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Evaluation of E-learning Experience in the Light of the Covid-19 in Higher Education

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Abstract

Covid-19 has been stated as a worldwide outbreak of pandemic disease and crisis. The Covid-19 pandemic has dramatically affected the teaching and learning experience at universities and schools. In response, governments and higher education institutions around the world put significant efforts to ensure that students continue to obtain the best possible level of education and learning outcomes. As such effective evaluation of e-learning is essential in order to ensure that students get proper learning and education especially during the current circumstances of Covid-19. Our study was carried out to determine the main elements and factors related to students' satisfaction and quality of e-learning during the Covid-19 pandemic era based on various aspects and dimensions of e-learning. The main findings of the study indicated that students satisfaction and evaluation of the e-learning experience during the pandemic were not promising. Therefore, higher education institutions should reconsider their efforts and approaches to improve the quality of e-learning and the learning outcomes achieved. For example, IT infrastructure, Internet access, and particularly network connectivity could be improved to support fully online courses. Such elements need to be addressed because of the prevalence of the current Covid-19 pandemic which perhaps will lead to e-learning occurring for a long time. With the move to e-learning, the size of the class (the number of students in each class) has been increased leading to other significant challenges related to communication and participation in the class and reducing the possible interactivity for each student. Furthermore, it has been also observed that new students need relevant training on IT and e-learning applications to ensure sufficient use and utilization of these applications in their e-learning journey.

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1. Introduction

Nowadays, the Covid-19 pandemic is a critical worldwide health issue due to its rapid transmission. Therefore, as Covid-19 has been stated as a global outbreak of pandemic disease and crisis, it has disrupted all industries and sectors worldwide, including the education sector. The Covid-19 pandemic has dramatically affected teaching and learning at universities and schools. In response, governments and higher education institutions worldwide put significant efforts to ensure that students continue to obtain the best possible level of education and learning outcomes. From this movement, e-learning strategies became emerging as the most accessible means for education. As such, incremental changes have been occurred to education by creating the relevant online learning environment, infrastructure, and resources. Apart, this can be through recognizing all available options and solutions and through using all accessible technological tools despite the constraints created by Covid-19 pandemic [1].

Meantime, Covid-19 has brought about a significant disturbance in the schooling framework [2]. Subsequently, higher education organizations worldwide have been focusing on exploring and authentic activating e-learning as conventional learning is unreasonable under Covid-19 guidelines [3]. It is worth mentioning that the sudden shift to e-learning with the lack of experience of teaching online tools for instructors might affect teaching [4]. The conventional classroom performs an essential part in the teaching-learning process. Researchers and analysts deeply involved in such a field of study are perseveringly searching for the ideal ways to keep up with its worth and viability [5]. Nonetheless, the blast in innovation multiplied the students requirements with being unhappy with what they realized in the study hall. Countless understudies were looking for one more wellspring of learning. Therefore, e-learning is one of the major factors that exceptionally added to advancing a more popular system for learning [6]. The flexibility and simplicity of availability that the e-learning contributes, besides the utilization of various created tools from social networks, chat rooms...etc., raised its demand and fame [7]. E-learning has been activated in Jordan since the beginning of the pandemic in March 2020. Students have been suspended from the university as part of precautionary measures to achieve social distancing to prevent the spread of the virus. The ascent of the new pandemic Covid-19 prompted the universities to close (Face-Face Teaching). Thus, the alteration from the conventional classroom to e-learning was the best choice for saving the scholastic year. Numerous analysts have widely concentrated on the effect of e-learning on education. They have observed that e-learning has various advantages, for example, guaranteeing the continuousness of education [8, 9] and decreasing the significant expenses related to conventional schooling. Restrictions like education techniques, planning, and time issues are due to different locations of students and instructors [10]. Subsequently, the higher education institutions focused on e-learning, and they began continuously to enlist it in the teaching-learning system as an important needing. In view of that, this study endeavors to examine the attitude of a university in Jordan toward e-learning and if those students are with moving from conventional learning to e-learning. Overall, this study aims at evaluating the e-learning experience of students and their level of satisfaction with the learning outcomes and learning tools during their e-learning journey.

1.1. E-learning in Jordan

The progress in innovation technology with learning tools provided the induction of another sort of learning defined as e-learning. E-learning is one of the most important modern educational tools, where classroom lessons and methodological information are transferred through technology means from the educational institution to the student. In light of the current circumstances of the spread of the Coronavirus, which has swept the whole world, the distance education process has been activated in Jordan and the students attendance of schools has been stopped as a precautionary measure to achieve distancing to prevent the spread of the virus. The beginning of e-learning in Jordan with web networks began in January 2003 with an association with many organizations' public-private sector partnerships [11]. The covid-19 pandemic has forced Jordanian universities to include e-learning models as a main part of teaching. Researchers have exposed an abundance of studies concerning e-learning in the covid-19 era. In [12] authors have studied the challenges, limitations, and satisfaction rates of medical students during their clinical year. They found that the students faced a considerable challenge with internet quality and its covering. In [13] authors have studied the view of Jordanian academic ophthalmologists with e-learning for the undergraduate course. Their study has summed up, the main advantage of e-Learning is the flexibility to time and place; in contrast, lack of skills was the significant barrier for e-learning. Many other studies have been done to study the impact of Covid-19 pandemic on e-learning in Jordan [14, 15]. Toward the start of the pandemic, the university utilizes a nonsynchronous model of e-learning

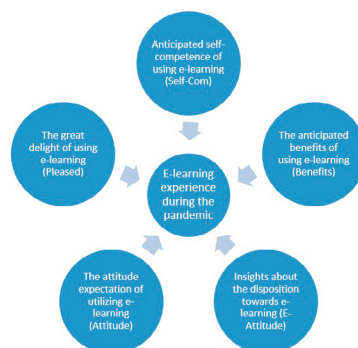


Fig. 1. Research Model

which authorizes users to interact via video chats including “Zoom” to finish the course syllabus. Afterwards, the starting new college year, the university utilizes one more model of e-learning which is “Microsoft Teams”. To date, the university still combats with e-learning as a result of some of the common issues that show up each time can be summed up as follows:

- Students without a computer or PC.
- Instructors are uninvolved or unfamiliar with this sort of adapting either due to the absence of information or because it was not official as a teaching device in Jordan.
- Technical Challenges.
- Lack of Internet access and poor internet, where 16% of students in Jordan lack Internet access [16].
- Low motivation and educational motivation, reflecting the absence of interest in e-learning for students.

1.2. Model Development

Effective evaluation of e-learning is essential in order to ensure that students get proper learning and education specially during the current circumstances of Covid-19. This requires relevant instruments to obtain students inputs and feedback in order to improve their learning experience and ensure they get proper knowledge in their degrees. Our study is centralized on students evaluations of various aspects of e-learning including as illustrated in the study model. All Items and concepts included in the research instrument were selected from previous relevant studies and based on proper scan of relevant literature [17, 18, 15]. The five main factors for our analysis, are illustrated in Table 2.

Specifically, Liaw *et al.* [18] established the first four factors to explore individuals’ attitudes and behaviors in using e-learning without any circumstance. Each factor has several items and they used a 7-point Likert scale. Here, these factors, along with some of their elements that, from our point of view, are influential in studying student satisfaction and evaluating the e-learning experience during the Covid-19 pandemic, have been highlighted. Further, we used the fifth factor along with some of its elements accordingly to [17]. Notwithstanding, the well-known “Likert scale” was used, five points (5=strongly agree, 4=agree, 3=neutral, 2= disagree, 1=agree). Figure 1. Illustrates the overall of study model.

2. Research methodology

The study was conducted in a Jordanian university from Sep-Dec 2021 Data were collected data using questionnaires from university students about their experiences with e-learning during the Covid-19 pandemic. After elimination of incomplete and questionnaires, 264 questionnaires were analysed. The university’s name and identity were omitted for integrity and privacy reasons. The questionnaire was sent to all students at the university using the university email system and after the right approval obtained from the university administration. Participation in the study

was optional and all participants were informed/filled the consent form of the study instrument. All answers were destined to be confidential and no personal or identity data were required.

2.1. Sample Characteristics

In this subsection, demographic questions were answered, and open-ended questions. Table 1 illustrates the demographic questions. It can be observed from Table 1 that the gender of respondents of the questionnaire is 62.1% of females are while the remaining 37.9% are male. Most answers were collected from students of first-year. Students who do not have a PC represented 61.4%, so 83.7% used their smartphones for study. The students were asked about

Table 1. Demographic questions of this study.

		Number	Percent
Gender	Female	164	62.1
	Male	100	37.9
School Year	First Year	194	73.5
	Second Year	23	8.7
	Third Year	13	4.9
	Fourth Year	23	8.7
	Master Student	11	4.2
Do you have a PC?	Yes	102	38.6
	No	162	61.4
What tool do you use at home to study online?	Smart Phone	221	83.7
	Computer	43	16.3
Total		264	100

the main challenges they face during e-learning. The most notable challenges were poor Internet and technical issues, i.e., malfunctions in learning applications and Internet connection quality in some areas. Some students exposed that not conveying ideas during the explanation smoothly as if the learning was in person, especially for some courses which need practical labs. Another considerable challenge was affirmed cheating at exams, i.e., relying on having the materials in front of you during the exam, thereby affecting students’ average score. Moreover, the inability to adequately communicate between the students and the instructor. Regarding the students’ suggestions for developing e-learning, the most notable recommendation was to improve e-learning infrastructure and holding training courses for students, university professors, and all those involved in the educational process. The students have been exposed to another suggestion that combines the education process with face-to-face education. Thus, reducing the number of students in each class facilitates interaction between the student and the instructor.

2.2. Analysis and Findings

Our study was carried out to determine the main elements and factors related to students’ satisfaction and quality of e-learning during the Covid-19 pandemic based on various aspects and dimensions of e-learning. The main results reported in this paper represent basic results of the study. It is worth to note that this is a part of a large project being conducted in higher education in Jordan. The main findings here are about one large university in Jordan, which has over 10000 students. The results showed a low level of student satisfaction with e-learning experience as illustrated in the mean and standard deviation vales as majority of them had either undesirable satisfaction or low level of satisfaction. Therefore, universities should make some efforts to improve the quality of e-learning and the factors affecting e-learning experience of all students. Figure 2 shows the descriptive Analysis of the used factors, along with their elements. It is clearly can be observed that, the students are agreeing with some items in the insights about the disposition towards e-learning systems such as the e-learning is essential during this pandemic (E-ATTITUDE4). The students are also agreeing about the attitude expectation of utilizing e-learning “using e-learning as a standalone educational tool” (ATTITUDE2). On the other hand, the students are mostly neutral with other factors with their items such as PLEASED, SELF-COM, and Benefits which we think their answers were because the total sudden convert

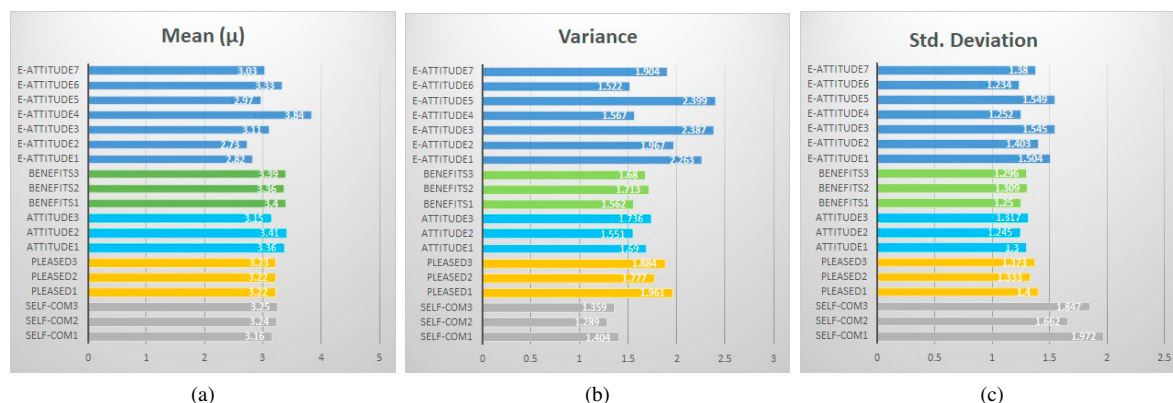


Fig. 2. Descriptive Analysis of E-learning Experience based on the factors and their items, including, (a) Mean (μ). (b) Std. Deviation. (c) Variance.

Table 2. The description of used factors and their mean values for our study.

Anticipated self-competence of using e-learning (Self-Com):	Mean (μ)
•Self-assured while using the e-learning system.	3.16
•Self-assured while using e-learning models.	3.24
•Self-assured while using online learning content.	3.25
The great delight of using e-learning (Pleased):	
•I have enjoyed using e-learning as a learning aid.	3.22
•I have enjoyed using e-learning models.	3.22
•I am satisfied with the e-learning content.	3.23
The attitude expectation of utilizing e-learning (Attitude):	
•I propose to use e-learning to aid learning.	3.36
•I propose to use e-learning as a standalone educational tool.	3.41
•I propose to use e-learning content to assist my learning.	3.15
The anticipated benefits of using e-learning (Benefits):	
•I think e-learning contents are helpful.	3.40
•I think e-learning is a valuable educational tool.	3.36
•I think e-learning contents are informative.	3.39
Insights about the disposition towards e-learning (E- Attitude):	
•Better studying online than studying in a traditional classroom.	2.82
•Lessons taught by teachers through e-learning are better than in a traditional classroom.	2.73
•I'm with e-learning	3.11
•E-learning is essential during this pandemic.	3.84
•E-learning could replace traditional classrooms after the pandemic.	2.97
•E-learning is an addition to the traditional classroom	3.33
•I support the combination of e-learning and face-to-face education.	3.03

from traditional class room to e-learning and due to the difficulties of the using of e-learning system. Furthermore, the comprehensive descriptive statistics including Means (μ), Standard Deviations (Std), and Variance (Var) were obtained for the main factors of this study, as shown in Table 3. The scale was rated as: 1-1.8 = strongly disagree, 1.81-2.6 = disagree, 2.61-3.4= neutral, 3.41-4.2 = agree and 4.21-5 = strongly agree.

2.3. Validity and Reliability

Moreover, both reliability and validity of this study were examined as shown in Table 4. Reliability was examined using Cronbach’s coefficient alpha (α). The Cronbach’s alpha for all factors and items were obtained as shown in Table 4. In this study, the cut-off point is 0.88 and above. It can be observed that Cronbach alpha scores ranged from 0.89 for the E- Attitude to 0.95 for the benefits, which reflects associated with excellent reliability. Our Model was

Table 3. Descriptive Statistics of e-learning attitudes for university students in Jordan during Covid-19 pandemic.

Factor	N	Range	μ	Std	Var
Self-Com	264	5.00	3.219	1.277	1.63
Pleased	264	5.00	3.226	1.286	1.65
Attitude	264	5.00	3.306	1.191	1.42
Benefits	264	5.00	3.383	1.233	1.52
E-Attitude	264	5.00	3.118	1.106	1.22

validated using both discriminant validity and convergent validity. The square root of the (AVE) was as conducted to assess the discriminant validity. Discriminant validity can be assessed using the square root of the Average Variance Extracted (AVE) for each factor; the factors are different if the AVE for the factors is greater than their shared variance. The results shown in Table 4 demonstrated that discriminant validity was met. All values in parentheses (square root of the Average Variance Extracted) are higher than the shared variance. Convergent validity (CV) was assessed. It can

Table 4. Correlation of factors, average variance extracted, and Cronbach’s alpha coefficients.

Factor	*AVE	Self-Com	Pleased	Attitude	Benefits	E-Attitude	Cronbach’s α
Self-Com	0.89	(0.94)					0.93
Pleased	0.88	.805**	(0.93)				0.93
Attitude	0.85	.797**	.846**	(0.92)			0.91
Benefits	0.92	.776**	.857**	.869**	(0.95)		0.95
E-Attitude	0.62	.718**	.777**	.801**	.796**	(0.79)	0.89

*.Average Variance Extracted AVE. Numbers in parentheses are the square root of AVE.

**.. Correlation is significant at the 0.01 level (2-tailed).

be achieved when all items in a measurement model are statically significant, factor loading 0.60 or above. While the average variance extracted (AVE) for each factor is recommended to be 0.5 or higher [19]. In this study, the factor loadings surpassed the recommended values, indicating that the convergent validity was satisfied.

3. Conclusion

With the growth of using e-learning during Covid-19 pandemic and the advances in technologies for distance learning. Nevertheless, of those benefits, this study sought to distinguish factors that impact an understudy’s acceptance of the e-learning framework. Our research model showed a high level of validity for the concepts measured in this study. Mostly, students preferred hybrid teaching models (combining both e-learning and face-to-face learning) instead of just e-learning. This might be explained as students require further explanation and knowledge related to some teaching modules and/or prefer some face-to-face session to overcome learning difficulties for some modules. Noteworthy, the most significant issues that majority of students reported are technical problems and Internet issues which affect connectivity and interaction of students, leading thus to dissatisfactory level of knowledge obtained compared normal learning experience. The study indicated that students satisfaction and evaluation of the e-learning experience during the pandemic were not promising. They expressed low satisfaction level of learning outcomes and knowledge obtained through online education. Therefore, higher education institutions should reconsider their efforts and approaches to improve the quality of e-learning and learning outcomes achieved. For example, IT infrastructure, internet access and particularly network connectivity could be improved to support full online courses. Such elements need to be addressed because of the prevalence of the current Covid-19 pandemic which perhaps will lead to e-learning occurring for a long time [20]. Last but not least, students’ suggestion in the open-ended part of the questionnaire brought to our attention some important notes. With the move to e-learning the size of class (number of students in each class) has been increased leading to other significant challenges related to communication and participation in the class. This reduces the possible interactivity for each student, which effects students learning and understanding of class materials. Furthermore, it has been also observed that new students need relevant training on IT and network tools and applications that are used to ensure sufficient use and utilization of these tools and applications in their e-learning

journey. Therefore, University needs to reconsider reducing the number of students in each class and provide planned training to e-learning tools in use to all students before the semester starts.

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