

Original Research Article

Investigating Online Learning Satisfaction in Jordan Schools during the COVID-19 Outbreak: The Student Perspective

Abstract

In the past two years, the flare-up of the COVID-19 pandemic in Jordan has turned traditional education into online teaching, which impacted the education quality. This paper uses an integrated model of UTAUT model, ISS model, and quality of interaction to study the online learning satisfaction in Jordan from the students' point of view during the COVID-19 outbreak. For such purpose, a questionnaire survey was distributed among students from five different Jordanian schools to gather the data, and the SmartPLS tool was used to analyze this data. The results showed that all the employed factors in the proposed model significantly influenced the students' satisfaction with online learning throughout the COVID-19 pandemic proliferation. Thus, these research results will be a significant reference for educational institutes, decision-makers, developers, and researchers on the significant factors that influence students' satisfaction with online learning, which in turn can improve the development of online learning systems.

Keywords: online learning; students' satisfaction; education quality

1. Introduction

Face-to-face classes were suspended for about one million students globally due to the widespread COVID-19 pandemic, which led to held up educational programs worldwide. Shortly after, online learning using ZOOM, Skype, Teams, and other platforms was introduced as a substitute for traditional classes in several countries [1]. The spread of the pandemic necessitated the use of online learning in order to maintain educational programs and regular teaching. In Jordan, the Ministry of Education declared in March 2020 that teaching would be conducted online via different platforms [2]. Nevertheless, employing these platforms has resulted in many issues, including system jams and live broadcast failures. Thus, it is vital to assess if these platforms can meet the demands learning process and provide high-quality learning activities. Besides, based on the study results, making recommendations and suggestions to improve the development of these platforms.

Moving from traditional education to online education has come up with questions about the quality of the education process and students' satisfaction [3]. Although there are several notable instances of online learning in education, it is still challenging to anticipate and evaluate its effect on user satisfaction [4]. Currently, researchers in different countries have performed research studies to evaluate the online learning process, using different approaches to determine the satisfaction of students with online learning platforms. For example, Koceska and Koceski [5], conducted research using an integrated model draw on TAM and ISS models to study the effect of online education platforms on students' satisfaction and results. The findings revealed that good system quality and information quality would enable students to use online education platforms more actively. Also, ease of use and perceived usefulness are significant factors that affect the students' satisfaction and use. Students' satisfaction, in turn, contributes to good students' outcomes. Sukendro et al [6], conducted a study to investigate the factors predicting the use of

online education platforms during (COVID-19) among sport undergraduate students in Indonesia. The theoretical framework of this study has been built based on the TAM model and an external variable (facilitating condition). The findings confirmed that most TAM-based relations are significant. Also, this study found that many students don't have adequate technology infrastructure (facilitating conditions) to start online education. However, previous research on student satisfaction did not consider the new variables that came up by the pandemic, like facilitating conditions, performance expectancy, and students' interaction. In addition, the culture and circumstances in Jordan are different from other countries when studying the students' satisfaction. Therefore, it's important to study the factors that determine the students' satisfaction with online education in Jordan. This research employs an integrated model of UTAUT, ISS, quality of interaction to study the impact of online education on the students' satisfaction in Jordan.

2. Overview

2.1 Online Learning Platforms

Many experts and researchers from different countries have studied online education due to the rapid growth of this sector. The following are some examples of these studies: Researchers in [7] argued that online courses need to be rethought to encourage students to improve their confidence in studying from a distance and actively and interactively involving them in online activities. Hrastinski [8] theorized that enhancing online education needed enhancing online learner engagement. According to authors in [9], there is a growing interest of people to learn online, yet the interest of colleges and universities is declining. Also, to alleviate the negative consequences of online learning, they thought it was necessary to discuss the process from the students' point of view. In a study by [10]. Online education satisfaction was investigated based on the number of students who attend class, the percentage of students who do their homework, and the advancement in their grades. The author in [11] conducted a study using the TAM model to investigate online education satisfaction. The data was collected using a questionnaire from 172 students, and the result revealed that student satisfaction is mainly defined by perceived usefulness, course quality, platforms quality, and the predicted achievement.

As shown by the findings above, many researchers and academics have studied online education using many assessment models. However, many additional issues emerge in the new type of online education when carried out amid an epidemic. These necessitate include additional variables influencing customer satisfaction in the research study. Thus, to discover novel variables influencing student satisfaction, this study integrates UTAUT, ISS, and relevant factors from the literature that may more accurately represent student satisfaction during the COVID-19 outbreak.

2.2 Students satisfaction

The extent to which a person feels pleased or disappointed as a consequence of a comparison between the perceived effect of a product or service and the value that was expected is defined as user satisfaction. It is often considered to be one of the most significant indicators for an information system's successful application [5]. When the usage of an information system is mandated, it is particularly important to measure user satisfaction.

2.3 Unified Theory of Acceptance and Use Technology (UTAUT)

The UTAUT model is a holistic model since it has summarized almost all variables contained in the previous models into four factors (performance expectancy, effort expectancy, facilitating condition, and social influence) [12]. The UTAUT efficiency has been increased as a result of a combination between the constructs and moderating factors. The model uses two main factors to identify the acceptance of ICT, which are behavioral intention and actual use. The predictive efficiency of the UTAUT model has been increased to 70% as a result of the combination between the construct and moderating variables, while TAM has a 40% predictive model rate [12]. Figure (1) shows the UTAUT model.

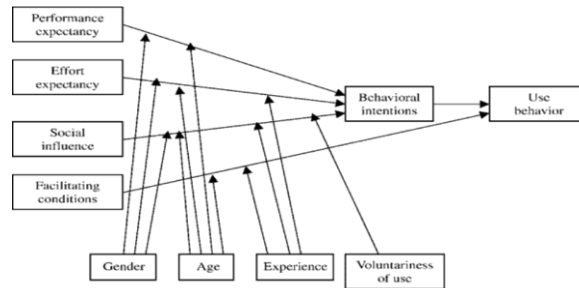


Figure 1: Unified Theory of Acceptance and Use of Technology (UTAUT)

Many researchers have utilized the UTAUT model in the context of education. For example, Chao [13], conducted an empirical study to investigate the factors impacting behavioral intentions toward using mobile learning. In this study, a new integrative model was created to expound the determinants of university students' behavioral intentions for the use of mobile learning. A theoretical model has been built drawing on an integrated model of the UTAUT and five external variables. The result showed that the proposed model has high reliability and internal consistency, and satisfaction is the main factor that significantly affects the behavioral intentions of the university student for using mobile learning. In addition, the result showed a negative impact of perceived risk and perceived enjoyment on behavioral intention. Almaiah et al [14], conducted research that utilized the UTAUT model and seven external constructs to study the impacts of different factors on the acceptance of students for mobile learning. The data was collected using a questionnaire from 697 undergraduate students in five Jordanian universities, and the SEM technique has been used to analyze data. The result revealed that all the constructs have a significant impact on the students' acceptance of mobile learning except social influence. The findings of this research included the requisite information about how universities can improve the acceptance and satisfaction of students for mobile learning and encourage the use of mobile devices in the learning process. Many studies have evidenced that the UTAUT is a useful model for explaining and foreseeing users' acceptance toward using emerging technology in different contexts [15]. In addition, comparing to other models, UTAUT has gained a large degree of attention in the literature. Therefore, the UTAUT model was chosen as a base to develop the study's conceptual model to attain a solid basis to explain the students' satisfaction with online learning in Jordan throughout the pandemic outbreak.

2.4 The Information System Success model (ISS)

It is one of the most important IS models that predict and explain the system user's actual use and satisfaction [16]. Using this model support the relations between factors satisfaction, user behavior, and system use outcomes [17]. The first version of the ISS model is comprised of six determinants: information quality, system quality, usage, satisfaction, personal effect and organizational effect [18]. DeLone and McLean [19] improved their initial model in response to advancements in IS applications, and they presented an updated version in 2003. The updated model has included service quality, and the individual and organizational impacts have been integrated into a single construct called net benefits, as illustrated in Figure (2).

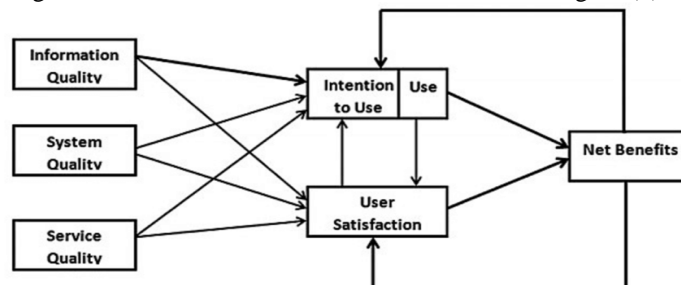


Figure 2: Updated ISS Model

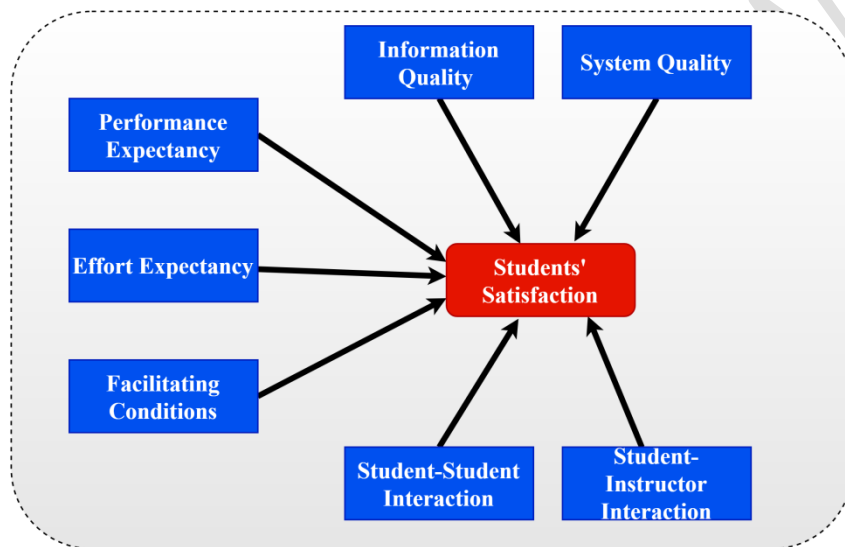
This model was much used in the context of online learning. For instance [5], investigated the online learning effect on satisfaction and outcomes of the students utilizing an integrated model of ISS and TAM. The results revealed that the system quality, information quality, ease of use, and

usefulness positively affect student satisfaction [5]. Al-Adwan et al [20], conducted research that utilized an integrated model of ISS and TAM to explain the main factors that impact the success of e-learning systems. The data was collected using a questionnaire from 537 undergraduate students in 3 Jordanian universities, and the SEM technique has been used to analyze data. The findings revealed that all the proposed model's constructs positively affect students' satisfaction and system use.

3. Research Model and Hypotheses

We opted to employ an integrated research model to investigate the influence of online learning on student satisfaction based on theoretical support from the ISS model, UTAUT model, and quality of interaction (Figure 3.). Our research integrates the ISS model, UTAUT model, and appropriate constructs from literature (student-student interaction and student instructor interaction) to investigate the factors that affect students' satisfaction in Jordan online learning context. Thus, the following research study hypotheses have been proposed:

Figure 3: The Proposed Model



3.1 Performance Expectancy

Performance Expectancy refers to "the extent to which a person perceives that using a new system or technology helps execute a specific task" [12]. In this study, Performance expectancy indicates the students' impression of performance improvement gained via the usage of online learning. Many research studies indicated that performance expectancy has a positive influence on students' satisfaction. For example, Violaine and Hwang [21], in their empirical study of the factors that affect students satisfaction of e-learning proved that students satisfaction is positively affected by the performance expectancy. Another study, Koceska and Koceski [5], showed that perceived usefulness (Performance expectancy in UTAUT) positively influenced students' satisfaction in online learning. Thus it is hypothesized as follow:

H1: Performance expectancy positively influences the students' satisfaction.

3.2 Effort Expectancy

Users' perspective of how difficult it is to use e-learning services is referred to as effort expectation [12]. Students are more satisfied and anticipate achieving the required performance when they understand that e-learning services are simple to use and require little effort. The effect of effort expectancy on students' satisfaction has been proved in many studies [21], [5]. Thus, it is hypothesized as follows:

H2: Effort expectancy positively influences the students' satisfaction.

3.3 Facilitating conditions

Facilitating conditions denote the existence of an infrastructure to facilitate the usage of a system [12]. Online learning necessitates particular skills that users can operate computers and smartphones and connect to the internet network. Also, the students will be more satisfied if appropriate infrastructures back the system use [22], [23]. Therefore, this research examines the

effect of facilitating conditions on students' satisfaction with online learning in Jordan during the COVID-19 outbreak. Thus, it is hypothesized as follows:

H3: Facilitating conditions positively influence the students' satisfaction.

3.4 Information quality

Information quality relates to the quality of information produced by systems. This concept employs correctness, completeness, relevance, content demands, and timeliness while using online learning systems [5]. We may define information quality as the system's output that fits the demands of the students. Information quality is an original construct in ISS that directly affect user satisfaction. In addition, many research studies argued that it significantly impacts students' satisfaction in the context of online learning. For example, Al Mulhem [24], in his empirical study of the factors that affect students satisfaction with e-learning, proved that the information quality positively affected students satisfaction. Another study [25] showed that students satisfaction is positively influenced by information quality in online learning. Thus, it is hypothesized as follows:

H4: Information quality positively influences the students' satisfaction.

3.5 System quality

System quality is the extent of how well a system performs in comparison to expectations. In an online learning system, qualities such as response time, user-friendliness, availability, ease of learning, and so on are essential in determining its overall system quality [5]. System quality is an original factor in ISS that directly impacts user satisfaction. Moreover, many studies contend that it has a substantial influence on student satisfaction in the context of online learning. In his investigation of the factors that determine students' satisfaction with online learning, Al Mulhem [24] demonstrated that system quality significantly affects students' satisfaction. Another research [25] found that the system quality in online learning significantly impacted student satisfaction. As a result, the following hypothesis is proposed:

H5: System quality positively influences the students' satisfaction.

3.6 Quality of interaction

Several research studies argued that interaction quality is critical to students' learning and successful online learning implementation [26], [27], [1]. In an online learning environment, instructors and students do not share the same place, which reduces the quality of interaction. Two forms of interaction are required for online learning in order to overcome any possible inadequacies:

3.6.1 Student-instructor interaction: It is possible to have student-instructor interaction in many ways, including delivering information, motivating the student, and offering feedback. Additional interactions with instructors include the students' questions and discussions.

3.6.2 Student-student interaction: When students discuss the course, they interact in a process known as information and idea exchange. There are many forms of student-student interaction, such as group projects, group conversations, and so forth are possible. Such an interaction has the potential to promote learning process.

Many researchers studied the impact of quality of interaction on students' satisfaction. For example, the author in [28] showed that students' satisfaction is directly affected by the quality of interaction. The same result was shown in the study by Chen et al. [1] when they investigated the factors that affect the student satisfaction of online learning during COVID-19 proliferation in China. Thus, the following hypotheses are proposed:

H6: Student-instructor interaction positively influences the students' satisfaction.

H7: Student-student interaction positively influences the students' satisfaction.

4. Research Methodology

4.1 Participant

High school students from six Jordanian public schools participated in this study, including Aljabal secondary school, Sahab secondary school, Salt secondary school, Madaba secondary school, Karak secondary school, and Mafraq secondary school. Students were from 11th and 12th grade, who are now utilizing online learning at six Jordanian schools. Thus, the participants in this research can assist us in answering questions linked to the research topic, allowing us to get a

complete understanding of the factors influencing the students' satisfaction with online learning from their perspective.

4.2 Data Collection

The quantitative approach has been used in this research study by employing the questionnaire instrument. Students in six Jordanian schools, including Aljabal secondary school, Sahab secondary school, Salt secondary school, Madaba secondary school, Karak secondary school, and Mafraq secondary school, filled in a self-administrated questionnaire during the second semester of 2020/2021. In all, 600 questionnaires were handed out to school students for completion. Due to the missing data, 93 questionnaires had to be discarded. As a result, 507 questionnaires with an 84.5 per cent response rate were included in the main analysis. The authors in [29] claimed that the minimal quantitative research sample size is (354), where this study sample size (507) meets that standard. Table 1 shows the details of the participants.

TABLE 1: Participants details

School	Number of students
Aljabal secondary school	112
Sahab secondary school	103
Salt secondary school	83
Madaba secondary school	78
Karak secondary school	69
Mafraq secondary school	62

4.3 Questionnaire development

This section shows all the factors items of the questionnaire used to measure all the constructs (exogenous and endogenous variables) for our proposed model. These items have been adapted from the literature on online learning, information systems (IS) studies, and the opinions of IT experts. For instance, as depicted in Table 2, the items of performance expectancy, effort expectancy, and facilitating conditions have been adapted from [15], [30], [12]. Information quality items were adapted from [30], [31], [32], and system quality items were adapted from [33], [5]. In addition, the items of student-student interaction and student-instructor interaction were adapted from [34]. Finally, student satisfaction factor's items were adapted from [34], [13]. To ensure the validity of the questionnaire structure, constructs, and items, it was pre-evaluated by two faculty members from the Israa University Information Technology School who are experts in information system analysis and development. Also, the questionnaire was pre-evaluated by seven students who study master degree in the Israa University software engineering and Information System department who have experience with online learning systems. The questionnaire consists of two sections: the first section contains the demographic questions, whereas the second section contains the constructs items that are measured with a five-point Likert scale. The measurement scale ranges from 1 - 5, where 1 represents strongly disagree and 5 strongly agree.

TABLE 2. Questionnaire's constructs, items and resources.

Factors		Items	Resources
Performance Expectancy (PE)	PE1	The use of online learning allows me to do my tasks more swiftly and effectively.	[15], [30], [12]
	PE2	The use of online learning raises the level of equality for all students.	
	PE3	The use of online learning saves me time.	
	PE4	The use of online learning enhances the learning process quality.	
Effort Expectancy	EE1	It's simple to utilize the online learning	[15], [30],

(EE)		platform.	[12]
	EE2	For me, it's easy to be skillful at using mobile learning platforms.	
	EE3	By utilizing online learning platforms, I can gain learning services easily.	
Facilitating Conditions (FC)	FC1	I have the needed resources to employ online learning platforms.	[15], [30], [12]
	FC2	I have the needed knowledge to employ online learning platforms.	
	FC3	If I face any technical issues, there is a person who helps me to overcome them.	
Information Quality (IQ)	IQ1	The information offered via online learning is easy to comprehend.	[30], [31], [32]
	IQ2	Online learning offers all relevant information necessary to fulfill my study needs.	
	IQ3	Online learning platforms offer clear and well-formed information.	
System Quality (SQ)	SQ1	I do not experience any difficulties when I upload tasks.	[33], [5]
	SQ2	I do not experience any difficulties when I respond to discussions	
	SQ3	I do not experience any issues with the learning platforms when learning online.	
Student-Student Interaction (SSI)	SSI1	In the course, I can communicate with my peers.	[34]
	SSI2	Online learning promotes me to work with other students in groups.	
	SSI3	I am able to share learning knowledge and experiences with my peers.	
Student-Instructor Interaction (SII)	SSI1	I'm being encouraged to engage in course discussions by the lecturer.	[34]
	SSI2	I get feedback on my work from the instructor.	
	SSI3	The instructor keeps me updated on my progress periodically.	
Student Satisfaction (SS)	SS1	I am satisfied with the effectiveness of online learning.	[34], [13]
	SS2	I feel delighted with online learning.	
	SS3	Overall, I am satisfied with online learning.	

4.4 Pilot study

The reliability of the questionnaire questions was tested using a pilot study first, which included 33 students. A Cronbach Alpha analysis was conducted to check for data consistency, where the Cronbach Alpha score should be more than 0.7. For all factors, in this research, Cronbach's alpha values were more than 0.7, as indicated in Table 3. Thus, SEM can be used to analyze the data.

TABLE 3. Reliability analysis

Constructs	Cronbach Alpha
Performance Expectancy	0.910
Effort Expectancy	0.879
Facilitating Conditions	0.871
Information Quality	0.854
System Quality	0.877
Student-Student Interaction	0.917
Student-Instructor Interaction	0.865

Student Satisfaction	0.935
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5. Data Analysis

5.1 Reliability Analysis

In order to validate this study's questionnaire, a reliability test was conducted before the main analysis. Cronbach's Alpha is used in reliability analysis to determine the construct items' consistency. A Cronbach Alpha analysis was conducted to check for data consistency, where the Cronbach Alpha score should be more than 0.7. For all factors. In this research, Cronbach's alpha values were more than 0.7, as indicated in Table 3. As a result, the questionnaire is regarded as reliable.

5.2 Validity Analysis

Two steps to assess the validity: convergent validity and discriminant validity. According to [29], the average variance extracted (AVE) is used to assess the convergent validity, where the AVE must be greater than 0.5. As shown in Table 4, the AVG in this study was greater than 0.5 for all constructs. For the second step, the square root of AVG was used to assess the discriminant validity as recommended by [29]. Table 5 illustrates that discriminant validity is greater than the pairwise correlations for all constructs. Thus, the discriminant validity threshold was achieved in this research.

Table 4. Convergent validity results.

Constructs	AVG
Performance Expectancy	0.847
Effort Expectancy	0.797
Facilitating Conditions	0.795
Information Quality	0.772
System Quality	0.788
Student-Student Interaction	0.858
Student-Instructor Interaction	0.858

TABLE 5. Discriminant validity results.

Factors	EE	FC	IQ	PE	SII	SSI	SQ	SS
EE	0.893							
FC	0.199	0.892						
IQ	0.183	0.542	0.878					
PE	0.245	0.523	0.44	0.921				
SII	0.395	0.751	0.52	0.503	0.873			
SSI	0.591	0.503	0.336	0.348	0.549	0.926		
SQ	0.515	0.233	0.136	0.42	0.203	0.214	0.888	
SS	0.13	0.244	0.728	0.495	0.521	0.636	0.519	0.941

5.3 Path Analysis

The proposed model hypotheses were analyzed utilizing SEM modelling path analysis. The hypotheses testing results are shown in Table 6. Seven hypotheses were examined; one dependent variable was verified in the proposed model (SS). According to the testing results, all the proposed hypotheses were supported.

The testing result revealed that PE significantly influences SS ($\beta = 0.122$, $p < 0.05$); thus, hypothesis H1 was supported. EE factor was specified to have a significant influence on SS ($\beta = 0.122$, $p < 0.01$), which supported hypothesis H2. The testing findings also showed FC has a significant impact on SS ($\beta = 0.543$, $p < 0.01$), which also supported hypothesis H3. In addition, IQ significantly influenced SS ($\beta = 0.071$, $p < 0.05$), and thus, hypothesis H4 was supported. Moreover, the other three independent variables: SQ ($\beta = 0.224$, $p < 0.01$), SSI ($\beta = 0.212$, $p < 0.01$), and SII ($\beta = 0.160$, $p < 0.01$) significantly affected SS, and this result supported hypotheses (H5, H6, and H7).

TABLE 6. SEM path analysis result

Hypothesis		Path (β)	Result
Performance Expectancy	————→	Student Satisfaction	0.122 Supported *
Effort Expectancy	————→	Student Satisfaction	0.122 Supported **
Facilitating Conditions	————→	Student Satisfaction	0.543 Supported **
Information Quality	————→	Student Satisfaction	0.071 Supported *
System Quality	————→	Student Satisfaction	0.224 Supported **
Student-Student Interaction	————→	Student Satisfaction	0.212 Supported **
Student-Instructor Interaction	————→	Student Satisfaction	0.160 Supported **

6. Discussion

Even though many research studies yielded significant results by identifying the most common factors (Social influence, system quality, information quality, ease of use, hedonic motivation, and service quality) impacting the student's satisfaction with online learning, this research showed that other factors such as performance expectancy, facilitating conditions, and quality of interaction significantly impact the student's satisfaction with online learning. In line with the research study purpose, we have reviewed the most current research on the students' satisfaction with online classes. As a result, this research proposed an integrated model through the amalgamation of the ISS model, UTAUT model, and quality of interaction. The following is a detailed discussion of the findings.

First, we studied the effect of performance expectancy on students' satisfaction based on the model developed for this research. According to the findings, students' satisfaction is significantly impacted by performance expectancy. This finding has been predicted because students are more likely to be satisfied with online learning if they believe it is beneficial.

Second, the findings also showed that effort expectancy significantly influenced students' satisfaction. This result is compatible with the results of many previous research studies [30], [23], [35], [36]. Students are satisfied with online learning platforms more often if they find the platforms user-friendly, straightforward, and easy to use.

Third, the findings illustrated that facilitating conditions and students satisfaction are closely associated, which indicates that the Jordanian government is on the right track of education since they are now spending substantial amounts of money on developing ICT infrastructure. This outcome is compatible with the original UTAUT model, where the facilitating conditions are essential for successfully applying a new system or technology.

Fourth, the findings indicated that students' satisfaction with online learning is significantly influenced by information quality. The findings imply that when the information provided by online learning is accurate, comprehensive, relevant, and efficient for students' learning, students' satisfaction with online learning will certainly grow. This result is compatible with the results of many previous research studies [37], [38], [39].

Fifth, the findings also showed that system quality significantly influenced students' satisfaction. This result is compatible with the updated ISS model [19] and the results of many previous research studies [24], [25], [40] . Students are satisfied with online learning platforms more often if they find the platforms provide certain qualities such as response on time, user-friendliness, availability, ease of learning. This outcome indicates that designers, developers, and policymakers should concentrate on such qualities to improve system quality and thus improve the students' satisfaction with online learning.

Sixth, the study result revealed that student-student interaction has a significant effect on online learning student satisfaction. The result suggests that when students can discuss the course, they interact in a process known as information and idea exchange, where such interaction improves their learning process and thus improves their satisfaction with online learning. Such a result is compatible with the findings of many previous research studies [41], [42].

Seventh, the study result revealed that student satisfaction with online learning is significantly influenced by student-instructor interaction. The result suggests that when instructor interacts with students by delivering information, motivating the student, and offering feedback in the online classes, such interaction improves their learning process and thus improves their satisfaction with online classes. Such a result is compatible with the findings of many previous research investigations [41], [42].

Finally, the proposed model defined the main factors of students' satisfaction with online learning systems that may be advantageous for educational institutes to implement online learning successfully. Also, this study contributes to the current literature by integrating UTAUT, ISS, and quality of interaction. Thus, these research results will be a significant reference for educational institutes, decision-makers, developers, and researchers on the significant factors that influence students' satisfaction with online learning, which in turn can improve the development of online learning systems.

7. Conclusion

This research study proposed an integrated model by amalgamating the UTAUT, ISS, and quality of interaction to investigate the main factors that impact students' satisfaction with online learning in Jordan schools. Thus, we identified the most important factors that impacted the students' satisfaction with online learning, and we developed a new model that can be used to evaluate the students' satisfaction with online learning.

This research study contributes to the current research studies on satisfaction with online learning by the following outcomes. First, facilitating conditions were determined as the most influencing factor of online learning students' satisfaction. In addition, the other factors of the UTAUT model (performance expectancy and effort expectancy) have been determined as significant factors that impact the students' satisfaction with online learning. Second, this research study has confirmed the impact of an information quality factor and system quality factor on students' satisfaction with online learning. Third, regarding the quality of interaction, the student-student interaction and student-instructor interaction have been shown as influential factors that contribute to improving the students' satisfaction with online learning.

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