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Original Paper

An Empirical Study of Students' Acceptance of Online Education during the COVID-19 Pandemic in Saudi Arabia

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Abstract

This paper seeks to explore factors that determine the university student's acceptance and adoption behavior towards online education platforms in Saudi Arabia (SA) during the COVID-19 pandemic. The research relied mainly on two theories: Unified Theory of Acceptance and Use of Technology (UTAUT), and the Technology Acceptance Model (TAM). Five different constructs were utilized from those theories to investigate the university student's intention toward using online education platforms. The proposed model and its five hypotheses were tested by conducting a quantitative survey across social media to university students from different regions around SA. For the model validity, the measurement model was analyzed using a structural equation modeling technique applied using SmartPLS software. The survey sample consisted of 708 university students in different regions of SA. The analysis results show that Performance Expectancy (PE) and Facilitating Conditions (FC) affect students' Attitude toward Using (ATU) and that ATU positively affects Behavioral Intention (BI). Nevertheless, Effort Expectancy (EE) is not significantly related to ATU. Thus, the level of difficulty in using the online education platform is not an effective determinant factor that would change the student's attitude.

Keywords

Online Education, Blackboard, Technology Adoption

1. Introduction

The world began to face a pandemic that started in China and then gradually swept through most of the world (Chen et al., 2020a). On Monday, March 2, 2020, the Ministry of Health (MOH) announced the emergence of laboratory results confirming the registration of the first case of the new coronavirus, COVID-19, for a citizen coming from Iran through the Kingdom of Bahrain (Ministry of Health, 2020).

Saudi Arabia was considered one of the first countries to initiate precautionary and early preventive measures, having sensed the inherent danger behind this outbreak, which became a pandemic in a short time (Ministry of Health, 2020). The first measure Saudi Arabia took was to suspend travel to China. After the confirmation of the first case in Saudi Arabia, strict and effective precautionary measures were taken to impose social distancing and to stop all activities in sectors, and establishments within its territory (Ministry of Health, 2020). On March 9, 2020, in-school suspension was declared in Saudi Arabia (MOE, 2021), as well as in most countries, according to the preventive and precautionary measures recommended by competent health authorities. These measures prompted all universities to develop plans to continue providing their services to their students during the home quarantine period imposed by governments to limit the spread of the pandemic (Chen et al., 2020a). As all universities around the world began to continue and broadcast lectures online, students moved from traditional to online education (Chen et al., 2020a). The same applied for students in Saudi Arabia where the most used educational platforms/technologies in Saudi universities (ranked from most, common, least) are Blackboard LMS, Zoom, GoogleMeet, and Cisco. Online education creates communication between a teacher and students, helps in developing new teaching methods and modern learning styles, provides educational services anytime and anywhere, and enables course and lecture delivery via the internet (Al-Sharif, 2020). Moreover, it reduces the high costs of education for universities as well as students; however, the utilization of these educational platforms is still below expectations. According to Al-Sharif (2020), the major reasons for not making full use of digital platforms in education are the lack of student training approaches and methods for using these digital platforms in education and poor internet connection. Students' attitudes are also affected by the ease of learning platforms or their differing computer skills (Aixia & Wang, 2011, Liaw & Huang, 2011). Training and teaching students how to use educational platforms and computer tools make online education more enjoyable (Aixia & Wang, 2011). Ultimately, students' perspectives and attitudes are important and necessary for the continuity and development of online education (Selim, 2007). Most past research identified barriers regarding the use of online learning and the factors that affect students' interest in online learning and difficulties facing university faculty members. Although this study's objective is similar, the study targeted students had not experienced online education before the pandemic. Therefore, the current research has focused on investigating university students' perspectives towards online education during the COVID-19 pandemic. Based on that, this study asks the following research question: what factors affected students' acceptance of online education in Saudi universities during the COVID-19 pandemic?

2. Literature Review

2.1 Online Education

Many institutions have opted to cancel all face-to-face classes, including labs and other learning experiences, and have mandated faculty members to move their courses online to prevent the spread of the virus. As a result, online education during COVID-19 pandemic has become an effective tool for preventing and controlling the pandemic. At the same time, it is used for ensuring the continuation of the educational process (Chen et al., 2020a). According to Basak et al. and others (2018), online education has multiple names, such as computer-based training, web-based training, internet-based training, online training, e-learning (electronic learning), m-learning (mobile learning), and computer-aided distance education. However, the general definition of online education is an electronically supported learning that relies on the online for teacher/student interaction and thus the distribution of class materials. With online education, students can turn anywhere with Internet access and electricity into a classroom. It can include audio, video, text, animations, virtual training environments and live chats with professors. (Basak et al., 2018)

Digital transformation isn't a unique phenomenon; education institutions have been using it for a few years now (Kopp et al., 2019). Digital transformation of higher education institutions may be a topical issue about which several education stakeholders must feel concerned, for which universities must be up to the task of preparing potential professionals to face online education challenges and solutions (Bond et al., 2018; Sandkuhl & Lehmann, 2017).

2.2 Advantage and Challenges

One of the foremost frequently used terms after the pandemic is "new normal." The new normal in education is the increased use of online learning tools (Gautam, 2020). The pandemic has triggered new ways of learning. All around the world, educational institutions are looking toward online education platforms for teaching students. The new normal is a transformed concept of education with online education at the core of this transformation.

Today, digital learning has emerged as a necessary resource for universities and students. For many educational institutions, this is often a completely new method of education. Online learning is now not only applicable to academic courses but also extends to extracurricular activities for university students. In recent months, the demand for online learning has risen significantly and will continue for the future. Like most teaching methods, online learning also has its own set of positives and negatives. Decoding and understanding them will help universities, colleges, and institutes create strategies for more efficiently delivering online courses, thus ensuring an uninterrupted learning journey for university students. Advantages of digital learning include:

- Efficiency. Online education provides efficient and easy ways for teachers and students to deliver and receive lessons. It provides a diverse set of tools such as videos, podcasts, interactive boards, easy sharing of multimedia materials, and lectures recording features and proofreaders (Gautam, 2020).

- Ease of access and flexibility. This allows students and teachers to deliver/attend/ participate in classes at any time and in any geographic locations. Additionally, online lectures can be recorded, archived, and shared at any time (Gautam, 2020).
- Affordability. Online education is more economical than traditional education. Moreover, all course materials are accessible on the web, consequently establishing a paperless learning climate (Gautam, 2020).
- Customized learning. Each student has a different learning style—visual, auditory, reading/writing, and kinesthetic—that can dramatically affect their ability to fully comprehend the topics (Gautam, 2020).

For the challenges, it is highly disruptive to shift all present courses online during a matter of days. With the COVID-19 pandemic, it has become obvious that the education system is susceptible to external dangers (Bozkurt & Sharma, 2020). Overall, an entire online course requires an elaborate lesson plan design, teaching materials such as audio and video contents, and technology support teams. However, because of the sudden emergence of the COVID-19, most college members face the challenges of lacking online teaching experience, early preparation, or support from educational technology teams, and students may lack the technical skills to handle any obstacles (Bao, 2020). Also, Ribeiro (2020) rightly noted that this digital transformation of instructional delivery came with several logistical challenges and attitudinal modifications.

2.3 Online Education Platforms

Lately, online education having become popular, a wide variety of online education platforms have emerged one after another. Meanwhile, higher requirements have been put forward for the teaching/learning outcomes and technical standards that the platforms need to achieve (Chen et al., 2020a). During COVID-19, more business software moved to developing online education functions and has been widely used. However, the standard of those platforms varies greatly, so it is necessary to pick a representative platform from many online education platforms. Also, some educational platforms have added new tools or improved tools during the pandemic. Therefore, the technical and interactive features of online education should be considered more closely when evaluating these platforms and online courses. Currently, many online education platforms have been used in Saudi Arabia during a COVID-19 pandemic, including Blackboard LMS, Moodle, Zoom, and Googlemeet.

- Blackboard provides a wide variety of tools to build a better educational experience, virtual classrooms, offices, and meetings. This allows for more opportunities to collaborate with an outsized number of scholars and provides new methods for peer-to-peer education. Through the Blackboard, students, and faculty members can access their courses' content and groups through various mobile devices, including Android, BlackBerry, and iPhone (Saudi Electronic University, 2020).
- Moodle is an open-source learning management platform. The platform can be used for more than 95 languages and also has the capacity to empower learning environments. It has a desktop and

mobile app (iOS and Android). Moodle offers a variety of customization options and integrations to plugins and add-on-site gives users access to a community of developers, users and certified partners that share best practices on the use of the platform (Raouna, 2020).

2.4 Statistics of the Most Used Educational Platform in Saudi Universities

At the beginning of the COVID-19 pandemic crisis, colleges and universities in Saudi Arabia used some applications that were not specifically designed for educational purposes, such as Zoom, Cisco Webex, and other similar applications. These platforms were not sufficient or satisfactory for the quality of education and the satisfaction of students and teachers. Immediately after the end of the first online semester, universities and learning institutions rushed to plan using the best learning platforms that would meet students' and teachers' needs. Some universities have chosen the Blackboard LMS, Moodle or other educational platforms.

The number of Saudi universities is about 72 (private and public), and the number of university students is around 1,982,747 students according to the Ministry of Education (2021). According to the available information on Saudi universities' websites and social media accounts, most universities in Saudi Arabia used Blackboard LMS during the pandemic. As Figure 1 shows, the Blackboard has the largest usage rate (59.46%) whereas others platforms represent 33.78% (some universities used special systems belongs to the institution, and others also use Zoom, Google meet). Finally, Moodle won (33.78%). Therefore, this paper measures the acceptance of university students' use of the Blackboard LMS during the COVID-19 pandemic.

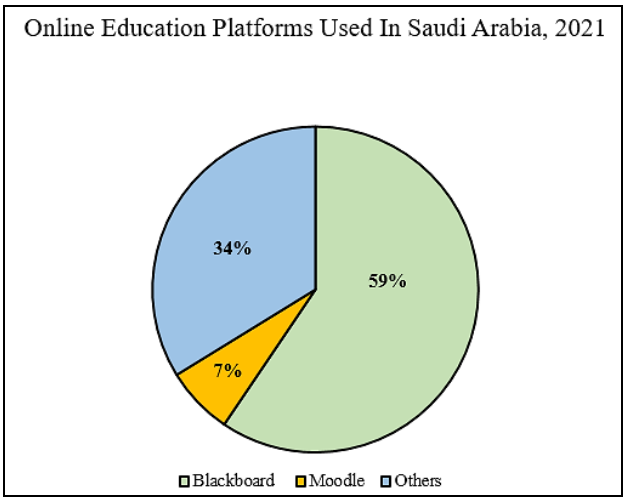

Figure 1. The Most Used Platform Education in Saudi Arabia, 2021

2.5 Students' Perspective on Online Education

Online education is arising as the new worldview of current advanced education. Students' initial perceived satisfaction with technology-based online education determines whether they will use the system continually (Aixia & Wang, 2011). Students' satisfaction is the state of pleasure or

disappointment formed by the comparison of the perceived effect of service with the expected value (Chen et al., 2020a). On the other hand, there is minimal research on college students' attitudes toward online education environments (Aixia & Wang, 2011). Based on Qazia et al. (2020), student satisfaction and acceptance of online education are linked to residence location, previous online learning experience, availability of education tools, and use of online education resources by a friend or family.

Moreover, students' satisfaction has been affected during the lockdown (during the pandemic) because of bans on gathering, events, travel, and shutting down the educational institutes (Sohrabi et al., 2020; Chinazzi et al., 2020; Chen, 2020a). Therefore, this study proposes a new model to identify the factors affecting the use of online education in universities from the perspective of students during the COVID-19 pandemic. The proposed model was developed based on the available literature, which concerns technology adoption and diffusion theories. Some of the models are social cognitive theory (SCT) (Bandura, 1986), the technology acceptance model (TAM) (Davis, 1989), the model of PC utilization (MPCU) (Thompson et al., 1991), the motivation model (Davis et al, 1992), combined TAM and TPB (Taylor & Todd, 1995), and task-technology fit (Goodhue & Thompson, 1995), and innovation diffusion theory (Rogers, 1995), and the unified theory of acceptance and use of technology (UTAUT) (Venkatesh et al., 2003).

2.6 Knowledge Gap

Some studies have focused on the use of digital platforms from multiple perspectives, and among those studies is (Al Sharif, 2020) study. The research is concerned with investigating the opinions of Taibah University students towards their reality in the direction of employing digital platforms in e-learning. The study emphasizes the significant role of training for faculty members and students on using the digital platforms, converting paper books into electronic books. Another study (Chen et al., 2020b) collected students' and teachers' experience in dealing with the online education platforms before and after the outbreak of COVID-19 and evaluated the change of their experience. The paper summarizes the following suggestions to improve the user experience of the online education platform during COVID-19: (a) improve the support services, (b) improve the convenience of interactive communication, (c) optimize ease of use, and (d) enrich platform resources. Wan et al. (2020) proposes a model to assess user satisfaction and to investigate the determinants affecting university students' continued intention of using MOOCs. The results revealed that Performance Expectancy (PE), Effort Expectancy (EE), and Social Influence (SI) are the crucial predictors. Al-Okaily et al. (2020) explored students' intention to use e-learning systems at a Jordanian university. The results indicated positive effects of Subjective Norm (SN), Perceived Ease of Use (PEOU), and Perceived Usefulness (PU). The results also showed that PU and PEOU mediate the relationship between SN and behavioral intention (BI) to use an e-learning system partially supported.

Limited research has examined the level of online education platforms from the end users perspective and the impact of the pandemic is not counted (Chen et al., 2020a). Thus, this paper optimizes the

indicators used in previous researches to analyze students' acceptance of online education during COVID-19 pandemic.

3. Method

The model proposed in this research aims at examining the main influencing factors that impact the adoption of Blackboard LMS. The model is developed by utilizing two models, UTAUT and TAM, to serve the study's purpose. The constructs used from the UTAUT model are PE, EE, and FC. For ATU, and BI are obtained from the TAM model (Figure 2).

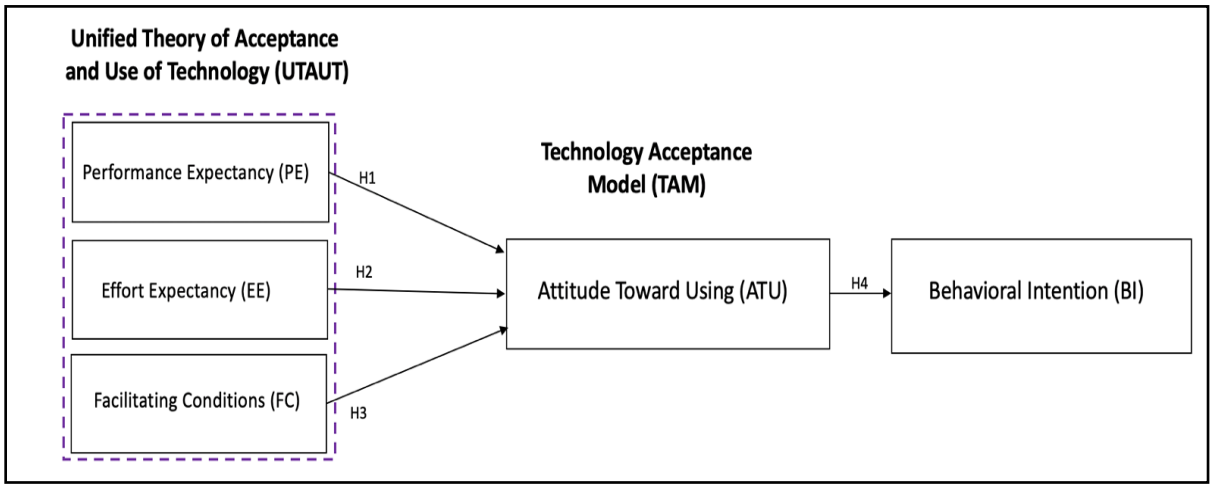

Figure 2. The Study Theoretical Framework

3.1 Hypothesis

This research suggests that different models and their factors influence the adoption of Blackboard LMS: Effort Expectancy (EE), Effort Expectancy (EE), and Facilitating Conditions (FC) from the UTAUT model; and Attitude toward Using (ATU) from the TAM model.

3.1.1 UTAUT Model Hypothesis

Venkatesh et al. (2003) thought about the likenesses and contrasts among the eight models which recently utilized with regards to the information systems, all of which had their roots in sociology, psychology, and communications. These models are TAM, Theory of Reasoned Action (TRA), joined TAM and TPB, theory of planned behavior, MPCU, Diffusion of Innovation, Motivational Model, and SCT. The critical constructs of UTAUT are Effort Expectancy (EE): the amount of effort required to use a new system/technology; Performance Expectancy (PE): which is the degree to which a person believes that using a new system/technology will aid in improving job performance, Social Influence (SI): the individual's perception of how important it is for others to think that he/she can use the new system/technology, and Facilitating Conditions (FC): the degree to which a person assumes that the available organizational and technological infrastructure facilitate the use of a new system/technology

(Venkatesh et al., 2004). Besides, four significant moderating variables were identified; gender, experience, age, and voluntariness of use. Accordingly, hypothesis H1-H3 are as follows:

- H1: The influence of Performance Expectancy (PE) on Attitude toward Using (ATU) will be positive.
- H2: The influence of Effort Expectancy (EE) on Attitude toward Using (ATU) will be positive.
- H3: The influence of Facilitating Conditions (FC) on Attitude toward Using (ATU) will be positive.

3.1.2 TAM Model Hypothesis

TAM explains the motivation of users towards using a new technology by three factors; Perceived Usefulness (PU) is the users' perceptions regarding the outcome of a particular system that would enhance their job performance, Perceived Ease of Use (PEOU): the degree to which an individual believes that using a particular system will be free of effort, and Attitude Toward Use (ATU): is the evaluative effect about performing the target behavior (Davis, 1989). TAM is probably one of the most widely cited models in the field of technology acceptance (Bamufleh, 2021). Accordingly, hypothesis H4 is as follows:

- H4: The influence Attitude toward Using (ATU) on Behavioral Intention (BI) will be positive.

For the behavioral intention variable, it indicates an individual's intention to benefit from a particular tool in the future (Venkatesh et al., 2003). This variable was derived from the previous theories (TPB, TAM, TAM 2, and TRA) (Venkatesh et al., 2003). Behavioral Intention (BI) is considered a basic and conditional requirement in order to actually initiate the behavior (Ajzen & Fishbein, 1975). Previous studies of Venkatesh et al. (2003) have found a direct effect of BI on the future use behavior of individuals.

3.2 Study Survey

To test the proposed model, the study adopted a quantitative research method, including a survey, to collect data from university students at various universities in Saudi Arabia who used the Blackboard LMS. The research questions were constructed based on five different measures used in the proposed model. The authors reviewed previous studies that have used them and adjusted the survey items to fit the study's scope. Table 1 shows the survey items.

The survey items used a five-point-Likert scale to measure the public's level of agreement, from 1 (Strongly disagree) to 5 (Strongly agree). The survey was divided into two parts: the first part collected the demographic information, and the second one was based on the proposed research model's constructs (Table 1). The survey was distributed online through social media in Saudi Arabia in two languages Arabic and English. The participants were selected randomly based on whether they had used Blackboard LMS. The survey was issued on March 18, 2021 and was valid until Mar 28, 2021. 708 valid responses were received.

Table 1. Survey Items

Constructs	Survey Items	Reference
Performance Expectancy (PE)	**PE1:** I find using Blackboard Learning Management System is useful to my study.	
	PE2: Using Blackboard Learning Management System enables me to accomplish more tasks.	
	PE3: Using Blackboard Learning Management System increases my productivity.	
	PE4: If I use Blackboard Learning Management System, I will increase my chances of getting a better grade.	
Effort Expectancy (EE)	**EE1:** My interaction with Blackboard Learning Management System is clear and understandable.	
	EE2: It is easy for me to become skillful at using Blackboard Learning Management.	
	EE3: I find Blackboard Learning Management easy to use.	Venkatesh et al., 2003
	EE4: It is easy for me to attend virtual lectures, attempt exams, working on projects, participate in discussion forums, and submit assignments and homework through the Blackboard Learning Management System.	
Facilitating Conditions (FC)	**FC1:** I have the resources necessary to use the Blackboard Learning Management System.	
	FC2: I have the knowledge necessary to use the Blackboard Learning Management System.	
	FC3: A specific person or group of technical support is available for assistance with difficulties I experience with Blackboard Learning Management System.	
	FC4: During online exams, the Blackboard team help me to solve the technical problems that I faced.	
Attitude Toward Using (ATU)	**ATU1:** Using the Blackboard Learning Management System is a good idea.	Davis, 1989
	ATU2: Blackboard Learning Management System makes classes more interesting.	
	ATU3: I am comfortable using Blackboard Learning Management System.	
Behavioral Intention	**BI1:** I intend to use Blackboard Learning Management System even if they are not mandatory.	Venkatesh et al. (2003)

(BI)	**BI2:** I I'm willing to enroll in online courses, training, or workshops that use Blackboard Learning Management System in future. **BI3:** I recommend Blackboard Learning Management System to the teachers.

4. Result

4.1 Demographic

Demographic items such as gender, region/location, student level, and experience in using Blackboard LMS were collected in the survey. Table 2 shows the demographic frequency and percentages.

Table 1. Demographic Sample

Demographic Category	Frequency	Valid Percentage
Gender		
Number of females	399	56 %
Number of males	309	44 %
Total	708	
Region		
Medina Region	238	34%
Mecca Region	112	16%
Riyadh Region	82	12%
Eastern Region	41	6%
Hail Region	35	5%
Jazan Region	33	5%
Northern Borders Region	32	5%
Al-Baha Region	29	4%
Al-Qassim Region	27	4%
Tabuk Region	24	3%
Assir Region	23	3%
Najran Region	20	3%
Al-Jawf Region	12	2%
Total	708	
Student Classification		
Junior	250	35%
Senior	244	34%
Sophomore	120	17%
Freshman	56	8%

Preparatory Year	38	5%
Total	708	
Duration of use of the Blackboard LMS		
12 Months or more	539	76%
6 Months	104	15%
3 Months	41	6%
1 Month	24	3%
Total	708	

To assess the reliability and validity of each construct in the proposed model, the authors used the Partial Least-Squares (PLS) method based on the Structural Equation Model (SEM). The survey data was analyzed using SmartPLS Version 3.3.3 and a two-step research approach. PE, EE, FC, AUT, and BI are the five constructs in the proposed adoption model.

4.2 Test of Measurement Model

Convergent and discriminant validity analyses were used to evaluate the reflective measures. Factor loadings, Composite Reliability (CR), and Average Variance Extracted (AVE) were the three methods for determining convergent validity. Table 3 shows that all reflective measures have factor loadings greater than 0.7, suggesting adequate indicator reliability (Carmines & Zeller, 1979). The CR values varied between 0.98 and 0.978, which is higher than the recommended value of 0.7 (Nunnally, 1978; Fornell & Larcker, 1981). AVE was in the range of 0.917 to 0.927, exceeding the suggested value of 0.5 (Hair et al., 2017; Comrey, 1992). This suggests that the constructs explain more than half of the variance in their indicators. As a result, the measurement model has convergent validity, internal accuracy reliability, and qualified indicator reliability.

After convergent validity, discriminant validity was evaluated. Item cross-loading was proposed as the primary measure for evaluating the discriminant validity of reflective indicators (Hair et al., 2011; Ringle et al., 2018). Table 4 shows the items' cross loading evaluation, where all of the metrics had eligible discriminant validity, which means that constructs shared more variance with their objects than with other constructs in the model. Finally, the model was found to have strong convergent and discriminant validity.

Table 3. Reflective Measurement Model

Construct	Item	Loading	CR	AVE
Performance Expectancy	PE1	0.96	0.978	0.917
	PE2	0.948		
	PE3	0.967		
	PE4	0.954		
Effort Expectancy	EE1	0.945	0.98	0.924
	EE2	0.967		
	EE3	0.969		
	EE4	0.963		
Attitude Toward Using	ATU1	0.956	0.973	0.924
	ATU2	0.955		
	ATU3	0.972		
Behavioral Intention	BI1	0.96	0.974	0.927
	BI2	0.967		
	BI3	0.961		

*CR= Composite Reliability

*AVE= Average Variance Extracted

Table 4. Discriminant Validity: Item Cross Loading

Items	**PE**	**EE**	**ATU**	**BI**
PE1	**0.96**	0.917	0.915	0.906
PE2	**0.948**	0.904	0.881	0.882
PE3	**0.967**	0.866	0.916	0.885
PE4	**0.954**	0.856	0.91	0.895
EE1	0.897	**0.945**	0.882	0.893
EE2	0.879	**0.967**	0.866	0.884
EE3	0.881	**0.969**	0.863	0.88
EE4	0.896	**0.984**	0.887	0.903
ATU1	0.919	0.912	**0.956**	0.917
ATU2	0.902	0.836	**0.955**	0.907
ATU3	0.907	0.875	**0.972**	0.918
BI1	0.903	0.879	0.921	**0.96**
BI2	0.891	0.894	0.908	**0.967**
BI3	0.896	0.901	0.917	**0.961**

Next, the variable correlation was checked. The correlations between constructs and the square root of the average variance derived for that construct were compared. The square root of the AVE was greater than the correlation with other constructs, as shown in Table 5, implying adequate discriminant validity. As a result, the reflective measurement model's convergent and discriminant validity were found to be adequate.

The variance inflation factor was used to analyze the multicollinearity test for the formative measurement model, as shown in Table 6. The authors found multicollinearity between indicators to be a significant indicator in determining formative measures' validating. Variance inflation factor (VIF) was used for formative measurement evaluation to search for multicollinearity. According to previous studies, VIF should not be more than ten. As shown in Table 6, the VIF for all items was less than 10. As a result, no objects were removed.

Table 5. Variable Correlation (Root square of AVE)

	PE	**EE**	**ATU**	**BI**
PE	**0.957**	0.925	0.946	0.932
EE		**0.961**	0.91	0.926
ATU			**0.961**	
BI			0.951	**0.963**

Table 6. Formative Measurement Model

Items	**Factor Weight**	**VIF**
FC1	0.043	7.201
FC2	0.31	6.369
FC3	0.2	7.563
FC4	0.502	6.043

4.2 Test of Structural Model

To test the structural model, hypothesis testing was applied. According to Table 7 and Figure 3, all the hypotheses were supported except for the second hypothesis.

The first hypothesis aimed to test the influence of university students' performance expectancy on their acceptance of online education. In the context of the study, performance expectancy refers to the extent to which students believe that Blackboard LMS is useful or improves performance. The results showed that performance expectancy positively affects students' attitude toward use of online education, (β = 00.606, $p < 0.05$). Thus, H1 is supported, which means that student attitudes to learning via online education are enhanced when they find the educational platforms to be useful to them and increase their learning outcomes.

The second hypothesis concerns Effort Expectancy (EE), which measures the effort needed to use the Blackboard LMS. In the scope of the study, EE refers to the extent to which students believe that Blackboard LMS is easy to use and understandable. The study results revealed that EE is not significantly related to attitude. Thus, H2 is not supported. This means that the level of difficulty of using the Blackboard LMS is not an effective determinant that would affect students' attitudes. This can be justified because most of the sample used the Blackboard LMS for 6 months or more.

The third hypothesis is Facilitating Conditions (FC), which are the necessary resources or technical support that influence students' perceptions of ease or difficulty of performing a task on the Blackboard LMS. The results showed that (FC) positively affects the university students' attitude to use online education platforms ($\beta = 0.337$ $p < 0.05$). Thus, H3 is supported. Consequently, the more support is provided to students, such as resource material, training courses, and effective and active technical support, the better acceptance of the Blackboard LMS.

For the fourth hypothesis, the findings prove the relationship between attitude and BI. Therefore, H4 is acceptable; it is generated with ($\beta = 0.951$ $p < 0.05$). Thus, if a university student has a positive opinion toward Blackboard LMS, their intention to use the Blackboard LMS improves.

Table 7. Hypothesis Testing

Hyp.	Description	Path Coefficient (β)	Standard Error	T- value	P-value	Decision
H1	PE -> ATU	0.606	0.069	8.73	0.000	Supported**
H2	EE -> ATU	0.035	0.075	0.467	0.641	Not Supported
H3	FC -> ATU	0.337	0.06	5.592	0.000	Supported**
H4	ATU -> BI	0.951	0.006	148.575	0.000	Supported**
Significant at P**= < 0.01, p* < 0.05						

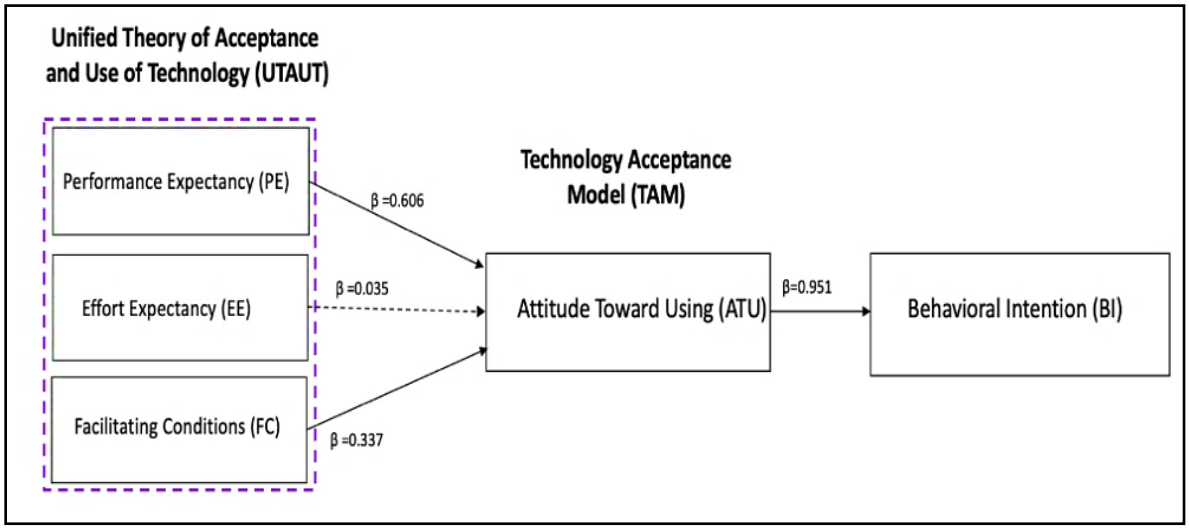

Figure 3. Results of the Structural Model

4.3 Multi-group Analysis

Multi-group analysis was conducted to determine if there is a significant effect of some groups of the sample on the relationships among Experience, Effort Expectancy (EE), and Facilitating Conditions (FC). Therefore, four groups were created according to the four options provided in the survey for months of experience in using the Blackboard LMS: 1 month, 3 months, 6 months, and 12 months or more. As shown in Table 2, the sample size for the participants with one month of experience is small; therefore, the first group (i.e., 1 Month) was excluded from the multi-group analysis. The results presented in Table 8 show that there are insignificant differences among the groups of students' experiences in relation to EE and FC.

Table 8. Multi-group Analysis

Relationship	Groups	t-value	p-value
Experience > EE	3 Months vs. 6 Months	1.653	0.101
Experience > FC	3 Months vs. 6 Months	0.019	0.985
Experience > EE	3 Months vs. 12 Months	0.966	0.334
Experience > FC	3 Months vs. 12 Months	0.166	0.868
Experience > EE	6 Months vs. 12 Months or more	0.266	0.791
Experience > FC	6 Months vs. 12 Months or more	0.211	0.833

5. Discussion

This study described the factors affecting university students to accept online education in Saudi universities during a COVID-19 pandemic. It further examined the associations between the university students' Behavioral Intention (BI) and the four selected factors: PE, EE, FC, and ATU. Similar results in literature have verified the correlation between BI and the variables mentioned earlier. The study results revealed that majority of university students included in the sample had a strong BI to accept online education during the COVID-19 pandemic.

First, performance expectancy has a significant relationship with Attitude Toward Use (ATU). In other words, if the online educational platforms are useful to students and increase their learning outcomes, then their attitude to use online education will improve. These findings are congruent with Altalhi's study (2020), which aims at identifying the major factors determining learners' acceptance of MOOCs in higher education in Saudi Arabia. Additionally, same conclusions are reflected in Bamufleh et al. (2020), in which this study explains students' intention to use online simulation games. Results of this study showed that students' intentions were enhanced when the game appeared to be useful to them and increase their learning outcomes.

Second, Effort Expectancy (EE) does not have a significant relationship with ATU. As per the study analysis, students' attitude towards the LMS will not be affected by the level of platform complexity.

This finding contradicted Tan's (2013) study which aimed to explore Taiwanese college students' needs for English E-learning websites. The results showed that EE positively affects users' attitude to use English E-learning websites.

Third, Facilitating Conditions (FC) have a positive significant effect on attitude (ATU). If the student finds sufficient resources and technical support for online educational platforms, then their attitude increases. These findings are congruent with Bamufleh et al. (2020), in which facilitating conditions positively affects students' behavior of using the online simulation games as a learning method.

Fourth, attitude has a positive significant effect on BI. This finding goes hand in hand with Shao (2020), which investigates the factors of students' satisfaction with online learning. The study indicated that attitude has a significant positive effect on students' intention and perceived satisfaction of online learning.

6. Conclusion

This research aims at exploring the factors affecting students to accept online education in Saudi universities during a COVID-19 pandemic. On March 9, 2020, Saudi Arabia decided to adopt and use online education instead of traditional education, to enable students to continue their study during the pandemic. The most common platforms used in Saudi universities is the Blackboard LMS. Adopting LMSs provides many benefits to university students as well as teachers. The study proposed a model based on UTAUT and TAM to fulfill the study's objective. The study found the most critical factors affecting the use of online education platforms are PE, FC, attitude (ATU) and BI. The study confirmed the validity and reliability of the proposed model.

This research makes theoretical as well as practice contributions. The study's sample included more than 708 students from different regions of Saudi Arabia. Also, this study conducted during a COVID-19 pandemic, which is considered a new experience for university students. From a theoretical perspective, the study validated the UTAUT model for demonstrating and foreseeing university students' behavior and acceptance of online education in Saudi Arabia during the COVID-19 pandemic. Thus, the paper contributes to technology adoption and acceptance literature in the domain of online education in Saudi Arabia.

One limitation of the paper is the sample size. The study considered only students in Saudi Arabia. It considered five factors that would affect students' acceptance of online learning platforms; therefore, deeper analysis could be done with more constructs.

Future research should enlarge the sample size. Furthermore, more specific groups should be explored, such as teachers, educational organizations, and technical staff. Different measures could also be applied in future studies for in-depth investigation and collection of more instructive findings.

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