefficient shows that the consistency of the two reviewers' scores is very high. Therefore, the average score of the two scores is taken as the average score of the two reviewers. The descriptive statistical analysis on the retention test scores, and the analysis results are shown in Table 3

Table 3: Retention Test Scores (average/standard deviation)

Groups	N	Average	Standard deviation
PPT	25	49.47	8.810
Pictures	24	51.62	11.299
Studio Video	22	45.32	7.856

Next, the previous test scores are used as covariates, the test scores are kept as the dependent variable, and the video type is a fixed factor. One-way covariance analysis is performed. This result shows that the difference in the retention test scores of the three groups of subjects is not significant ($F(2,68)=2.845$, $P=0.065>0.05$), indicating that the learners' retention test scores will not be significantly affected by the different types of instructional videos.

4.1 Learning satisfaction

The Cronbach consistency coefficient of the Learning Satisfaction Scale is 0.833, indicating that the scale has good reliability. Therefore, the author used the type of instructional video as the independent variable and the total score of learning satisfaction as the dependent variable and carried out descriptive statistical analysis and one-way analysis of variance on the investigation of the three groups of subjects' learning satisfaction. The descriptive statistical results are as follows, as shown in Table4:

Table 4: Learning Satisfaction Score (mean/standard deviation)

Groups	N	Overall satisfaction	
		Average	Standard deviation
PPT	25	79.08	9.282
Picture	24	82.63	9.609
Studio video	22	85.86	8.265

A one-way analysis of variance was performed on it, and the results are shown in Table 5: $F(2,68)=3.267$, $P=0.044$, indicating that the three groups have significant differences in learning satisfaction.

Then the LSD post-test was performed on the three groups. The results are shown in Table 6. According to the data in the table, it was discovered that the learning satisfaction of the participants in the studio recording group was significantly higher than that of the PPT recording group ($P=0.013<0.05$). Compared with the learning satisfaction of the picture-in-picture fusion group, although the average of the studio camera group ($M=85.86$) is slightly higher than that of the picture-in-picture fusion group ($M=82.63$), there is no significant difference ($P=0.232>0.05$), there is no significant difference between the PPT recording group and the picture-in-picture fusion group.

Table5: One-way ANOVA Results of Learning Satisfaction

	Square	DF	Mean square	F	Sig
Between groups	540.676	2	270.338	3.267	.044
Within groups	5626.056	68	82.736		
total	6616.732	70			

Table 6: LSD Post-test Results of Learning Satisfaction

I	J	Mean difference	Standard error	Sig	95% confidence interval	
					Lower limit	Upper limit
PPT	Picture-picture	-3.545	2.599	.177	-8.73	1.64
	Studio video	-6.784*	2.659	.013	-12.09	-1.48
Picture-picture	PPT recording	3.545	2.599	.177	-1.64	8.73
	Studio video	-3.239	2.685	.232	-8.60	2.12
Studio Video	PPT recording	6.784*	2.659	.013	1.48	12.09
	Picture-picture	3.239	2.685	.232	-2.12	8.60

The measurement of learning satisfaction mainly includes four dimensions of teacher teaching, teaching content, learning environment and video format. The score comparison of each group on the four dimensions is shown in Figure 2.

The Impact of Different Types of Teaching Videos on Learning Satisfaction and Cognitive Load

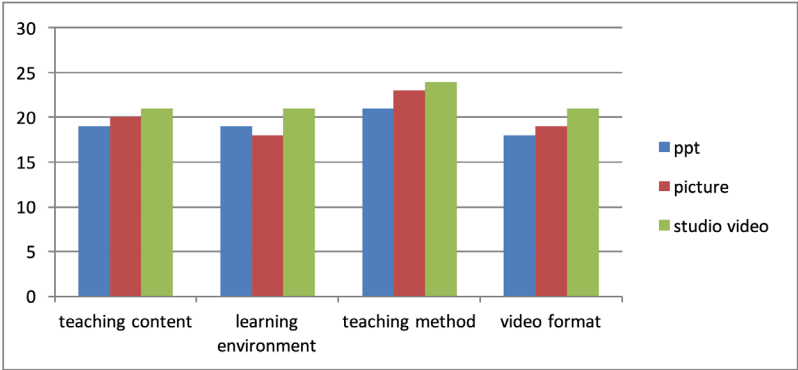


Figure 2: Comparison of Scores in Various Dimensions of Learning Satisfaction

Through the comparison in the figure 4.2, we can clearly find that in terms of satisfaction with teaching content, teacher teaching satisfaction, and video format satisfaction, the studio recording group has the highest average score, followed by the picture-in-picture fusion group, which has the lowest satisfaction. For the PPT screen recording group, in terms of satisfaction with the learning environment, the studio recording group's satisfaction is slightly higher than the PPT screen recording group and slightly higher than the picture-in-picture fusion group. Descriptive statistical analysis is performed on each dimension, and the results are shown in Table 7.

Table 7: Average Score and Standard Deviation of each Dimension of Learning Satisfaction

Groups	N	Content	Method	Environment	Video format
ppt	25	19.16 (2.625)	21.40 (3.819)	19.76 (2.385)	18.76 (2.437)
Picture	24	20.04 (2.726)	23.13 (2.983)	19.63 (3.160)	19.83 (2.839)
Studio video	22	20.77 (2.287)	24.36 (2.888)	20.55 (2.632)	20.18 (2.442)

Next, this research conducted a one-way analysis of variance on the four dimensions. The results showed that the three groups had no

significant differences in teaching content, learning environment, and video format, but there were significant differences in teacher teaching method (Teaching content: $F(2,68)=2.339$, $P=0.104>0.05$; Learning environment: $F(2,68)=0.747$, $P=0.478>0.05$; Video format: $F(2,68)=1.973$, $P=0.147>0.05$; Teaching method: $F(2,68)=4.873$, $P=0.011<0.05$).

For the teacher's teaching dimension, the LSD post-test found that the teacher's teaching satisfaction of the studio recording group was significantly higher than that of the PPT recording group ($P=0.003$). Through the above-mentioned data analysis, we conclude that learners learning through studio-recorded teaching videos have higher learning satisfaction. Learning through PPT recording-type learning videos has the lowest learning satisfaction. Among them, the performance is the most obvious in the teaching method of teachers; the studio video recording is significantly higher than the PPT recording screen.

4.2 Cognitive Load

This study conducted descriptive statistics and one-way analysis of variance on the impact of different types of instructional videos on learners' cognitive load. The results of descriptive statistics are shown in Table 8.

From the data in the table, it can be found that the cognitive load of the three groups has little difference. Therefore, a one-way analysis of variance on the cognitive load scores was carried out. The results are shown in Table 9. This result shows that there is no significant difference in the impact of different types of instructional videos on the cognitive load of learners ($F(2, 68) = 0.170$, $P=0.844$).

Table 8: Cognitive load score (mean/standard deviation)

Groups	N	Cognitive Load	
		Average	Standard deviation
PPT	25	10.32	3.065
Picture	24	10.00	2.377
Studio video	22	9.91	2.091

Table 9: Cognitive Load One-way Analysis of Variance Results

	Square	DF	Mean square	F	Sig
Between groups	2.235	2	1.117	.170	.844
Within groups	447.258	68	6.577		
total	449.493	70			

CONCLUSION

This research was conducted in an experimental environment with three types of teaching videos (PPT recording, picture-in-picture fusion, and studio recording) as independent variables, learners' retention transfer test, learning satisfaction and recognition. An experimental study on knowledge load as a dependent variable found that the three types of instructional videos have no significant differences in learning effects and cognitive load. In terms of learning satisfaction, studio-recorded instructional videos have the highest learning satisfaction and is significantly higher than the PPT recording type, but there is no significant difference from the picture-in-picture type. According to the above research results, in the experimental environment, the learner's learning satisfaction is determined by the video itself. Therefore, the studio-recorded teaching video will bring learners better learning satisfaction by virtue of its rich split-screen effect.

Therefore, when designing and producing instructional videos, it is particularly important to allocate various resources reasonably. Here are some suggestions for the construction of future instructional video resources based on the research results:

(1) In the process of making instructional videos, we should follow the principle of "content-based, design supplemented". We should not spend so much on production cost purely in pursuit of good viewing effects but ignore the meticulous design of teaching content. Although the rich split-screen effect may bring a better learning experience for learners, from the perspective of learning effect, it may not necessarily improve the learning effect. The authors believe that the fundamental factor that determines the learning effect is not whether the picture is rich or the technology is complicated, but whether the teacher's explanation is clear, whether the design of the teaching plan is reasonable, and whether the design is

appropriate.

The cost for the design of teaching videos should be as low as possible and with high returns. That is to say, we should make the best teaching videos with the lowest production cost according to the teaching content, instead of spending more on production technology. Be mindful, and try to simplify the video production technology so that more people can participate. The results of this study show that although the cost of PPT recording-based instructional videos is relatively less than the other two types, and the production process is simpler than the other two types, it still does not affect a teacher's teaching quality.

In the process of making videos, it is necessary to fully consider the type of knowledge of the teaching content itself, and different forms of teaching videos are suitable for different types of knowledge. At the same time, the prompt information in the video, the presentation design of knowledge points, whether there is a summary, the teacher's speaking speed, etc. may affect the final learning effect.

LIMITATIONS AND FUTURE STUDIES

It should be noted that this study has a small number of tests, and the sample size is not big enough so the sample may be underrepresented. In the future, we need to expand the research and verification. In addition, the duration of this study is relatively short, and the number of studies is small. In order to obtain more reliable conclusions, the experimental results need to be repeatedly verified in the future, especially the conclusions of only one experimental study.

In this study, the cognitive load test of learners is tested through the cognitive load self-rating scale. The results may be subjective. For the learner's cognitive load to be overloaded, a more objective test method is needed. Whether the learner's learning effect is affected by cognitive load still needs to be further explored. In the future, we can design secondary tasks of different difficulties to interfere with video learning, so as to precisely control the cognitive load.

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