Student's Perception Toward Learning Management System in Studying Organic Chemistry During Pandemic Covid-19

Norbaizura Nordin*, Muhammad Haiqal Amir Khalidi & Nik Nurul Izzah Faroerzy

Department of Science and Mathematics, Centre for Diploma Studies,
Universiti Tun Hussein Onn Malaysia, Pagoh Higher Education Hub,
84600 Pagoh, Johor, MALAYSIA

Abstract: During the Covid-19 pandemic, this lethal disease touched many sectors of life, including schooling. In most nations, educational institutions have been shuttered and e-learning has been required. Higher Education Institutions (HEIs) were not always equipped to give their whole curricula online. As a result, in order to reposition themselves, several HEIs have turned to Learning Management System (LMS) to help them develop and survive. LMS is software used for delivering, tracking and managing training or education. Therefore, the first objective of this study is to identify the most difficult chemistry courses in Diploma in Engineering Technology (DAK) program.Then, to identify the best learning and teching method. In addition, this study is to develop the LMS platform in studying Organic Chemistry. This study is mainly focusing on DAK students. The ADDIE concept served as a model for the development of LMS. A Likert-scale questionnaire was part of the study's quantitative research approach. Data was collected and analyzed using Statistical Package for the Social Science (SPSS) and descriptive analysis. The results showed that Organic Chemistry, with a mean score of 3.92, had the highest mean of the easiest and hardest subjects that offered in the DAK course during year 1. For the student's perception of using the LMS, the lowest mean of users' perceived students' comprehension is 1.23 for the question "Are the notes offered in this LMS easy to understand for students?" and the lowest mean of students' motivation for the question "Does the utilisation of this LMS improve students' understanding?" is 1.40. From the result, it can be concluded that LMS in teaching and learning is an appropriate platform that should be increased at UTHM in accordance with worldwide technology advancements in education.

Keywords: Learning Management System (LMS), Coronavirus, Covid-19, Higher Education,Chemical Engineering Technology (DAK)

*Corresponding author: baizura@uthm.edu.my

1.0 Introduction

During the COVID-19 epidemic, various governments took actions that drastically altered people's social lives in all aspect China, as the first country to detect the virus's spread, was severely hit as well [1]. Most countries have closed their educational facilities and now mandate e-learning. Higher Education Establishments (HEIs) weren't always prepared to offer their entire curriculum online. It is because the global Covid-19 pandemic has necessitated new measures while also providing new community engagement opportunities for the university [2]. For all institutions and libraries around the world, online learning has become a challenge. As a result, in order to reposition themselves, several HEIs have turned to Learning Management System (LMS) system to help them develop and survive. LMS platforms are used by many educational institutions and large corporations to support their education and training systems. During the epidemic, several schools began to adopt learning management systems more extensively.In addition, online learning is not a complete substitute for traditional classroom instruction. However, with the correct video content, flashcards, and interactive quizzes, a fantastic learning experience may be delivered remotely. An LMS is a low-cost method of communicating information and assisting individuals in learning new skills. The platform may distribute the material to a huge number of people in diverse locations and evaluate those people to verify they understand the topic.

Using software, a LMS can offer, track, and manage training or education. LMS range from systems for managing training or educational records to software for distributing courses over the Internet and offering features for online collaboration [3]. LMS also offer interactive courses with user forums or social media discussions to facilitate community interactions among students, professors, and teaching assistants, as well as immediate feedback on brief quizzes and assignments [4]. This system contains software application and features which make learning content easily accessible and managed. In addition, it helps instructors to provide their students with learning materials and manages student registration [5]. LMS give instructors with the ability to investigate and traverse LMS for content and inspiration.So, teachers and students can use LMS System to incorporate thousands of videos, assignments, exercises, and readings into their classes.

In addition, LMS is one of the online teaching and learning applications. Many public universities, including UTHM, responded positively to the Ministry of Education's desire to make online learning the foundation of the curriculum, with the vigorous promotion of LMS. However, LMS is yet to be implemented in the Centre For Diploma Studies. As a result, the main objective of this study is to identify the most difficult courses in Chemical Engineering Technology (DAK) program that will aid students in learning and teaching and to identify the best learning and teaching method.

2.0 Materials and Methods

This study is a descriptive study to identify the difficulty subject in studying Diploma of Chemical Engineering Technology . A questionnaire have been used to obtain feedback from respondents. Two distinct questionnaires have been employed, the first of which was issued to determine the level of pleasure and difficulty of students when studying DAK during the Covid-19 pandemic phase. The second questionnaire was created to gather some feedback from year 1 students of DAK on the LMS, which is intended to help them master the most challenging courses in the DAK course. The questionnaire is an instrument used frequently in descriptive studies because through this method the collaboration of the respondents is easy to obtain [6]. The second questionnaire emphasizes two key aspects of the user's perceived of students' comprehension and students' motivation.

The respondents of this study consists of students Diploma of Chemical Engineering Technology,Universiti Tun Hussein Onn Malaysia (UTHM). The objective for the first questionnaire is to identify student's difficulty in studying Diploma of Chemical Engineering Technology, it selection of 44 students from Year 2 Session 2020/2021 and 38 students from Year 3 Session 2019/2020 was due to the respondents who have been studying Organic Chemistry (DAK 11403). The objective for the second questionnaire is to determine student's toward LMS in studying Organic Chemistry. The students only consist of students from Year 1 Session 2021/2022 which are 30 respondents.

2.1 Materials

The software that have be used in this research are internet browsers (Google Chrome, Internet Explorer, Safari), Multimedia software (Powtoon), SPSS Software and Productivity Software such as Microsoft Word and Microsoft PowerPoint . Meanwhile the software for surveying personal networks is Canvas Network that used to develop LMS. The software are readily available in playstore and arcade.

2.2 Methods

The development process is based on the Analysis, Design, Development, Implementation, and Evaluation (ADDIE) model. The purpose of this model is designed to produce lesson plans and learning materials so that the delivery of a lesson will be more effective and efficient.

The analysis phase involves several processes of determination as well as identifying the problem to be solved. In this phase, the grade of the students for each course offered in DAK program and the most difficult course in the program have been identified.

The design phase is the stage of design explanation of the learning content approach, software to be used. The development of this LMS is based on the content is required in the syllabus of the subject that have been choose on teaching and learning notes, teaching and learning videos, quizzes and exercises that are suitable for use.

The development phase refers to the process of producing teaching materials and learning the subject that have be choose with the concept of LMS. For this study, LMS was chosen as a medium in delivering teaching and learning materials that have been designed. Canvas network was chosen as the main platform for applying our LMS system. Powtoon software is used to develop more interesting cutting speed instructional videos. Microsoft powerpoint is used for template preparation, tool preparation and facilities to add interesting pictures when the user sees it. Canva is used as a graphic design tool for making social media graphics, presentations, posters, documents, and other visual content.

This implementation phase was done after the teaching and learning materials of LMS concepted of the subject that have been choose are ready to be designed. In this phase, we will tests the finished product before the product is sent to the supervisor. The main purpose of the evaluation phase is to detect weaknesses and failures in the development process and operating system. The work process involved is to get feedback from the lecturer and students on the teaching and learning materials of that subject that have been choose with the concept of LMS that has been designed [7]. The link of the LMS for Canvas Network that has developed is https://canvas.instructure.com/courses/4060804 . The **Figure 1**, **Figure 2** and **Figure 3** shows the content of LMS that have been create.
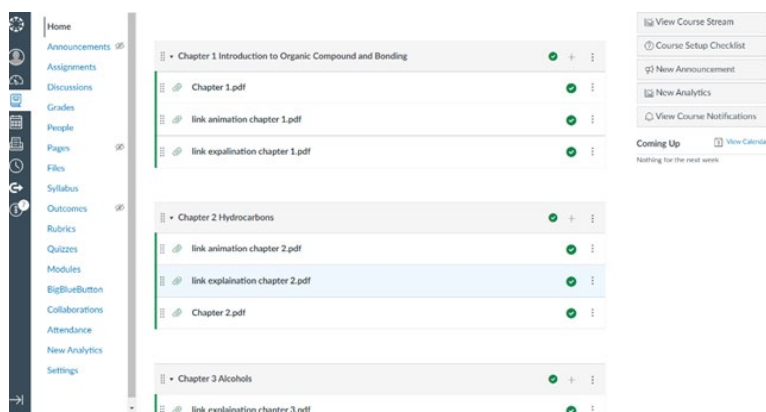
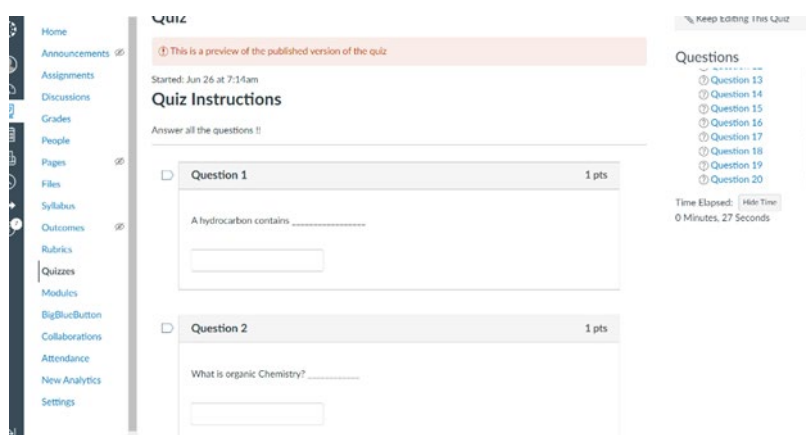

Figure 1 : Home page of the LMS
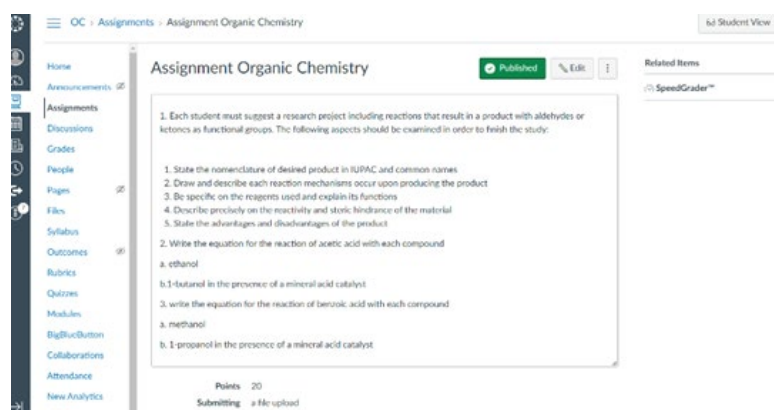
Figure 2 : Quizzes page

Figure 3 : Assignment page

3.0 Results and Discussion

The descriptive statistics for pleasure and difficulty in a Diploma of Chemical Engineering Technology are shown in **Table 1** that shows the measurement of pleasure and difficulty subjects offered during Year 1. This research aimed to determine the most challenging courses for DAK students and to gather some feedback from year 1 students of DAK on the LMS. This study uses 5 Likert scales to analyze respondents' problems on online learning and student's perception toward LMS in studying Chemical Engineering during pandemic Covid-19 as shown in **Table 1**.

Table 1: Rating description [7]

Scale	Rating description
1	Most easy to understand
2	Easy to understand
3	Moderate
4	Difficult to understand
5	Most difficult to understand

Based on **Table 1**, the Likert scales that have been provided for respondents to answers on questions provided in the `Google Form`. As a result, a score 1 was the most easy to understand reaction, score 5 was the most negative which is most difficult to understand, and score 3 was neutral.

The collected data is then evaluated descriptively to determine the mean value, standard deviation, percentage, or frequency.

Table 2 :Scale of mean score measurement [8]

MEAN SCORE	LEVEL OF MASTERY
$1.00 \leq mean \leq 2.33$	High/Satisfactory
$2.34 \leq mean \leq 3.66$	Moderate/Less satisfactory
$3.67 \leq mean \leq 5.00$	Low/Unsatisfactory

The mean score values were evaluated using the average mean level of agreement, which was divided into three levels: low, medium, and high according to the mean score as shown in **Table 2** [8]. The mean ratings were then divided into interval scores to determine respondents' level of agreement for the first and other objectives, as shown in **Table 3** below.

Table 3: The level of pleasures and difficulties for students in the subjects offered during year 1

Semester	Subject	Mean	Standard Deviation
1	Chemical Engineering Technology Laboratory	2.26	1.04
	Fluid Mechanics	2.47	0.90
	Mass and Energy Balances	2.87	0.99
	Physics for Engineering Technology	2.39	0.76
	Foundation of Chemical Engineering Technology	2.19	0.88
2	Engineering Drawing	2.82	0.93
	Organic Chemistry	3.92	1.12
	Analytical Chemistry	2.61	0.79
	Occupational Safety and Health	2.43	0.90

Table 3 shows the mean score and the standard deviations of pleasure and difficulty used subjects offered when studying during Year 1. The highest mean value is 3.92 and the standard deviation is 1.12 for the subject of Organic Chemistry. It is a difficult subject that was chosen by students years 2 and 3. The lowest mean value is 2.19 and the standard deviation is 1.04 for the subject of Chemical Engineering Technology Laboratory. So, that means it was the subject most easy to understand.

3.1 Students' Comprehension

Students' comprehension is defined as the level of knowing the completeness of the information used when using the LMS. The measurement of Students' Comprehension included nine items modified to suit the context of this study.

Table 4: The Students' comprehension of the use of LMS

Construct	Measured Item	Mean	Standard Deviation
Students' Comprehension	A1: Are the notes offered in this LMS easy to understand for students?	1.23	0.43
	A2: Are the notes created for each topic suitable for students to use?	1.66	0.80
	A3: Are the notes provided in each chapter easy to understand?		
	Chapter 1:Structure and Bonding	1.33	0.47

Chapter 2:Hydrocarbon	1.70	0.46
Chapter 3:Alcohol	1.40	0.56
Chapter 4:Aldehydes and Ketones	1.56	0.56
Chapter 5:Carboxylic acids and Derivative	1.53	0.50
Chapter 6: Amines	1.56	0.56
Chapter 7:Aromatic compounds	1.30	0.46
A4: Does the usage of instructional videos in this LMS help students' comprehension?	1.80	0.55
A5: Is the video explanation for each chapter easy to understand?	1.50	0.57
A6: Are the questions designed to improve students' understanding?	1.60	0.49
A7: Would the questions in this LMS be able to put students' minds to the test?	1.50	0.50
A8: Does the content in this LMS improve students' understanding?	1.60	0.49
A9: Does the LMS model provided help students to understand the subject of Organic Chemistry better?	1.60	0.62

Table 4 shows the mean score and the standard deviations of items referring to the comprehension in the use of LMS applications. The highest mean value is 1.80 and the standard deviation is 0.55 for item A4. The lowest mean value is 1.23 and the standard deviation is 0.43 for item A1. Overall, students' acceptance of the LMS on the ease of use of the application is at a good level because the range of mean value is between 1.23 to 1.80.

The first study's findings indicated that students' acceptance of the knowledge provided in the LMS application was beneficial to the entire item. This is evident when some students feel that the information in the LMS may improve their grasp of Organic Chemistry. The application of LMS is designed to improve literacy for LMS-style learning, engage students in learning, and assist students in increasing their willingness to study [5]. Finally, students' approval of their knowledge of the material contained in LMS System is good, but it still has to be enhanced so that students can easily learn the subject of organic chemistry.

3.2 Students' Motivation

Student's motivation is defined as the level to which it is believed that using LMS increases understanding in online learning. The Measurement of Students' Comprehension included five items modified to suit the context of this study.

Table 5: The Students' motivation of the use of LMS

Construct	Measured Item	Mean	Standard Deviation
Students' Motivation	B1: Does the utilization of this LMS improve students' understanding?	1.40	0.62
	B2: Does using this LMS help students grasp the material better?	1.70	0.46
	B3: Is the adoption of LMS beneficial to students?	1.46	0.50
	B4: Does the usage of LMS influence students' performance in the subject of Organic Chemistry?	1.63	0.49

B5: Does the utilization of this LMS increase students' interest in learning more about the subject of Organic Chemistry ?	1.46	0.50

Table 5 shows the mean score and the standard deviations of items referring to the comprehension in the use of LMS applications. The highest mean value is 1.70 and the standard deviation is 0.46 for item B2. The lowest mean value is 1.40 and the standard deviation is 0.62 for item B1. Overall, students' acceptance of the LMS on the ease of use of the application is at a good level because the range of mean value is between 1.40 to 1.63.

The findings of the second survey revealed that students' acceptance of the benefits of LMS application was positive overall. This is seen when some students feel that LMS assist them in obtaining learning subject knowledge rapidly. Students can also obtain educational materials and connect with professors via the internet and applications based on it [9]. Even educational materials may be more consistently controlled and distributed to students [10].

The findings also show that some students believe the LMS application saves time while teaching and studying. Multimedia technology offers enormous promise for increasing the quality and efficiency of teaching and learning [11]. The results also reveal that some students believe the LMS application can boost learning performance. Finally, students' acceptance of the benefits of LMS applications is good, but it has to be enhanced to guarantee the seamless execution of the course utilizing the LMS application.

4.0 Conclusion

In conclusion, the results shows that the two objectives set out at the beginning of the study have been achieved. The most difficult subjects in the Chemical Engineering Technology course were identified in this study. According to the study's findings, Organic Chemistry is the most hardest subject to grasp. As a result, the construction of this LMS system has the potential to improve students' understanding of Organic Chemistry. Furthermore, the study's findings indicate that students' acceptance of factors of understanding the knowledge provided in the LMS while using the LMS application is an important component to consider. It is because LMSs embrace lifelong learning features and make them broadly available to individuals. Furthermore, this global graduate learning must be utilized in our country's education to harness the usage of internet access to something more scientifically and give a lot of benefits to individuals.

Acknowledgement

References

[1] T. Chen, L. Peng, B. Jing, C. Wu, J. Yang, and G. Cong, "The impact of the COVID-19 pandemic on user experience with online education platforms in China," *Journal of Sustainability*, vol. 12, no. 18, pp. 1-31, 2020

[2] *National Elearning Policy Higher Education Institutions Malaysia*, The Ministry of Education Malaysia, Putrajaya, 2014

[3] K. Brush, "*What is learning management system*" Techtarget. https://www.techtarget.com/searchcio/definition/learning-management-system (accessed December 2019)

[4] N. Cavus, "Distance Learning and Learning Management Systems," *Procedia - Social and Behavioral Sciences*, vol. 191, pp. 872–877, 2015

[5] Huang, "Open source LearningManagement Systems in E-learning and Moodle," *Journal of Network and Computer*, vol. 9, no. 1, pp. 76–99,2010

[6]   N. Rao, & N. Murhty, "Measures of Central Tendency," *Applied Statistics in Health Sciences*, vol. 2, no. 5, p. 52, 2010

[7]   J. Elias, & M. Mirunalini, Construction and Standardisation of Nomophobic Rating Scale for Higher Secondary School Students, vol. 25, no. 3, pp. 5178–5182, 2021

[8]   A. Ghafar, & M. Najib, Penyelidikan Pendidikan, *Penerbit UTM*, 1999

[9]   K. S. Min, F. Mat - Yamin, and W. H. Isaac, "Design, purpose of usage and the impact of LMS on student learning: A preliminary findings," *Proceedings of the 6th Knowledge Management International Conference 2012*, pp. 673-676, 2012

[10]   F. Yamin, W. H. Isaac, & A. Ibrahim, "Students acceptance on document sharing through online storage system," *Proceedings of the 6th International Conference on Education and Information Management*, pp. 68-73, 2014

[11]   N. Azliza, & L. Halim, "Learning design and effectiveness assisted multimedia construc tivist approach for science KBSM," *Journal Technology* Universiti Teknologi Malaysia, pp. 19-38, 2002