FACTORS INFLUENCING STUDENTS' ACCEPTANCE OF E-LEARNING PLATFORMS IN PRIMARY AND SECONDARY SCHOOLS IN SAUDI ARABIA

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ABSTRACT

Due to COVID-19 pandemic, the Saudi Ministry of Education decided to transform the educational process for both primary and secondary schools into electronic education for the first time. In this regard, it has established a new platform called Madrasti to ensure the effective transformation of learning. The study aims to highlight the features of the Madrasti platform and adopted the unified theory of acceptance and use of technology (UTAUT) to determine the factors that influence students' acceptance of e-learning platforms in primary and secondary education in Saudi Arabia. A total of 802 students from different levels responded to the survey on UTAUT constructs. Empirical data revealed that performance expectancy and social influence determine students' behavioral intention. Moreover, facilitating conditions and behavioral intentions determine students' use of e-learning platforms.

KEYWORDS

e-Learning Platform, Unified Theory of Acceptance and Use of Technology Model, Primary Education, Secondary Education, Saudi Arabia

1. INTRODUCTION

Electronic learning (e-learning) pertains to the use of information and communication technology in education (Elkaseh et al., 2015). e-Learning can be conducted through a virtual learning environment, which provides learning platforms consisting of databases, online tools, and resources (Gao et al., 2018). e-learning reduced the time and cost required for training and facilitated access to e-learning materials anytime and anywhere. Furthermore, e-Learning features several aspects, such as interactivity, flexibility, scalability, reduced costs, self-organization, rich content, self-directed learning, and immediacy, which play significant roles in the development of the educational sector in general. Moreover, e-learning promotes innovation among students, improves many skills, such as technical, management, critical thinking, analytical, and problem-solving skills (Farooq et al., 2020; Gowda & Suma, 2017).

The Ministry of Education (MOE) in Saudi Arabia provides an asynchronous e-learning system for students from different levels through educational channels via TV such as the Ein-National Education Portal, which includes 20 satellite channels for each level of education. The system presents lessons and reviews for all curricula aligned with the approved study plan of MOE. In addition, it supports the use of sign language to achieve optimal advantage for students under special education and enhances the use of new technologies in the educational process through augmented reality, Ein 3D, and play and learn (Ministry of Education, 2020).

However, the education in Saudi Arabia faced the formidable challenge of transforming into synchronous e-learning using learning management system (LMS) platforms due to the COVID-19 pandemic. For the first time, the country experienced a nationwide dilemma as the transformation includes students from all levels: primary, middle, and secondary schools.

Therefore, the MOE (2020) created a new platform called Madrasti for public and private schools to conduct distance learning for primary, middle, and secondary school students. Moreover, Madrasti was developed to ensure that educational outcomes are met by simulating traditional school classes while keeping

learners safe. Madrasti (2020) is an LMS, which includes many electronic educational tools and features that support teaching and learning processes and contribute to the achievement of the educational goals of the curricula and decisions. Furthermore, it supports the achievement of skills, values, and knowledge to enable students to become up-to-date with present and future digital requirements.

Private schools in Saudi Arabia have the option to use other popular platforms for online learning, such as, Zoom, Microsoft Teams, and Classera. Zoom and Microsoft Teams provide synchronous e-learning with several features, such as online meetings, screen sharing, chatting, file sharing, and hand raising.

The majority of previous studies were conducted in higher education levels, such that relatively less is known about whether these factors apply to lower education levels. To address this research gap, the current study aimed to explore the factors that influence students' acceptance of e-learning in Saudi Arabia by conducting an empirical study with students under primary and secondary education as subjects.

The purpose of this study is to highlight the features of the Madrasti platform and investigate the effectiveness of its transformation by measuring students' acceptance of e-learning across platforms, such as Madrasti, Zoom, Classera, and Microsoft Teams, which were used by lower education levels. Previous scholars widely suggested the use of the unified theory of acceptance and use of technology (UTAUT) model to determine intentions to use an information system and resultant behaviors of such use (Ali et al., 2018). Thus, the current study employed the model to investigate the factors that influence students' acceptance of e-learning in general education in Saudi Arabia.

The remainder of the paper is structured as follows. Section 2 presents the features of the Madrasti platform. Related work is presented in Section 3. Furthermore, Section 4 introduces the research model and hypotheses followed by Section 5 with the research methodology. Section 6 analyzes contains data using several statistical techniques. The results are presented in Section 7. Finally, Section 8 concludes, provides several recommendations, and proposes further studies on e-learning in general education.

2. FEATURES OF THE MADRASTI PLATFORM

The main users of the Madrasti platform are students, teachers, parents, and school leaders. Accordingly, the platform enables users to take advantage of features and services depending on their roles and needs.

Madrasti provides a virtual classroom as a tool for delivering a safe environment for lessons over the Internet through Microsoft Teams, which enables a teacher to interact and discuss with students effectively, respond to inquiries, assign tasks and assignments, and motivate. Moreover, Madrasti provides more than 45,000 learning sources that consider differences between students. It provides visual and cartoon videos, educational games, augmented reality, 3D objects, interactive and fun experiments, and learning stories and books.

The platform features are improving student evaluation through electronic tests and assignments. Moreover, it facilitates exam preparation using a database of more than 100,000 approved questions for the majority of courses. Moreover, Madrasti provides spaces for discussion that enable interaction between teachers and students, between students and contents, and among students to enhance psychological and social communications skills. The Madrasti platform enhances the diversity of educational resources that make the education process more accessible through schoolbooks, Ein satellite channels, and discussion forums.

Besides, MOE provides many other tools to evaluate the new approach of e-learning, overcome obstacles as soon as possible, and ensure the quality of the education process electronically. It provides a technical team to assist the users of the platform and answers inquiries through technical support, automatic response, or contact to a unified number. Moreover, it creates electronic questionnaires to measure the quality of the Madrasti platform from the diverse perspectives of students, teachers, parents, and school leaders.

Madrasti provides several features that differ from one user to another to meet different needs. For students, the Madrasti platform provides a school schedule and educational enrichment foundation. A school schedule is a superior tool that ensures the arrangement of courses and enables each student to know and enter a specific course on time. For enrichment, it provides additional resources to expand and enrich student learning. Figure 1 demonstrates the student tools presented for each course separately.

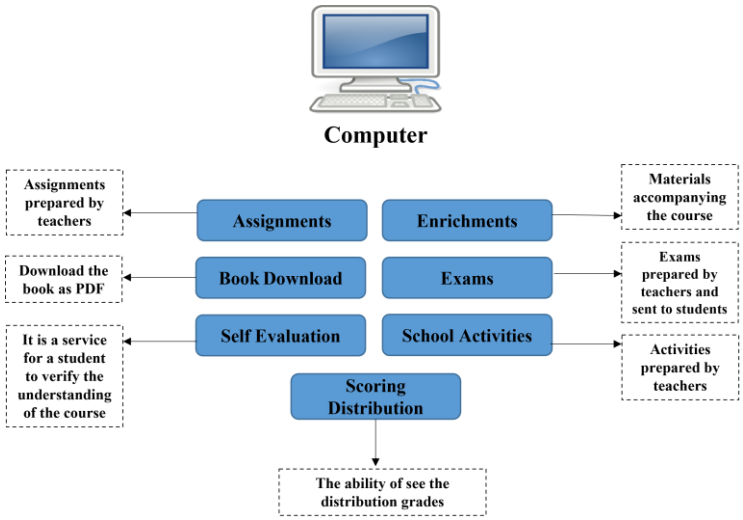

Figure 1. Students' Tools in Madrasti platform

Teachers use specialized tools in the Madrasti platform, such as electronic educational tools that develop students' skills, such as critical thinking, problem-solving, and innovation, which can help to overcome the educational gap and support students simultaneously. Moreover, teachers can conduct and attend virtual meetings with school employees and parents to serve the educational process. The evaluation process of teachers is dependent on the level of students' interaction and utilization of the platform. Therefore, teachers conduct a follow-up to improve students' performance and encourage them to increase their accomplishment. Teachers can also post students' grades and marks to be available on students' pages. Also, the teacher can monitor student absence or late attendance.

Moreover, Madrasti enables parents to supervise and follow up on the achievement of the children in the educational process through effective communication between parents, teachers, and school employees. Moreover, parents can view their children's data, such as attendance, assignments, and reports. The role of parents in supporting the educational process is to enter the system, selected the name of the child that requires a follow-up, and verify achievement and progress.

School leaders play an essential role in the traditional as well as the electronic educational process. For this reason, the platform provides beneficial tools for leaders to promote effective and efficient performance. Each school leader is responsible for essential tasks, such as adjusting the school schedule and ensuring that student information matches the appropriate level of education and teachers are assigned to appropriate courses. Lastly, school leaders are tasked with building and managing the school schedule for each classroom. The school leader can follow up the progress of the educational process in the virtual classroom by viewing the teacher's schedule, accessing any virtual classroom, and monitoring the progress of the educational process. (Ministry of Education, 2020).

3. RELATED WORK

In general, the acceptance of a new system is determined by the levels of users' adoption and usage. The significance of e-learning in the educational sector led researchers around the world to measure students' acceptance of e-leaning. For instance, Violaine (2019) used the UTAUT model to evaluate the factors that influence student's decision-making on the adoption of e-learning. Data were derived from higher education students in Rwanda. The study found that performance expectancy (PE), effort expectancy (EE), and facilitating condition (FC) are factors that significantly influence students' satisfaction with adopting e-learning, whereas social influence (SI) exerted no impact on students' adoption of e-learning.

In addition, Ameen et al. (2019) investigated the adoption of e-learning in Iraq. The authors surveyed a sample of 300 university students and used the TAM, UTAUT, and three factors to determine the factors that explain the adoption and effective use of e-learning system. The findings suggested that perceived usefulness (PU), perceived ease of use (PEOU), subjective norms (SN), information quality, system quality, technical

support (TS), and self-efficacy (SE) are factors that have a significant impact on behavioral intention (BI). Thus, BI and TS have significant direct impact on the actual use of e-learning systems.

Utama et al. (2020) conducted a study in Indonesia and explored the perspectives of medical students toward e-learning during the COVID-19 pandemic. The researchers employed the UTAUT model to determine the factors that influence the medical students' acceptance of e-learning. The study found that PE was a significant factor that reflects the positive perception of medical students, which supports BI to use e-learning. In contrast, EE, SI, FC, and experience were considered as negative factors that limit the usage of e-learning.

Furthermore, Raza et al. (2020) used the extended UTAUT model to examine the factors that influence students' acceptance of e-learning during the difficult time of social isolation due to the COVID-19 pandemic. The results pointed to the strong relationships of PE, EE, SI, and social isolation to BI of e-learning. In addition, the results indicated a strong relationship between BI and students' usage behavior of e-learning.

In addition, Tiwari (2020) explored the core factors that influence university students to adopt and accept e-learning during COVID-19. The study was based on the UTAUT model, which identified perceived cost (PC) as an additional factor for explaining the relationship between students' attitudes and acceptance of e-learning. The findings revealed that PE, EE, and FC exerted a significant impact; SI displayed a weak impact; and PC had no impact on BI toward e-learning acceptance.

Al-Azawei and Alowayr (2020) conducted a comparative study between two Middle Eastern countries (i.e., Saudi Arabia and Iraq) using the modified UTAUT model to determine the factors that facilitate students' acceptance of ML. Although many constructs were significant for one country, they were not for other countries, and vice versa. The results revealed that the variances for BI and hedonic motivation were 56.1% and 40.7%, respectively, for Saudi Arabia and 51.1% and 41.9%, respectively, for Iraq. Such findings reflect the acceptance level of students toward ML for both countries.

In the same manner, many scholars measured acceptance of e-learning among teachers. For instance, Sarbaini et al. (2019) surveyed 200 lecturers in Indonesia to investigate the factors that influence their adoption of e-learning technologies. The researchers used the UTAUT model to examine the constructs that teachers considered the most relevant, such as PE, EE, SI, and FC. Moreover, the study further considered individualism–collectivism as an additional construct that influences the intention to use e-learning technologies among teachers. The findings indicate that high levels of relative advantage, individualism–collectivism, EE, and PE are significantly associated with increased intention to adopt e-learning technologies.

In addition, Buabeng-Andoh and Baah (2020) surveyed 361 teachers to explore the factors that influence teachers' intention to use LMSs as a form of e-learning system. The research model used was based on the UTAUT and TAM. The findings indicated that SI, EE, and PE influence teachers' attitude and BI to use technology in education, whereas FC exerted no effect.

4. RESEARCH MODEL AND HYPOTHESES

Several methods are utilized for analyzing technology acceptance. The Technology Acceptance Model (TAM) is the most popular and frequently used. In 2003, Venkatesh et al. (2003) theorized that the UTAUT model can present a comprehensive view of the acceptance process of new technologies compared with previous models. UTAUT was derived from the comparison and combination of eight theoretical models of intention and usage, namely, Motivational Model, Theory of Reasoned Action, TAM, Theory of Planned Behavior (TPB), combined TAM and TPB (C-TAM–TPB), Model of PC Utilization, Social Cognitive Theory, and Innovation Diffusion Theory (Mutambara & Bayaga, 2021). Each model uses different constructs to measure user acceptance of new technologies. The constructs of the eight models were compared and combined to formulate new constructs for the UTAUT model. Currently, the UTAUT model contains five constructs applicable to a wide range of fields and considered a decisive factor for user acceptance and behavioral usage.

The study employed the UTAUT as the research model. Under the UTAUT model (Lescevica et al., 2013), the acceptance of e-learning technology is determined using five constructs, namely, Performance Expectancy (PE), Effort Expectancy (EE), Social Influence (SI), Facilitating Conditions (FC), and Behavioral Intension (BI).

- PE pertains to the degree to which a student believes that the usage of a system will be useful and improve learning performance.
- EE denotes the degree of ease associated with using the system.
- SI stands for the degree to which a student considers the importance of the notion that other students should use the new system.
- FC represents the degree to which a student believes that an organizational and technical infrastructure exists to support system use.
- BI refers to the subjective probability of the student to perform the behavior in question.

The study presents the following hypotheses as shown Figure 2:

H1: Performance expectancy positively influences students' behavioral intention to use e-learning platforms.

H2: Effort expectancy positively influences students' behavioral intention to use e-learning platforms.

H3: Social influence positively influences students' behavioral intention to use e-learning platforms.

H4: Facilitating condition positively influences students' use e-learning platforms.

H5: Behavioral intention positively influences students' use of e-learning platforms.

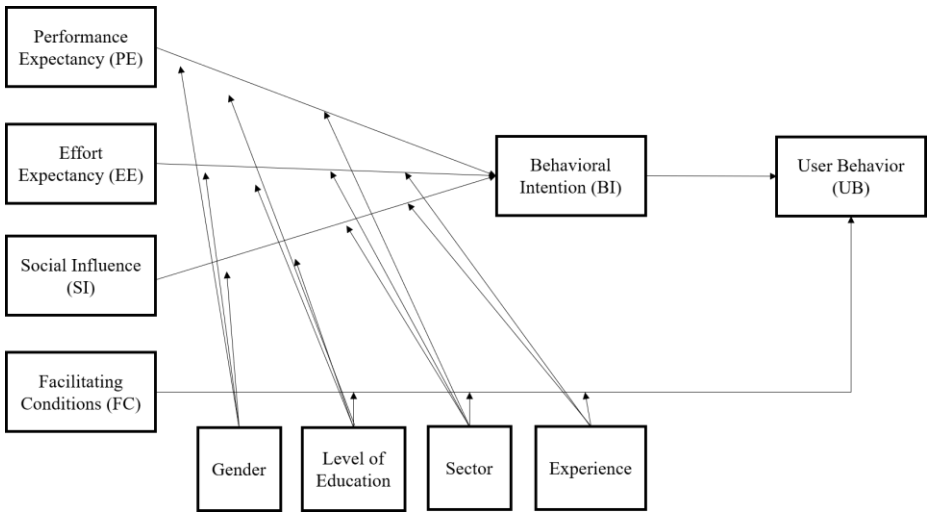

Figure 2. Research Model

5. RESEARCH METHODOLOGY

The study conducted a quantitative research in the form of a questionnaire, which was randomly distributed online to students at the primary, middle, and secondary school levels across public, private, and international schools. The questionnaire strictly followed the ethical guidelines of the institution. In the form of the questionnaire, the research purpose, the voluntary nature of participation, and the predicted time for completing the questions were noticed. The questionnaire aims to investigate the usage and acceptance levels of e-learning platforms among general education students. The questionnaire was developed based on the determining factors used in the UTAUT model. Items were rated using a five-point Likert-type scale ranging from 1 = strongly disagree to 5 = strongly agree.

As Arabic is the official language in Saudi Arabia, the original questionnaire was translated to Arabic by a professional translator. The authors reviewed the Arabic version and translated it back to English to ensure the same integrity of meaning.

Moreover, to ensure the reliability and validity of the results, a sample should represent a sufficient number of respondents that is representative of the general population. According to Hair et al. (2013), the sample size should be determined based on corresponding population sizes as shown in Table 1 .

Table 1. Determination of sample size based on population size

Population Size	Sample
10000	370
15000	375
20000	377
30000	379
40000	380
50000	381
100000	383
>100000	384

Note. Source: Hair et al. (2013*)*

According to the latest records published by MOE, the population of general education students is 6,187,776 as of 2020. Therefore, the study obtained 802 completed questionnaires, which reflects the optimal sample size required to produce reliable estimates. In this manner, the study can provide accurate answers and accurately reflect the results as representation of the population.

6. DATA ANALYSIS

6.1 Respondents' Profile

Table 2 presents the distribution of students according to gender, level of education, school type, e-learning platform used, and students' experience of using e-learning platform.

Table 2. Distribution of students

Distribution of students by:		Frequency	Percentage
Gender	Male	76	9.5
	Female	726	90.5
Education level	Elementary	230	28.7
	Middle	125	15.6
	High	447	55.7
School type	Public	725	90
	Private	51	7
	International	26	3
e-Learning platform	Madrasti+Microsoft Teams	706	88
	Zoom	28	3.5
	Classera+Microsoft Teams	44	5.5
	Microsoft Teams	24	3
Experience of using e-learning platform	Students with experience	227	28.3
	Students without experience	575	71.7

Table 3 and Figure 3 represent the most popular platform for each school type.

Table 3. Platforms used according to school type

School types	Platforms								Total	
	Madrasti+Microsoft Teams		Zoom		Classera+Microsoft Teams		Microsoft Teams			
	N	%	N	%	N	%	N	%	N	%
Public	707	99	9	32	3	6	6	37	725	90
Private	6	1	12	43	30	67	3	19	51	7
International	0	0	7	25	12	27	7	44	26	3
Total	713	100	28	100	45	100	16	100	802	100

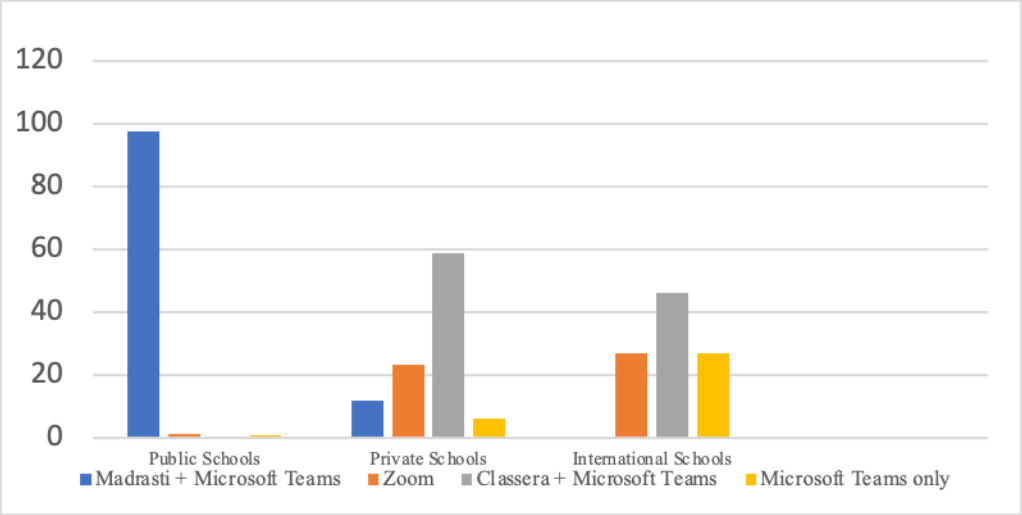

Figure 3. Relationship between platforms and school type

6.2 Reliability

The study employed Cronbach's alpha to test reliability. Table 4 indicates that Cronbach's alpha for the questionnaire is 0.944, which is a high value for stability (reliability). The table also presents that the validity and reliability of the items in the questionnaire are high and positive according "Pearson's correlation coefficient" with the highest and values at 0.916 and 0.758, respectively.

Table 4. Reliability statistics

	Cronbach's alpha 0.944	Items N = 16
	Performance Expectancy (PE)	Pearson's correlation
1	I found this platform useful in my learning process.	0.872**
2	Using this e-learning platform will help me accomplish tasks quickly.	0.877**
3	This platform will facilitate the effectiveness of learning.	0.900**
4	Using this platform will improve the quality of my learning.	0.881**
	Effort Expectancy (EE)	
1	My interaction with this e-learning platform is clear and understandable.	0.837**
2	I found this platform easy to use.	0.910**
3	Learning to operate this platform was easy for me.	0.916**
4	It was easy for me to become skillful at using this platform.	0.906**
	Social Influence (SI)	
1	People who influence my behavior (relatives) think that using this platform is easy for me.	0.807**
2	People who are important to me (non-relatives) believe that I should use this system.	0.758**
3	The Ministry of Education and my school encouraged me to use this platform.	0.825**
4	In general, I received sufficient supported in using this platform.	0.830**
	Facilitating Condition (FC)	
1	I have the resources necessary to use this platform.	0.866**
2	I have basic knowledge of using this platform.	0.874**
3	I have a support person/group (technical support team) who helps me with difficulties in using e-learning.	0.801**

*Note. **p < 0.01*

6.3 Inferential Analysis

The study used two methods for inferential analysis, namely, correlation and regression, to describe the relationships between PE, EE, and SI (independent variables) and BI (dependent variable) and between FC and BI (independent variables) and use of e-learning (dependent variable).

Table 5 provides the results of correlation analysis to verify the proposed relationship among variables. First, a positive relationship was observed between experience and educational level. Students' experience of using e-learning is positively correlated with education level. Thus, high school students have more experience than elementary and middle school students. Second, a significant relationship was noted between experience and school type that differs from one school to another. For UTAUT factors, a significant relationship was found between PE and SI, between EE and BU, and between FC and BU. In contrast, no significant relationship was noted between other factors.

Table 5. Correlations between factors

	Gender	Education level	School type	Experience	BI	PE	EE	SI	FC	BU
Gender	1.000									
Education level	−.210**	1.000								
	.000									
School type	.284**	−.132**	1.000							
	.000	.000								
Experience	−.005	.160**	.197**	1.000						
	.891	.000	.000							
BI	−.005	−.006	−.001	.086**	1.000					
	.876	.837	.987	.007						
PE	−.035	.000	−.029	.081**	.512**	1.000				
	.246	.986	.320	.007	.000					
EE	−.024	−.038	−.009	.101**	.423**	.567**	1.000			
	.422	.187	.772	.001	.000	.000				
SI	−.014	−.033	−.019	.060*	.388**	.496**	.560**	1.000		
	.644	.252	.517	.046	.000	.000	.000			
FC	.003	−.032	.008	.093	.404	.578**	.687**	.679**	1.000	.779**
	.924	.372	.819	.009	.000	.000	.000	.000	.000	.924
BU	−.021	−.023	−.011	.091**	.637**	.706**	.699**	.650**		1.000
	.474	.411	.693	.002	.000	.000	.000	.000	.000	.000

In the proposed model, the study used path coefficients to reveal relationships between UTAUT factors and test the research hypotheses. Table 6 shows a statistically significant effect of BI, PE, and SI on e-learning ($p < 0.05$), whereas EE did not exert a statistically significant effect on intention to use e-learning ($p > 0.05$). Such findings support H1 and H3 ($p < 0.05$) but reject H2 ($p > 0.05$).

Table 6. Structural research model for behavior intention

Hypothesis	Path	Unstandardized coefficients		Standardized coefficients	t-Value	Sig.	Remarks
		B	Standard error	β			
H1	PE → BI	0.644	0.053	0.490	12.153	0.000	Supported
H2	EE → BI	0.114	0.062	0.084	1.844	0.066	Rejected
H3	SI → BI	0.168	0.063	0.110	2.659	0.008	Supported

Note. Dependent variable: behavior intention

Table 7 indicates the statistically significant effect of FC and BI, which are related to use of e-learning, on e-learning acceptance ($p < 0.05$). This result supports H4 and H5 ($p < 0.05$). Figure 4 shows the path coefficients of the hypotheses.

Table 7. Structural research model for use of e-learning

Hypothesis	Path	Unstandardized coefficients		Standardized coefficients	t-Value	Sig.	Remarks
		B	Standard error	β-value			
H4	FC → UB	0.342	0.009	0.537	39.409	0.000	Supported
H5	BI → UB	0.514	0.012	0.580	42.531	0.000	Supported

Note. Dependent variable: use of e-learning (User Behavior)

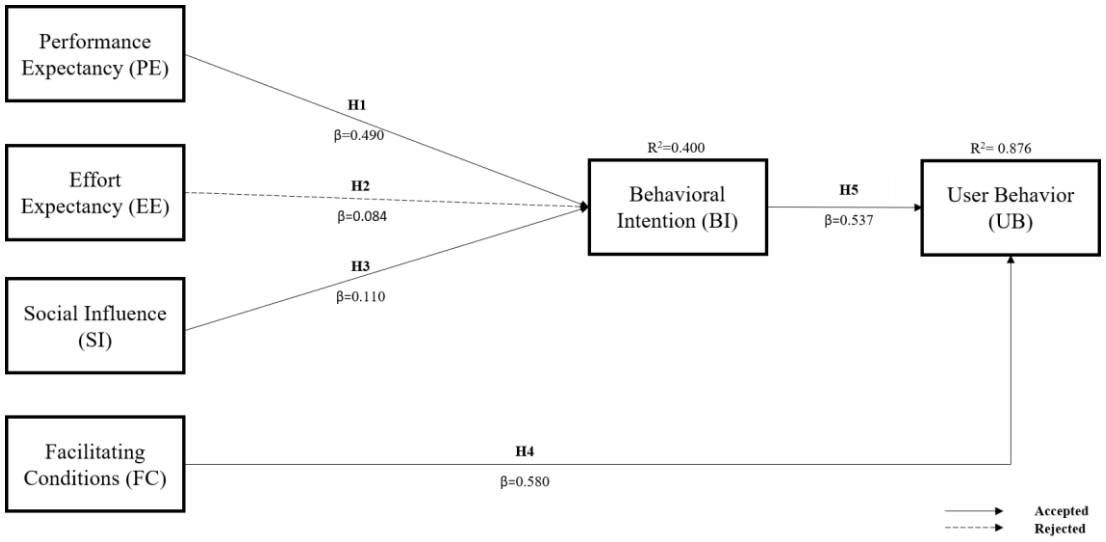

Figure 4. Path coefficients of the hypotheses

7. RESULTS AND DISCUSSIONS

The study investigated the main factors influencing students' use and acceptance of e-learning platforms as utilized by primary and secondary schools in Saudi Arabia in response to the COVID-19 pandemic. Analyses indicate that Madrasti is the most popular platform used for e-learning (88% of the total responses) and mostly used in public schools. Madrasti was selected by 88% of the respondents for its features and meeting the requirements of students in e-learning. Thus, Madrasti can be used across student levels and types of schools, which renders it a promising platform for potential use in other countries.

Moreover, the results revealed that the level of education of the students influence experience of using e-learning. As expected, high school students displayed more experience in using e-learning platforms compared with elementary and middle school students, whereas elementary students exhibited the least experience in using e-learning platforms. Moreover, 58% of international school students reported previous experience with using e-learning platforms followed by private (55%) and public (25%) school students.

The assessment of the core UTAUT variables in Figure 4 indicated that PE has a significant effect (0.490) (β-value) on BI to use e-learning platforms (H1) followed by SI (0.111) (β-value) (H2). The two constructs explain 40% (R2 value) of variance of BI. Moreover, FC has a significant effect (0.580) (β-value) on UB (H4) followed by BI (0.537) (β-value) (H5), which explains 87.6% of variance of UB.

Students reported efficient learning with the use of e-learning platforms, which are important tools for the rapid completion of tasks. Thus, PE is the most significant factor influencing BI to use e-learning platforms (49%). In addition, the efforts of the MOE are attributed for FC (58%), which enabled students to use e-learning platforms. Furthermore, students mentioned that the necessary resources, basic knowledge, and technical support were made available, which encouraged their acceptance and use of e-learning platforms.

In general, the results indicate high levels of acceptance of e-learning among students in the low level education scheme in Saudi Arabia. e-Learning in Saudi Arabia is undergoing constant development because it is predicted to be an approved approach to education in the future (Melibari, 2020).

8. CONCLUSION

The study used the UTAUT model to identify the factors that influence students' acceptance of e-learning platforms in general education in Saudi Arabia. The findings revealed that PE, SI, and FC were significant factors, whereas EE was not a significant factor for the acceptance of using e-learning platforms. Thus, EE can be considered an indicator of difficulties in using these platforms and lack of students' skills.

The research provided useful insights into students' acceptance and use of e-learning platforms. The model used laid the foundation for further research on the acceptance of e-learning platforms in general education. Therefore, future studies may use other methods used by international and private schools to gauge students' experience in using e-learning platforms. Moreover, researchers may explore possible techniques that can facilitate the use of e-learning platforms among students.

To encourage students to accept and use e-learning platforms, decision-makers in the MOE can use the results of the study to inform the design of such platforms with consideration of several aspects, such as ease of use, clarity, and understandability. Furthermore, enhancing the awareness and experience of general education students, especially elementary students, is important to promote acceptance of e-learning according to level of education. In addition, workshops and training courses may be conducted to aid students in the effective use of e-learning platforms. In this manner, the MOE can ensure that the largest possible number of students can make effective use of e-learning platforms.

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