

User-Centered Design for an Online Learning



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Abstract: *Online learning has been studied for a long time. It has many benefits and challenges. In the period of COVID-19 spreading, many universities and schools have more concerns for their students of the virus infection. Thus, the online classroom has been set to be a teaching method for students. However, it is quite a new normal practice, especially in Thailand, to have an online instead of a face-to-face classroom. Therefore, this study is a path for preparing to conduct online learning. This study aims to provide guidelines to design effective online learning based on students' opinions. By analyzing the open-end questionnaires with 37 participants, the results reveal that blended learning is the most preferred learning pedagogical approach. Moreover, the metaphor factors, including subjects' characteristic, class period, class size, activities and assessment that were suitable for online learning according to the students' opinion, were suggested. Finally, some obstacles that students have faced in online learning were presented, and some solutions were proposed.*

Keywords: *privacy invasion, reaction, technology, Thai students*

I. INTRODUCTION

Nowadays, the online classroom is essential for every school and university, particularly, at the time when there is a pandemic like COVID-19 (or Coronavirus). However, some universities have never planned to have an online classroom. Therefore, the study of benefits and challenges, and a design for a suitable online classroom are essential.

This study aims to investigate and suggest some guidelines to design a suitable online classroom based on students' perceptions as a resource for preparing an online course. Next section, the definitions of face-to-face, online, and blended learning will be described. Then, the method used in this study and the results will be explained. Finally, some findings and implications will be discussed.

II. LEARNING PEDAGOGICAL APPROACH: FACE-TO-FACE, ONLINE AND BLENDED LEARNING

A. The Definition

The term of face-to-face learning is traditional learning in a classroom that teachers and students have to join a class

together physically. Oppositely, an online classroom is using technology (the Internet) to help manage a classroom that teachers and students could find any place to join a class online.

Another learning method is blended learning which could be defined as a combination of online and face-to-face instruction [1]. Blended learning could be described as "a mode of teaching that eliminates time, place, and situational barriers, whilst enabling high-quality interactions between teachers and students [2]." From the definition, blended learning is an integrating of co-present face-to-face learning and online learning. It has mixed advantages of both learnings. Therefore, online learning has been interesting and has been used more widely as the technology is growing.

B. Benefits and Challenges of Online learning

In this study, blended learning is seen as part of the online learning pedagogical approach. Thus, the advantages and challenges will be presented in an overall picture of online learning. Traditional face-to-face environments are more likely to promote collaborative learning among students and lecturers. In addition, it provides effective teaching practices, quality of interactions, and discussions with diverse others [3]. The clear benefits of online learning are time and cost-saving on commuting [4]. This is flexible and convenient for students to manage their time and courses for enrolment. Some critical challenges are how to have the proficiency of instructors, course design and instruction. Furthermore, it is difficult to have good communication collaboratively among students, and individually between a student and the instructor. Without face-to-face communication, it could cause misunderstanding among them in an online environment. Finally, student performance online might be challenging to control since it depends on students' time management, self-efficacy and responsibility [5, 6]. The success of online learning depends on the instructors. They play a crucial role as a facilitator to build a learning community among students, help students with their questions and assignments and evaluate students' learning [4, 7]. The other success factors of online learning are Internet connectivity, teachers' pedagogical skills, and appropriate design of the course for the productive outcomes [8].

III. THE DESIGN FOR AN ONLINE CLASSROOM

This study does not intend to develop an online classroom system, but aims to suggest some guidelines for it to help lecturers who are in the early stage of conducting a class online. This study follows the user-centered design paradigm and a metaphor notion described as followings.

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A. User-Centered Design

User-centered design is described as design processes that users are involved and have an impact to the design throughout the design process [9]. Hence, the needs of users should dominate the design of a system [10].

There are three types of users: primary, secondary and tertiary users. The primary users are the main ones who use artifacts. Secondary users are occasionally using the artifacts or use it through an intermediary; and tertiary users, are those who are affected by the use of artifact or who make a decision on purchasing [11]. This study focuses on the primary users who are students. Thus, their opinions will be applied and used for the design implications.

B. The Metaphor

The metaphor is "an expression that makes the comparison that something is like something else, and metaphors have been promoted as efficient ways of helping users understand interactive systems [12]."

In this study, the metaphor is a traditional face-to-face classroom. It can be used to compare with an online class to shape questions and factors used to track the students' needs on their preferable online learning environment.

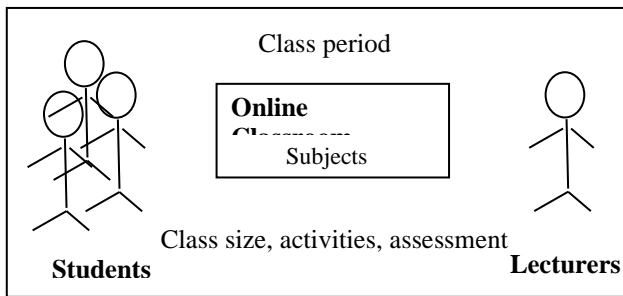


Fig. 1.A metaphorical expression for an online learning.

The figure1 shows an online classroom environment and expected factors that have an effective impact on online learning. The factors such as subjects' characteristic, class period, class size, activities and assessment will be used to survey students on their preferable online learning environment.

IV. METHODS

Open-ended questionnaires were used as a tool to collect students' opinions about the preferable online learning environment. The questions were asked and guided by the metaphor of the traditional classroom, including the suitable subject's characteristic, class period, class size (number of students), class activities and students' assessment. In addition, obstacles of online learning that students faced were asked to see general problems in online learning. There are 37 students who responded to the questionnaires. They are students at Kasetsart University (Kamphaeng Saen Campus). 16 students are female, and 21 students are male. 32 students of the 37 students have experience in online learning. The results from the questionnaires were analyzed and showed suitable or preferable aspects of online learning for students in the next section.

V. RESULTS

This section will present the results referred to the aspects of a traditional classroom and show the preferable online learning as followings:

A. Preferred Learning Pedagogical Approach

For the question asking in general, which pedagogical approach, including face-to-face, online and blended learning, is best suited for learning in the university. The responses are presented in Table I.

Table- I: The Preferred Learning Pedagogical Approach

The preferred learning approach	Responses	%
Blended learning	19	51.35
face-to-face learning	12	32.43
Presentation by students	6	16.21

Blended learning is a mixed way of gathering the advantages of both face-to-face learning and online learning. One of the respondents said that "since the coronavirus situation, it is safe to keep distancing by learning online. However, some practical subjects such as the subjects with laboratory need a laboratory room with guidance from lecturers." Moreover, someone said, "learning in the real classroom is more efficient, and they can talk with others interactively." Therefore, mix learning like blended learning is the best way for this pandemic situation.

B. Subject's Characteristic

The study wants to know that what is the subject's characteristic that students think is suitable to be taught online. The responses are presented in Table II.

Table- II: The Suitable Subject's Characteristic

The preferred class period	Responses	%
Lecture without calculation, workshop and laboratory such as history	34	91.89
Computer programming	2	5.41
Every subject	1	2.70

C. Online Class Period

The study wants to know how long it should take for an online class period. 23 students of the 37 students said 2 to 3 hours per class period is suitable for online learning. 4 students said they have no idea, 2 students were misreported, and the others (18 students) said less than 2 hours per class period is suitable for online learning, as shown in Table III.

Table- III: The Preferred Class period

The preferred class period	Responses	%
2 to 3 hours per class period	23	62.16
less than 2 hours	18	48.64
No answers	6	16.21

One respondent mentioned that "it is quite difficult to be concentrated online by themselves for a long time." In addition, 6 students mentioned that the time from 10.00 to 18.00 is suitable for learning online.

D. Class Size (Number of Students in an Online Class)

The study wants to know that the number of students online has any impact on students or not? Should an online class in the university have a limit number of students in the class? 24 students of the 37 students said it should not be limited for the maximum number of students to study



online.

However, 13 students said the class should have a limited number of students in online learning because they want full attention from their lecturer when they have any questions, or they need some help.

E. Online Class Activities

The study wants to know what kind of activities that students prefer for an online classroom. The responses could be summarized in Table IV.

Table- IV: Online Class Activities

Class activities	Responses	%
Group Discussion	23	13.94
Watching a learning media, i.e. Video clip	31	18.79
Presentation by students	17	10.30
Question-Answer session	15	9.09
Doing their assignments	28	16.97
Quiz	20	12.12
Giving feedback for exercises and quizzes	31	18.79

It can be seen that the students in this generation like to watch a learning media such as a video clip. Moreover, they also want to get feedback for their work or quiz as well. However, the online activities could be changed or rotated with the other activities, including giving them time to do their assignments together, group discussion, quiz, and have a question and answer session.

F. Students' Assessment

The study wants to know what kind of assessment that students think it is suitable for an online classroom. The most preferred assessment was taking an examination or a quiz online, taking assignments such as a project or an exercise, and asking questions and answering in the class, respectively. The responses could be summarized in Table V.

Table- V: The Preferred Online Class Assessment

Class assessment	Responses	%
Taking an examination or a quiz online	22	52.38
Taking assignments such as a project or an exercise	16	38.10
Asking questions and answer in the class	4	9.52

G. Obstacles of Online learning

The study asked students about the obstacles they faced when they study online. The main obstacles that the students mentioned are: "it is difficult to concentrate on learning by themselves". Moreover, they said about the problems of internet connection and hardware broken; for example, the Internet is unstable or delayed, and the headphones did not work correctly.

VI. DISCUSSION

The study focuses on a design for the preparation of an online learning environment, mainly for the new lecturer of online learning. Because of the COVID-19 pandemic, the online classroom is forced to be used unexpectedly. The study shows that blended learning is likely to be the most preferred approach to learning. The reason should be that blended and online learning help to keep a distance for

protecting the virus infection. At the same time, they are flexible and time-saving learning approach. Moreover, the subjects' characteristic that suitable for an online class is a lecture without any laboratories. The reason is the subjects that have a laboratory have to do on the job training, and students want to consult their lecturers physically. Oppositely, for the subjects without any laboratory, the students can study by themselves and have less need for their lecturers' facilitation physically. The most suitable class period is 2 to 3 hours, and the preferred time for study is 10.00-18.00. Some students said it is difficult to be concentrated to study online by themselves longer than 2 hours, and it will be sleepy. Furthermore, it should not have a limit number of students in an online class. However, some students said the number of students should be limited because they want full attention and facilitation from their lecturers. Therefore, lecturers still have an essential role as a facilitator for their students online. In addition, the preferred class activities are watching learning media and getting feedback for the work. The students in this generation were born with media and technology, so they are familiar to learn new things with digital media such as video clip on the Internet. The preferred assessment is to have an examination online. Finally, it was found that some students had problems with class concentration, the Internet connection is delayed and unstable, and the hardware like headphone is not working correctly. If lecturers or universities know the issues, they could provide some help for their students, such as shortening the class period and providing some video clip for students to have self-study. Furthermore, they could provide their support by buying students the Internet service package or let them borrow some equipment like headphones. This study tried to provide a guide for online learning design by describing the metaphor factors such as subjects' characteristic, class period, class size (number of students), class activities and students' assessment that should be suitable for online learning environments but there are some limitations, especially the small sample size. Although, the sample size is small; however, the good responses could make an impact to design and plan for an effective online learning classroom.

VII. CONCLUSION

This study aims to provide user-centered design for online learning. It was found that blended learning is the most preferred learning pedagogical approach. The students still need help and interaction from their lecturers even though the technology is far forward as in an online environment especially, for the subjects with laboratories. The majority of students suggested that class size should not be limited in online learning. The other factors such as class period, activities and assessment in online learning were suggested as in the same direction as for the traditional classroom. Finally, lecturers and the university could take an important role to help and support their students to cope with their problems in an online learning environment.



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