Learning Experience During COVID-19 Pre-Pandemic

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Summary
COVID-19 has caused thousands of educational institutes to shut down. A traditional education mode which requires students to attend lectures in classrooms had switched for a long-distance online learning mode. Students and teachers were forced to switch to an online mode. Many of them were not prepared. The aim of this study is to reveal user experience in a virtual classroom during pre-pandemic of COVID-19, through learning experience assessment. A case study was conducted at one of the top universities in Jordan during pre-pandemic period. Self-assessment evaluation was used, in which an online survey was sent out to all students (N=155) who enrolled in the computer graphics and animation program. Seventy-five percent of them (n=117) responded to the survey. The study explored five important elements of learning experience: engagement, enjoyment, memorability, the satisfaction of the technology used, and negative academic emotions such as confusion, boredom, and distraction. The obtained results indicate in spite of students satisfied with the use of virtual classroom platform, they did not enjoy learning a virtual classroom and did not perceive that they could retain what they learn. Students also highly experienced boredom and distraction in a virtual classroom. The findings in this study suggest that the willingness defines one's experience.

Keywords:
Experience learning, User Experience, Covid-19, Learning Tools

1. Introduction

The COVID-19 was first identified in December 2019 in Wuhan, one of the provinces in China. On March 12, 2020, the World Health Organization (WHO) announced the COVID-19 outbreak as a pandemic. Since then the coronavirus has been known as a deadly virus and has spread to every corner of the world. COVID-19 has caused chaos, uncertainty, and a threat to all countries and territories around the world. Millions of people have lost their loved ones. As on April 8, 2020, there were more than 1.4 million people around the world got affected by the coronavirus in 184 countries, and at least 82,000 people have died, and as on June 2, 2020, there have been more than six million (6,374,962) people got affected, while the number of death cases has raised to more than 300 thousand (377,607) [1]. More than half of all the confirmed cases have been in Europe as illustrated in Figure 1. The COVID-19 transmits from human to human. It has not only affected people's health, but also all aspects of life. At the beginning of the Covid-10 storm, vaccine for COVID-19 was not available.

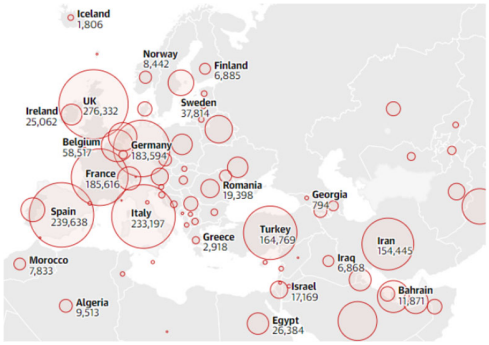

Fig. 1 Confirmed cases of COVID-19 in Europe, Middle East and North Africa as on June 1, 2020.

The WHO requested people around the globe to practice physical or social distancing [2], to slow the spread of COVID-19 among people. To exercise social distancing, governments around the world decided to close universities and schools. As a matter of fact, schools and universities around the world were closed before the cities and states were imposed on lockdown. The traditional learning and teaching which take place physically at those educational institutes had been suspended. A traditional education mode which requires students to attend lectures in classrooms had been drastically switched to a long-distance learning approach in the forms of virtual classrooms or normal e-learning modes. The main differences between virtual classrooms and the normal e-learning approach is that virtual classrooms opt for having an online meeting, while a normal e-learning approach does not require online meetings. For example, in the e-learning approach, the instructor would upload teaching materials such as text documents, videos, and audios, and students can view and download the posted materials at any time and at anywhere. Examples of well-known e-learning platforms are Coursera at coursera.org and Udemy at udemy.com, or other learning management systems such as Moodle and Blackboard. While in a virtual classroom, a teacher and students who supposed to meet at a physical classroom, meet on an online platform. The meeting between students and a teacher occurs recurrently as has been scheduled such as three hours per week. The online platform is normally online meeting tools or video conferencing tools. These include

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GoToMeeting, Skype, Google Meet, Zoom, Microsoft Teams, EasyTalk; to name a few, which are used for conducting a virtual classroom. Most of these tools offer features that are most needed to exercise an interactive setting such as a feature to give a lecture in real-time through microphone and camera and to share a presenter's screen. Other additional features such as chat, uploading files through the chat facility, and features that enhance the capability of a virtual classroom. During the COVID-19 pandemic, certain universities, colleges, schools around the world have opted for a virtual classroom mode rather than just a normal e-learning mode. Because it happens suddenly, most students and teachers of these institutions did not have a chance to prepare themselves for teaching and learning in a virtual classroom. In fact, it was a "force" rather than a "choice". It is an interest of this study to investigate whether a user's in control state (user's decision) plays a role for his/ her own experience. This paper is organized as follows. Section 2 presented related work to user experience, and elements of learning experience briefly, Section 3 presents the methodology of the study, Section 4 presents results and their analysis, and Section 5 concludes the study.

2. Related Work

User experience is a multidisciplinary study and is a special branch of the human-computer interaction field. The international standard on ergonomics of human-system interaction, ISO 9241- 210 [5] defines user experience as a person's perceptions and responses that result from the use or anticipated use of a product, system or service /it". User experience includes studies about users' emotions, beliefs, preferences, perceptions, physical and psychological responses, behaviors, and accomplishments that occur before, during, and after use. According to [6], user experience is a subjective matter because it is about individual thought and perception. User experience is an important bridge between a user and a system, product, or service for continual use. In the context of online learning, a virtual classroom which is defined by video conferencing tools, is categorized as the use of product and system. The use of audio participation in video conferencing tools is seen as a way to increase social presence. It is useful for a longer open-ended response [3]. The use of breakout rooms in a video conferencing tool can keep students in a small group. Authors [3], [4] proposed 4 guidelines for using breakout rooms. These include, monitor discussion, keep groups small and keep activity focused and brief. Researchers such as [6]-[8] had conducted a user experience study in the context of interactive e-learning or a virtual classroom in a normal situation, but to the best of the author's knowledge, this is the first effort to conduct such a study in an emergency. Researchers such as [7] and [9] described experience as a consequence of a user's internal state. User experience in learning can be assessed through learning experience such as engagement, enjoyment, memorability, the satisfaction of the technology used, and negative academic emotions [11-37].

3. Methodology

This study explored elements that contribute to learning experience such as engagement [10], memorability, enjoyment, satisfaction [5] and negative academic emotions [11]. The authors used a questionnaire survey for the self-assessment approach to evaluate UX.

3.1 Study Setting

The higher ministry of education in Jordan had decided to suspend studies in all educational institutions, including schools, colleges, and universities on March 15, 2020, as a response to the uprising of the spread of COVID-19. The educational institutions swapped immediately from a traditional classroom to an e-learning model. Universities had subscribed to a video conferencing tools such as Zoom or Teams for academic staff students to conduct a virtual classroom. Both applications have similar features. In this study, students and academic staffs used Zoom. The virtual classroom setting is based on the features offered by Zoom as shown in Figure 2.

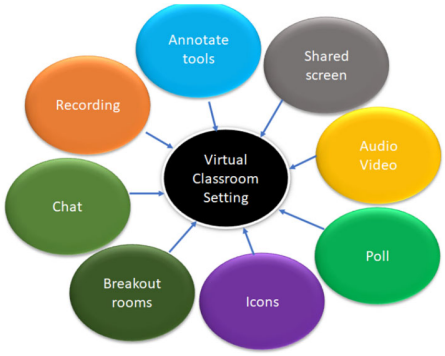

Fig. 2 A virtual classroom setting based on Zoom feature

The authors formulated five major research questions (RQs) as a guideline.

- RQ1: Does a virtual classroom support engagement
- between professors and students?
- RQ2: Do students achieve enjoyment in learning?
- RQ3: Does taking lessons in a virtual classroom increase students' memorability
- RQ4: Do students satisfy with the platform of a virtual classroom platform?

- RQ5: Do students experience negative academic emotions in a virtual classroom

3.2 Survey Items

The survey contains eleven items that were dedicated to find answers for the mentioned research questions (RQ1 - RQ5). According to [12], the quality of student-professor relationships predicts student engagement. Therefore, student engagement was explored through a healthy relationship that occurs between students and a course instructor (RQ1). Students' perception of a student-professor relationship determines whether student engagement exists or not in a virtual classroom. The items are listed below.

- RQ1-1: I have a better connection with my course professor in a virtual classroom
- RQ1-2: I have a chance to ask more questions to my professor in a virtual classroom.

Enjoyment is a positive feeling which can be stimulated through an environment or a setting, which also makes a person's memory stronger. This feeling is essential for students and it has a great impact on learning. Enjoyment (RQ2) was investigated through a self-assessment report using two items (RQ2-1 and RQ2-2). The items were randomly arranged in the survey questionnaire.

- RQ2-1: I enjoy learning through a virtual classroom.
- RQ2-2: Taking a lesson in a virtual classroom is exciting.

In a learning context, memorability or retaining what a learner learned is a key factor to success. This factor (RQ3) was investigated through two items as in the following lists.

- RQ3-1: I am able to remember what I learn in a virtual classroom more than in a traditional classroom.
- RQ3-2: I can learn in a virtual classroom more than a traditional classroom.

According to [11] students experience different kinds of emotions in an academic setting (classrooms) such as pride, feeling happy, feeling bored, confused, and distracted. Despite the fact that negative academic emotions also have a great impact on students' performance and achievement, these emotions have been neglected by educational psychology. In this study, the authors studied three types of negative academic emotions. These include distraction, confusion, and boredom. Three straight forward items were used in the questionnaire survey.

- RQ5-1: I often get confused in a virtual classroom
- RQ5-2: I often get bored in a virtual classroom.
- RQ5-3: I often get distracted in a virtual classroom

3.3 Data Collection

A questionnaire survey was published using a Google Form. The URL of the survey was sent through emails to all identified students (N=155) who enrolled in the Computer Graphics and Animation program. The survey was sent after all virtual classrooms ended; respondents of this study had participated in a virtual classroom for a duration of 9 weeks (with 3 hours class session per week). The Likert scale which strongly agrees (SA), agree (A), neutral (3), disagree (D), and strongly disagree (SD) were used in collecting data for RQ1, RQ2, RQ3, RQ4, and RQ5.

4. Result

Out of 155 students, 117 (n=117) students responded to the survey, where 74.4% of the respondents were female. Despite the fact that, Computer Graphics and Animation is a four-year study program, some of students took longer than that. Demographic data for the year of study of respondents were also collected. Figure 3 shows the distribution of the respondents according to the year of their study. More than half of the respondents were in the first to the third year of their study. This proportion reflects the numbers of enrollments in each year.

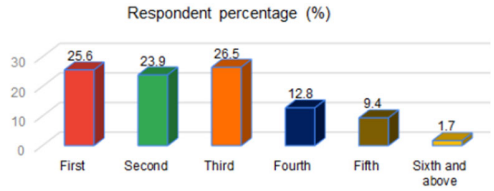

Fig. 3 The distribution of the respondents according to the year of their study.

Data of type of devices used for attending a virtual classroom was also collected for the purpose of investigating whether students seriously equipped themselves for their classes. Four common computing devices were used; a desktop computer, a laptop computer, a tablet computer and smartphone were listed. The laptop is commonly used as 70.1% of respondents selected a laptop computer as shown in Figure 4. This suggests that a laptop computer is the most convenient device for attending a virtual classroom. The following subsections presents data analysis and results of the survey questionnaire.

3.1 Engagement

Researchers have studied student engagement through three primary types of engagement: emotional, cognitive, and behavioral [13-15]. According to [16] emotional, cognitive, and social forms of student engagement are important factors for students to perform well in university courses.

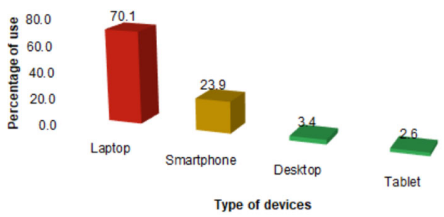

Fig. 4 The distribution of devices used among students in a virtual classroom

Emotional engagement focuses on the extent of positive negative) reactions [17] towards academic settings such as course instructors, classmates, schools, or universities [14], [18]. While behavioral engagement behavior includes efforts, participation, and attention in academic activities [14], [15], [18] and [13] describes engagement as "the holy grail of learning" because it has direct and positive impacts on students' motivation and academic performance [19]. Researchers had been using various kinds of measurements to measure engagement such as brain imaging [20], response time, eye tracking [21], self-report [14], discourse analysis [22] and observation. For instance, [15] investigated student engagement by observing students' interaction with peers and teachers. In a physical or traditional classroom, student engagement can be analyzed through their non-verbal cues such as their hand gestures, facial expressions, gestures, and body postures [19], however, these cannot be observed in a virtual classroom. In a virtual classroom, students' perceptions and feelings towards their relationships with their course instructor and how they perceive their behaviors or actions in a classroom, such as asking questions were explored in this study. A student-professor relationship represents student engagement. If students feel that they are close to their course professor, they will not feel isolated and left alone and this may trigger them to ask questions. Opportunities to ask more questions during class time are also indicators for cognitive and social forms of engagement.

3.2 Enjoyment

Enjoyment in learning is about a pleasant feeling of the learner during the learning process in which motivates the learner to complete the task to persevere the feeling. According to [23], happiness and enjoyment have a positive effect on social behavior, learning, and memory. They claimed that enjoyment positively affects students in memorizing information. Classrooms are an emotional setting. Researchers have a great interest in studying emotional experiences such as enjoyment, anxiety, boredom, hopelessness, and confusion. These emotions are connected to students' feelings of well-being in classrooms and directly affect their learning process and achievement. Students and teachers perceived fun and enjoyment experience motivated them to attend and learn in classes. Furthermore, fun and enjoyment experience had been also identified as a way to build a socially connected learning environment and had been proven that enjoyment also give a great impact on adult learning [24]. The obtained results for the items of RQ2-1 and RQ2-2 are presented in Figure 6. The mean scores for RQ2-1 and RQ2- 2 are 2.47 and 2.25, lower than neutral, indicating that most respondents perceived that they did not enjoy in a virtual classroom.

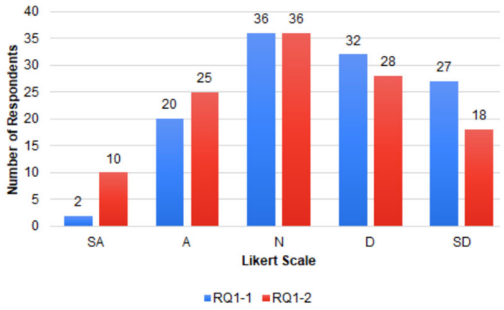

Fig.5 Self-assessment result for engagement

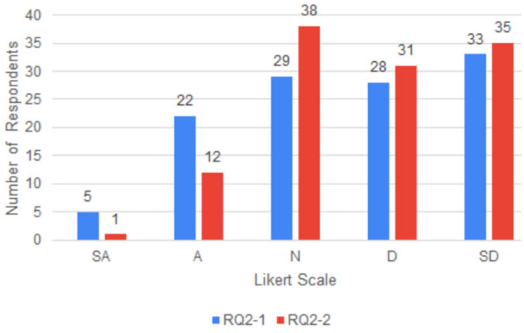

Fig.6 Self-assessment result for enjoyment

3.3 Memorability

Emotions play an important role in the cognitive processes in humans, including perception, memory, and attention. Memorability is the state of being easy to remember and it is essential in the learning process. This study investigated whether students perceived that they can learn (RQ3-1) and remember (RQ3-2) more in a virtual classroom compared to a traditional classroom. The obtained results were presented in Figure 7. Out of 117 respondents, 57.3% of them had answered disagree and strongly disagree towards RQ3-1 and 65.8% of them had answered disagree and strongly disagree for the RQ3-2. The results also reveal that more than 50% of the respondents did not perceive that the virtual classroom helps their memorability. Authors in a number of studies such as [25], [26], [27], [28], [29], [30], and [31], suggested that emotion plays a role at various stage of memorability.

Table 1: Mean score for the enjoyment and memorability

RQ	RQ2-1	RQ2-2	RQ3-1	RQ3-2
MEAN SCORE	2.47	2.25	2.26	2.41

Table 1 shows the mean score of RQ2 and RQ3; all of the items of RQ2 and RQ3 scores are below 3. This suggests there is a causal association between an enjoyment feeling (RQ2) and memorability and (RQ3) in a virtual classroom. If students enjoy learning in a virtual classroom then they can memorize what they learn better. Doubtlessly the physical instructor's presence can compete with words and visuals drawn on the board for students' attention [21] and this may also increase memorability.

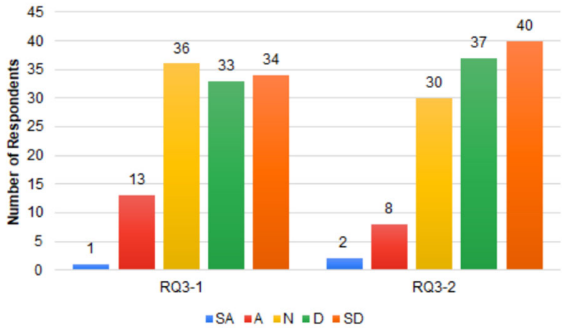

Fig.7 Self-assessment result for memorability

3.4 Dissatisfaction

According to [32] satisfied students appear to be engaged, responsive and motivated. Previously, [33] mentioned that effective technology tools in online courses contribute to student satisfaction. In this study, student's satisfaction towards virtual classroom is accessed through their perception towards efficiency and sufficiency as well as the ease of use of the technology used (Zoom). The obtained results are presented in Figure 8. The result shows that about 69% of respondents had answered as strongly agree and agree to the ease of use of the technology (RQ4-2) and 40% of the respondents strongly agreed and agreed that the technology used is efficient and sufficient enough (RQ4-1).

The mean score for RQ4-1 is 3.3, while RQ4-2 score is 3.7. The mean scores suggest that in spite of the Zoom app was not mainly designed and developed for a virtual classroom, it is good enough to be used as a platform for a virtual classroom. This also suggests that any type of video conferencing tools which has similar features to Zoom (Figure 2) is suitable enough to be used as a platform for conducting a virtual classroom.

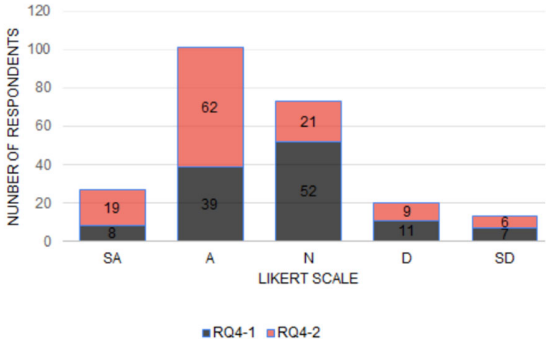

Fig.8 Self-assessment result for satisfaction

3.5 Negative academic emotions

Negative academic emotions are studied through three types of emotion: confusion, boredom, and distraction. Confusion is one type of emotional response that occurs when a person running into a problem. Researchers such as [34] associated confusion with blockages or impasses in the learning process. Confusion causes students to lose their focus. Because of difficulty in identifying and detecting emotions like confusion, responding to this type of negative academic emotions to give support or feedback is also challenging. Despite the fact that it is relatively easy for an experienced teacher to detect student confusion in face-to-face settings [35], [36], it is almost impossible in a virtual classroom. The authors assessed student confusion through a self-assessment report as in item RQ5-1. Figure 9 presents the obtained result which shows that out of 117 respondents, 52 (44%) of them were strongly agreed and agreed, and on the other hand only 36 (31%) of them were strongly disagreed and disagreed with the fact that they often get confused. The remaining number of respondents (29 students) opted for a neutral option. This suggests the majority of students often get confused in a virtual classroom.

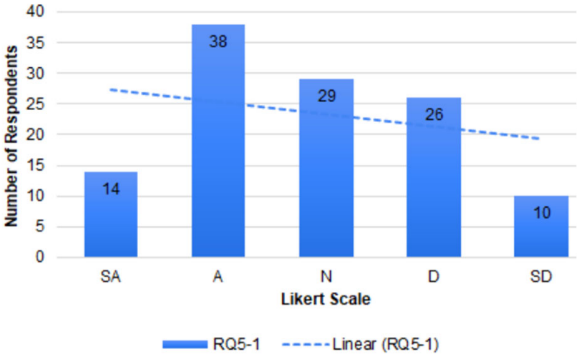

Fig.9 Self-assessment result for confusion in a virtual classroom

Authors in [17] stated boredom as an experience because of a lack of activity or being disengaged from a satisfying activity. Boredom is a negative academic emotion that affects students in many ways, such as students become less attentive, easy to get stress when their names are called out, hard to understand new teaching materials, do not feel challenged, and finally, it may also affect their health. This negative feeling can also occur during activity and also when there is no activity in which to engage. Figure 10 presents the obtained result of boredom assessment. The result shows, out of 117 respondents, 87 (74%) of them are facing boredom in a virtual classroom.

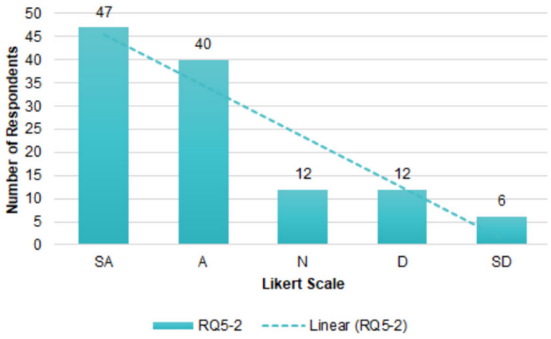

Fig.10 Self-assessment result for boredom in a virtual classroom

Distraction is one of the negative academic emotions which can make the learning process harder. It is normally caused by people or technology (which is also known as a digital distraction). Digital distraction is prevalent in virtually every environment people operate and has been a concern in both a workplace and an educational environment. In the context of an educational environment, digital distraction breaks the concentration during the studying process [37] which leads to a poor understanding of the concepts. Authors in [38] argued that digital distraction negatively impacted the learning process inside or outside the classroom [17].

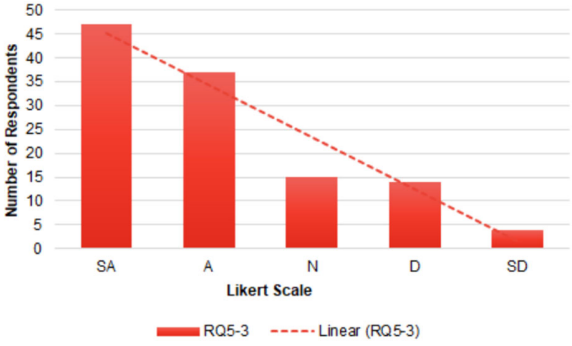

Fig.11 Self-assessment result for distraction in a virtual classroom

Table 2: Mean scores for negative emotions

RQ5	RQ5-1 Confusion	RQ5-2 Boredom	RQ5-3 Distraction
MEAN SCORE	3.2	4.0	4.0

Table 2 presents the mean scores for negative academic emotions assessment. These results suggest that respondents highly experience boredom, and distraction in a virtual classroom. The mean score for confusion is also higher than 3, suggesting that respondents perceive confusion. There is no doubt that a traditional classroom is more appreciated because regular attendance helps students to improve their physical fitness, mental alertness, and social fitness.

5. Conclusion

This paper has successfully addressed all the research questions in the motivation section. The findings suggest that students do not have a better engagement in a virtual classroom, they did not enjoy learning, and the virtual classroom does not help them to have a better memorability. Furthermore, the findings of this study also suggest that there is a causal association between enjoyment and memorability. Social interaction is so crucial in student engagement. In a virtual classroom, techniques such as breakout rooms, paired activities, inductive interactions, inclusive response features, close-ended questions should not be neglected by professors to increase student engagement. In spite of students did not experience engagement, enjoyment, and better memorability, they did agree that the use of Zoom application as a platform for a virtual classroom is sufficient enough. This also suggests that any video conferencing tool which is able to demonstrate the same features as of the Zoom application is sufficient enough to be used as a platform for a virtual classroom.

This study also found out that students experienced academic negative emotions in a virtual classroom such as boredom, distraction, and confusion. This can be also associated with a lack of physical fitness and social fitness. The low mean scores for enjoyment or memorability and the high mean score for academic negative emotions such as boredom and distraction suggest a causal association between these emotions and learning processes, consequently, affect the learning process. If students get bored and distracted, then they do not enjoy the learning process, therefore, they cannot retain what they learn.

Contrarily, studies of [6] and [8] suggested that students were engaged and enjoyed their lessons in a virtual classroom. The former study reported that students took computer programming lessons in a virtual classroom voluntarily, while in the latter study, students who have

family and financial constraints to learn midwifery and maternity abroad were given the same opportunities through a virtual classroom. In the context of this study, students were used to take their lessons in a physical classroom mode, and then they were directed to continue their lessons in a virtual classroom because of the COVID-19 pandemic. This indicates that a factor of readiness and willingness to take lessons in a virtual classroom also affects user experience. This suggests that the success of teaching and learning in a virtual classroom does not depends only on the classroom setting, but also on the choice of options. Consequently, we can conclude that user's decisions in using or participating in any type of services, products, and systems play an important role for a user to have either a positive or negative user experience. In this study case, users do not have control over the decision made, and this has contributed to negative user experience in a virtual classroom.

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