Role of Teachers' Ability and Students' Facilities in Educational Sustainability during the COVID-19 Pandemic: Empirical Evidence from Saudi Arabia

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A R T I C L E   I N F O

A B S T R A C T

Purpose The sustainability of education became a global issue due to the COVID-19 pandemic lockdown and captured the focus of regulators and recent literature. The current article investigated the impact of teachers' ability related to the usage of learning management system (LMS) and research engines and students' facilities related to access online learning activities and learning resources. The objective was to examine the moderating role of institutional support among the linkage of students' access to online learning activities, students' access to learning resources, and education sustainability of private and public universities in Saudi Arabia. **Methodology** The study used a survey questionnaire to gather the data and smart-PLS to analyze the data. **Findings** The results indicated that teachers' ability to use LMS and research engines and students' access to online learning activities and learning resources have a positive impact on the education sustainability of private and public universities in Saudi Arabia. The results also exposed that institutional support significantly moderated between the linkage of students' access to online learning activities and education sustainability of private and public universities in Saudi Arabia. **Implications to Research and Practice** This study would provide help to the policymakers while developing the policies regarding education sustainability during and after the COVID-19 pandemic.

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Introduction

The COVID-19, a contagious and fatal wide-spreading disease, wreaked destruction on the educational system across the world. It forced educational institutions, including education care centers (ECEC), early childhood education, schools, universities, and colleges, to close completely. With an intention to overcome or fight against the spread of COVID-19, a majority of governments agreed to temporarily shut down the educational institutions (Burki, 2020). The increasing closure of elementary, secondary, and higher schooling in more than 100 nations resulted from struggles to overcome the widespread of COVID-19. This outbreak of fatal and contagious illness epidemics led to widespread school closures with various degrees of success. As on Jan. 12, 2021, around 825 million students have been affected by school closures as a result of the epidemic. The UNICEF monitoring shows that 23 nations have executed countrywide closures, and 40 countries have implemented local closures, affecting over half of the world's student population. Schools in 112 nations are currently open (Atuahene et al., 2020). There has also been non-pharmaceutical therapies and preventive measures like self-isolation and social distancing (Ahmed et al., 2021).

The world statistics have shown that through school disclosures, the spreading of infectious diseases can be controlled. Well, the effectiveness of the program is determined by the contacts that help students sustain outside schools and colleges (Tang et al., 2021). As the program to close the educational institutions was implemented quickly, it was effective in reducing virus affected cases and deaths. The closures of educational institutions that occurred later in the outbreak may be less effective and may have been useless at all (Evans et al., 2020). Moreover, in certain situations, reopening schools after a period of closure has resulted in an increase in infection rates. It can be difficult to quantify the certain effects of school closures because they often occur in conjunction with other interventions, such as public gathering prohibitions (Mhlanga & Moloi, 2020). In this situation, when the schools are closed, the education of learners is likely to be affected. Many students, having exhausted with the closure of schools, felt the need to improve teaching and learning methods or get assistance in creating a comfortable learning environment to bring sustainability in education. The teachers' abilities and students' facilities determine the possibility of sustainability education even during the contagious times (Reuge et al., 2021).

Saudi Arabia is a high-income developing country with estimated GDP of 843 billion in 2020. The education system of Saudi Arabia is one of the largest ones in the world (Hassounah et al., 2020). Like, the education sector in any other country, Saudi Arabia's education sector was also much affected by the outbreak of the pandemic (Khalil et al., 2020). The Ministry of Education (MOE) devised a temporary emergency strategy to oversee and facilitate distance education at both school and university levels in order to keep the educational processes running smoothly. The MOE extensively controlled the educational processes in public schools by using online education platforms to encourage virtual classes by making use of right digital material. Saudi Arabia developed its own formal online school education platform. All the classes for all levels of students were available asynchronously on the Ain channel on YouTube (Alshaikh et al., 2021).

Higher education institutions and universities, on the other hand, were allowed more flexibility in administrating educational projects during the pandemic. The MOE devised a number of policies, strategies, and procedures to protect students' learning, secure future opportunities, and maintain the average performance (Alqurshi, 2020). Currently, all Saudi universities use Blackboard, which is one of the most widely interacted and used e-learning platforms. By applying trustworthy communication instruments, this educational practice made the experience more adaptable (Alyami et al., 2020). As a result, universities in Saudi Arabia eliminated various barriers to communication between tutors and learners, allowing all stakeholders to communicate with one another. As education is a significant socio-economic sector in the country and social welfare as well as economic development all depends on education development (Yamin, 2020). Not only in Saudi Arabia but across the world, COVID-19 has affected the educational sector by creating interruptions in regular education activities. For the prevention of COVID-19, the educational institutions were closed, which disturbed the education of students and affected their future and country's growth (Alsmadi et al., 2021). Considering this need, a need was felt to initiate a study to focus on education sustainability during COVID-19.

The current study aimed to examine the impact of teachers' ability to use LMS and research engines, students' access to learning resources and online learning activities and institutional support on education sustainability for the education sector of Saudi Arabia. It also examined the moderating influence of institutional support on the association between teachers' ability to use LMS, teachers' ability to use research engines, students' access to learning resources and students' access to online learning activities and educational sustainability. This study would prove exceptional in this domain due to many reasons: 1) In previous studies, the role of teachers' abilities and students' facilities in education sustainability has though been analyzed but not in one single study. Our study blended all variables such as teachers' abilities, students' facilities and education sustainability at one place, which is a unique contribution. 2) In the past research, teachers' abilities and students' facilities did not establish their relationship with the internet or digital technology while analyzing education sustainability. This study for the first time relates teachers' abilities and students' facilities to digital technology with the use of LMS, search engines, and online learning activities in order to determine the education sustainability during COVID-19. 3) Previous studies have discussed the impact of institutional support on teachers' abilities and students' facilities and education sustainability but ignored the moderating role of institutional support between teachers' ability to use LMS and research engines, students' access to learning resources and online learning activities and educational sustainability.

The paper has five parts which are as follows: The first part dealt with introduction and purpose of the study. The second part presents literary views on institutional support, teachers' ability to use LMS and research engines, students' access to learning resources and online learning activities and education sustainability. The third part describes the methodology, or the processes adopted for the collection of data and data evaluation. The next part deals with results and comparisons with past studies. In the last part, the paper presents conclusion, implications and limitations of the study.

Literature Review

The education sector of a country plays a significant role in its economic survival, growth and social welfare. Educational institutions are producers of economic and social actors like scientists, doctors, academics, businessmen, economists, researchers, philosophers, and social reformers (de Souza et al., 2020; Oyedotun, 2020). This sector has come under danger ever since the outbreak of COVID-19. In order to fight against the devastating effects and widespread of this contagious disease, self-isolation and social distancing was needed. The closure of schools as a result of these precautions affected the education level or education quality within the country. Teachers, as well as students, played an effective role in mitigating COVID-19 impacts on education (Daniel, 2020). This study examined the impact of teachers' ability to use LMS, teachers' ability to use research engines, students' access to learning resources and students' access to online learning activities on education sustainability. For this purpose, the present study looked at the arguments of authors from the past literature, which helped develop a few hypotheses.

The learning management system (LMS), according to Alturki and Aldraiweesh (2021), has brought a great revolution in the education world by saving, time, space, and money, improving the quality of education, the scope of education, and thereby, developing sustainability in the education. According to the arguments of Al-Abdulkader et al. (2018), the LMS is effective in education sustainability in pandemics. Edelhauser and Lupu-Dima (2020), defined LMS as a software system or web-based technology employed for planning, execution, and making an assessment of a particular learning process. Traditionally, a particular LMS provides teachers with a way to develop and transfer education content, monitor student engagement in learning, and evaluate their performance. LMS develops the ability in the learners to apply interactive features like discussion forums, threaded discussions, and video conferencing. Mostly, educational institutions use some popular LMSs like Moodle, Blackboard Learn, Schoology, TalentLMS, eFront, and iSpring Learn, which are specially designed and used for education sustainability (GEZEGİN & Melike, 2020; Mazur & Kuć, 2020; Navarro et al., 2021; Tomteberget & Larsson, 2020). A research article by Raza et al. (2021) investigated teachers' ability to use LMS and their influence on education sustainability. The research was carried on 2400 teachers and 35000 students on a school board. The reliability of the relationship of the factors under research was analyzed through statistical analysis software like SAS and SPSS. The study implied that teachers needed specific abilities to run LMS such as the ability to access the LMS from a digital device of their choice, to easily understand the user interface and interact with it. They needed the ability to navigate, to view and track the online training practices, supply students with learning opportunities 24/7 without taking breaks, and train them even without regular face to face classes. Based on above arguments, the following hypothesis is developed:

H1: Teachers' ability to use LMS has a positive association with education sustainability.

The teachers' ability to use research engines and implementation of this ability to teach students, apart from regular classes at educational institutions, is an effective initiative to develop sustainability in education and performance of educational institutions. A research engine is a software system designed to carry out internet-based searches. These engines look

for the World Wide Web to search information, particularly in a systematic textual search query (Currie et al., 2020). The information attained through search engines may be in the form of web pages, articles, images, research papers, videos, infographics, databases, directories, and different files, depending on the type of search engines. The ability of tutors to access appropriate search engines and use them in education enables them to enhance the knowledge of their students and help them to keep on their learning even when they are in a position to attend proper classes even in COVID-19 (Choi et al., 2021).

In a literary workout, Murray (2018) presents arguments on teachers ability to use research engines and sustainability of higher education. This study was based on case studies related to digital technology and sustainability in higher education. It emphasized that when teachers are proficient in interaction with search engines like google, google chrome, Microsoft Edge, Firefox, Bing, Yahoo, and contextual web search, they create awareness of these research engines as a source of learning and teach the students how to employ them at home when it is needed. This indicates that teachers' ability to use search engines can be effective in developing sustainability in education even during COVID-19. Kamrozzaman et al. (2020) also support the fact that teachers' knowledge and skills interact with search engines, and it is helpful to maintain the quality of education provision to students during COVID-19. Hence, the hypothesis runs thus,

H2: Teachers' ability to use research engines has a positive association with education sustainability.

Different education institutions introduce different teaching and learning resources to their teaching staff and students with an intention to develop sustainability in the quality of education to be provided to students and compete successfully in the education sector (Leal Filho et al., 2021). When teaching staff and students have access to teaching and learning resources which are challenging, encouraging, and engaging learning programs for students, students can more effectively hit the learning targets and show good results in examination, even though they are not able to attend the face to face classes due to the COVID-19 (Popa et al., 2020). In the words of Huang et al. (2020), learning resources are the spoken, written or visual text or activities used or conducted by schools for providing education to students in a better way so that the education can be sustainable and effective. This study implied that though COVID-19 put a ban on the transportation of public and the opening of schools or colleges for regular classes, the education institutions employed latest technology to perform their primary objectives and assist the students to have access to learning through effective digital learning resources, thus signifying sustainable education performance in the overall education sector. Trung et al. (2020) examined the learning habits (based on learning resources) and sustainability of education in Vietnam during COVID-19. Through the snowball sampling method, the questionnaires were distributed over a network of educational societies on Facebook between Feb. 7 to Feb. 28 in 2020. The research inferred that the students who had the access to were proficient in the use of modern digital learning resources like research engines, web-based sites, social media, learning applications, and video conferencing, etc. They were also more active during the period of spreading contagious disease like COVID-19. Hence, we put the following hypothesis:

H3: Students' access to learning resources has a positive association with education sustainability.

In the modern era, the age of digital technology, both middle and higher education institutions are engaged in online activities and also encourage these activities among their students to have better sustainable education (Adarkwah, 2021). Since the beginning of the COVID-19 outbreak across countries, the education communities have been much affected. There has been felt a need to adopt the ways to continue education even though restrictions without being affected by the virus and its damages to health. In this situation, online activities whose basic objective was to promote distance learning played a key role in sustaining the education of students without affecting the quality of education (Adedoyin and Soykan (2020). Zhu and Liu (2020) also integrated the relationship between students' access to online learning activities as an education strategy to mitigate the influences of COVID-19 on education sustainability. This research was based on the data from colleges and universities in China when it was inflicted by the contagious disease of COVID-19. This study examined online learning activities like online debates, real-world case studies, classroom newspapers, whiteboard teaching, trivia competition, comic strip, and video newscast and checked their role in education sustainability in students' education. The results indicated that the students who had the facility to engage and lead online learning activities had not been disturbed by the spread of COVID-19 as it helped them maintain the curricular activities with the same potential and to be prepared for the examination in future. Another research conducted by Ullah et al. (2021), in the education sector of China and Pakistan, also revealed that students' access to online learning activities developed sustainability in children's education during a health crisis. On the basis of the above discussion, the following hypothesis is drawn:

H4: Students' access to online learning activities has a positive association with education sustainability.

The behavior of educational institutions is indicated by decisions, policies, and strategies regarding the teaching methods, contents of courses, sources of learning, innovation, and learning context to the students. When institutions show supportive behavior towards the teaching staff and students in order to encourage them for better performance, the students are motivated to focus on their subject, their curricular courses, and co-curricular activities and have the opportunity to better use their learning skills. This ensured sustainability in students' education (Yıldırım, 2021). A study presented by Cavus et al. (2021), aimed to investigate the relationship between institutional, educational support, social networking sites as learning resources and sustainability in education for the context of COVID-19 in Nigeria. This article was a systematic review of the studies which examined institutional support and the worth as well as the facility of social networking sites in the education sector. The study implies that the institutional support to the students in the form of providing them with the convenient resources of education and giving them a comfortable learning environment may develop awareness and skills in the students to use social networking sites. This assists the students to enhance their knowledge and carry on their study even after a health crisis in the form of COVID-19.

A study by Tran et al. (2020) throws light on the nexus among institutional support, student access and behavior to learning resources, and education sustainability during COVID-19. The study findings are based on the data from the original survey of 420 K6–12 students in Hanoi, Vietnam, with the differentiation of socio-economic statuses during the disease's outbreak. The findings show that high institutional support improves the relationship between student access and behavior to learning resources and education sustainability during COVID-19. Hence. A hypothesis can be drawn:

H5: Institutional support plays a moderating role between students' access to learning resources and educational sustainability.

A study was conducted by Khan et al. (2021), during June–August 2020, in order to investigate the role of institutional support and students' access to online learning activities in education sustainability in the context of COVID-19. For this study, the quantitative approach was employed, and data from 184 university students of National Capital Territory (NCT) of Delhi, India, namely Delhi University, Guru Gobind Singh Indraprastha University and Jamia Millia Islamia (Central University), were acquired via an online questionnaire. This research study was conducted during June–August 2020. The study implied that when educational institutions provide support (financial, cognitive, or emotive support) to students, the students may have access to and ability to get engaged in online learning activities and thereby, they can sustain their education at home. Another research carried out by Torres Martín et al. (2021) examined institutional support, virtual learning, and educational sustainability. The relevant data were collected from the students at the Faculty of Education Sciences of the University of Granada in 2nd semester of 2019–2020. The study showed that when educational institutions showed supportive behavior towards students helping them in getting an education, they held access to online learning activities such as real-world case studies, online debates, whiteboard teaching, classroom newspapers, trivia competition, comic strip, and video newscast. This assured education sustainability. That is why, we may say

H6: Institutional support plays a moderating role between students' access to online learning activities and educational sustainability.

Methodology

Research Design

This study investigated the impact of teachers' ability to the usage of LMS and research engine and students' facilities to access online learning activities and learning resources on education sustainability and also examined the moderating role of institutional support among the linkage of students' access to online learning activities, students' access to learning resources and education sustainability of private and public in Saudi Arabia.

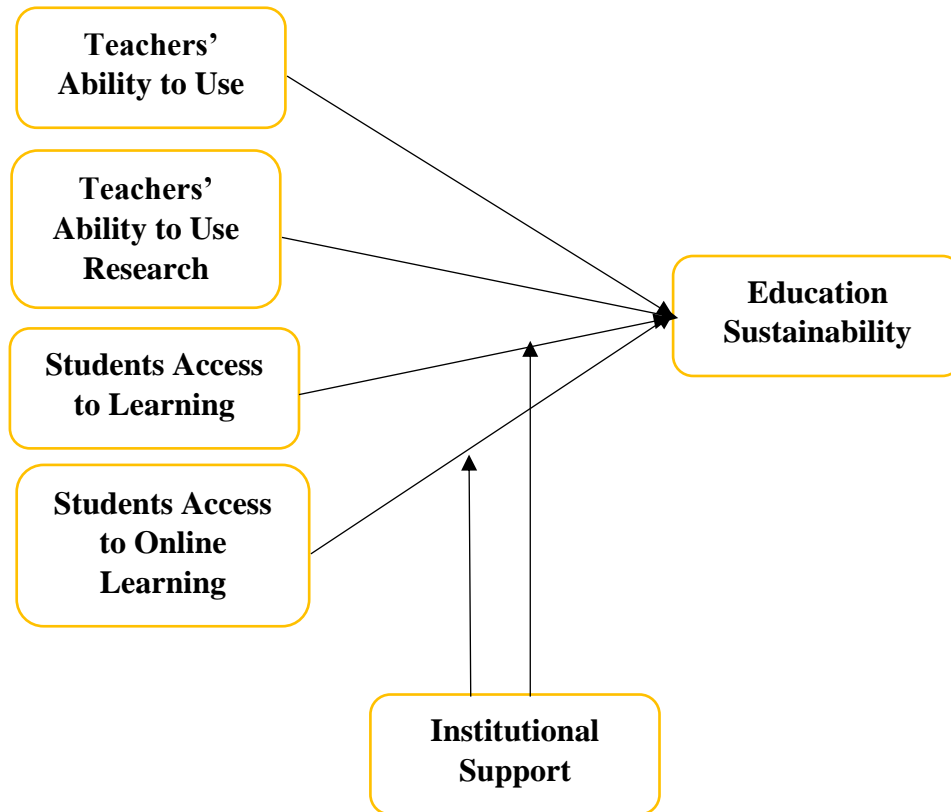Figure 1 given below shows the framework of the study.

Figure 1: *Theoretical model*

Research instrument and procedure

The current study used survey questionnaires to gather the data adapted from the studies of Sobaih et al. (2021) hand Almazova et al. (2020). The questions related to the teachers' ability to use LMS and research engine and institutional support were asked from the teachers while the questions related to the students' access to online learning activities and learning resources and education sustainability were asked from the students.

This study selected four predictors such as teachers' ability to the usage of LMS (TAULMS) with six items extracted from Almazova et al. (2020), teachers' ability research engine (TAURE) with four items, and also extracted from the study of Almazova et al. (2020). In addition, students' access to online learning activities (SAOLA) with five items taken from Almazova et al. (2020) and students' access to learning resources (SALR) with four items taken from Sobaih et al. (2021). Moreover, institutional support (IS) has been used as the moderating variable with five items also taken from Almazova et al. (2020), and education sustainability (ES) has been taken as a predictive variable with five items taken from Sobaih et al. (2021). These measurements are given in Table 1.

Table 1

Measurements

Variables	Items	Statements	Sources
Teachers' Ability to use LMS	TAULMS1	"I have sufficient knowledge and skill to use e-teaching during the COVID-19 pandemic."	(Almazova et al., 2020)
	TAULMS2	"I have experience in using e-learning."	
	TAULMS3	"I prefer conventional learning than e-learning."	
	TAULMS4	"I need to learn how to use my computer for e-learning."	
	TAULMS5	"The use of e-learning during this pandemic is not convenient for me."	
	TAULMS6	"My discipline is suitable for e-learning."	
Teachers' Ability to use Research Engine	TAURE1	"I feel enough computer literacy skills."	(Almazova et al., 2020)
	TAURE2	"The preparation of electronic education content using research engines is not much time-consuming."	
	TAURE3	"I feel the need to be taught how to work in a digital educational environment."	
	TAURE4	"It is not difficult to adopt new teaching methods using research engines within days."	
Student Assess to Online Learning Activates	SAOLA1	"I have sufficient knowledge and skill in the use of e-learning during the COVID-19 pandemic."	(Almazova et al., 2020)
	SAOLA2	"I can assess the platforms chosen for e-learning."	
	SAOLA3	"I have not to face technological problems when assessing the electronic educational process."	
	SAOLA4	"I experience psychological comfort studying online during the COVID-19 pandemic."	
	SAOLA5	"I have devices/high-speed Internet connection for the use of e-learning."	
Student Assess to Learning Resources	SALR1	"I access to adequate learning resources relevant to the course."	(Sobaih et al., 2021)
	SALR2	"The course/s facilitates discussions and assignments or project work."	
	SALR3	"I was provided with sufficient information to get on with my studies."	
	SALR4	"I did find the design of the course/s interesting."	

Variables	Items	Statements	Sources
Institutional Support	IS1	"The University provides technical support for e-learning."	(Almazova et al., 2020)
	IS2	"The platforms chosen by the University to support e-learning are easy to use."	
	IS3	"The platforms chosen by the University include the necessary features and functions I need."	
	IS4	"There are enough and clear instructions/training about how to organize a digital educational process from the institution."	
	IS5	"I receive a satisfactory and timely response from the IT services staff."	
Education Sustainability	ES1	"The class interactions online support enhances my learning experience."	(Sobaih et al., 2021)
	ES2	"I feel a greater sense of community with class peers."	
	ES3	"I have learned a great deal from peers through the online interactive activities."	
	ES4	"I feel encouraged to learn more about the subject through the online activities."	
	ES5	"I enjoyed the activities because they helped to understand the subject better."	

Research sample

The current research selected teachers and students from ten private and public universities of Saudi Arabia as study's respondents. Using simple random sampling method, 500 students and 530 teachers were selected as respondents. A total of 500 surveys were sent to the respondents by mail and through personal visits. After twenty days, only 290 valid responses were returned, representing about 58.0 percent response rate.

Data Analysis

The current paper used the smart-PLS to analyze the data. The study used the PLS-SEM because it is the best statistical tool that operates perfectly in even larger sample size and complex framework used by researchers (Hair Jr et al., 2021).

Findings

The results show the convergent validity which highlights the association between the items of the study. The items correlation was examined using "Alpha, composite reliability (CR), factor loadings and average variance extracted (AVE)." The figures in Table 2 indicate that CR and Alpha values are greater than 0.70 and the loadings and AVE values are greater than 0.50. These figures exposed valid convergent validity and the high association between items. Table 2 shows convergent validity findings.

Table 2

Convergent validity

Constructs	Items	Loadings	Alpha	CR	AVE
Education Sustainability	ES1	0.862	0.889	0.918	0.693
	ES2	0.827			
	ES3	0.816			
	ES4	0.836			
	ES5	0.820			
Institutional Support	IS1	0.854	0.920	0.939	0.756
	IS2	0.865			
	IS3	0.869			
	IS4	0.884			
	IS5	0.875			
Students' Assess to Learning Resources	SALR1	0.907	0.881	0.918	0.738
	SALR2	0.805			
	SALR3	0.853			
	SALR4	0.868			
Students' Assess to Online Learning Activities	SAOLA1	0.955	0.970	0.977	0.894
	SAOLA2	0.927			
	SAOLA3	0.962			
	SAOLA4	0.918			
	SAOLA5	0.964			
Teachers' Ability to Use LMS	TAULMS1	0.743	0.814	0.860	0.505
	TAULMS2	0.700			
	TAULMS3	0.722			
	TAULMS4	0.701			
	TAULMS5	0.709			
	TAULMS6	0.688			
Teachers' Ability to Use Research Engines	TAURE1	0.974	0.944	0.962	0.863
	TAURE2	0.783			
	TAURE3	0.972			
	TAURE4	0.973			

The results also show the discriminant validity which highlighted the association between the variables. The variables correlation was examined using "Fornell Larcker, cross-loadings, and Heterotrait Monotrait (HTMT) ratio." Firstly, Fornell Larcker was used, and the findings revealed that the first value was larger than the other values that showed relationships with variable itself was larger than the other variables. These figures exposed valid discriminant validity and the low association between variables. Table 3 shows Fornell Larcker findings.

Table 3

Fornell Larcker

	ES	IS	SALR	SAOLA	TAULMS	TAURE
ES	0.832					
IS	0.404	0.870				
SALR	0.516	0.428	0.859			
SAOLA	0.417	0.427	0.478	0.945		
TAULMS	0.197	0.162	0.138	0.251	0.711	
TAURE	0.495	0.379	0.235	0.483	0.111	0.929

Secondly, cross-loading was used, and findings revealed that values linked with the current variable were larger than the values of other variables that showed relationships with the variable itself were larger than the other variables. These figures exposed valid discriminant validity and the low association between variables. Table 4 shows cross-loadings findings.

Table 4

Cross-loadings

	ES	IS	SALR	SAOLA	TAULMS	TAURE
ES1	**0.862**	0.366	0.449	0.329	0.213	0.396
ES2	**0.827**	0.329	0.440	0.389	0.151	0.374
ES3	**0.816**	0.297	0.369	0.296	0.127	0.389
ES4	**0.836**	0.346	0.410	0.322	0.150	0.398
ES5	**0.820**	0.337	0.468	0.388	0.171	0.490
IS1	0.337	**0.854**	0.327	0.354	0.172	0.284
IS2	0.319	**0.865**	0.342	0.357	0.152	0.297
IS3	0.301	**0.869**	0.384	0.370	0.137	0.342
IS4	0.373	**0.884**	0.397	0.372	0.115	0.354
IS5	0.406	**0.875**	0.403	0.397	0.132	0.364
SALR1	0.467	0.379	**0.907**	0.395	0.143	0.723
SALR2	0.387	0.380	**0.805**	0.353	0.092	0.676
SALR3	0.460	0.342	**0.853**	0.438	0.122	0.753
SALR4	0.453	0.375	**0.868**	0.450	0.115	0.716
SAOLA1	0.377	0.416	0.448	**0.955**	0.215	0.444
SAOLA2	0.396	0.392	0.459	**0.927**	0.270	0.468
SAOLA3	0.402	0.407	0.448	**0.962**	0.216	0.456
SAOLA4	0.396	0.391	0.453	**0.918**	0.268	0.464
SAOLA5	0.399	0.412	0.451	**0.964**	0.216	0.452
TAULMS1	0.123	0.004	0.029	0.053	**0.743**	0.000
TAULMS2	0.218	0.288	0.150	0.282	**0.700**	0.136
TAULMS3	0.092	0.107	0.107	0.276	**0.722**	0.098
TAULMS4	0.109	0.126	0.151	0.204	**0.701**	0.125
TAULMS5	0.097	0.020	0.046	0.079	**0.709**	0.027
TAULMS6	0.110	-0.027	0.057	0.088	**0.688**	0.037
TAURE1	0.454	0.337	0.763	0.447	0.109	**0.974**
TAURE2	0.468	0.382	0.796	0.438	0.091	**0.783**
TAURE3	0.458	0.343	0.760	0.450	0.103	**0.972**
TAURE4	0.448	0.340	0.768	0.452	0.108	**0.973**

Thirdly, the HTMT ratio was used, and the findings revealed that the values of the HTMT ratio were lower than 0.85. These figures exposed valid discriminant validity and the low association between variables. Table 5 shows HTMT ratio findings.

Table 5

Heterotrait Monotrait ratio

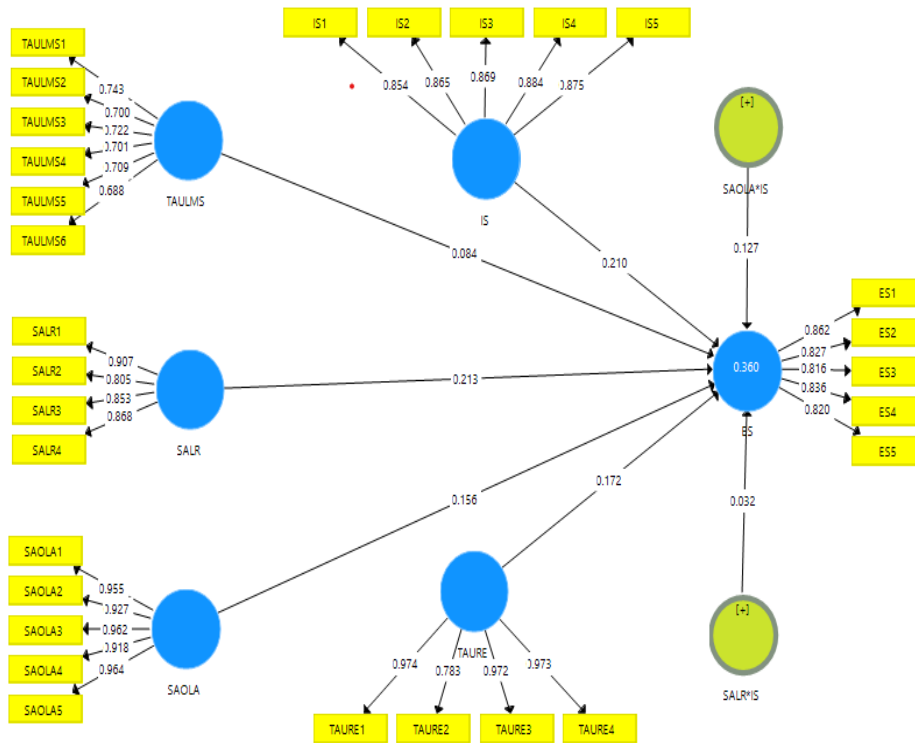|	ES	IS	SALR	SAOLA	TAULMS	TAURE
ES						
IS	0.440					
SALR	0.578	0.475				
SAOLA	0.446	0.450	0.515			
TAULMS	0.202	0.166	0.146	0.256		
TAURE	0.536	0.404	0.714	0.504	0.113	

Figure 2: *Measurement model assessment*

The results indicated that teachers' ability to use LMS and research engine and students' access to online learning activities and learning resources made a positive impact on the education sustainability of private and public universities in Saudi Arabia and thus H1, H2, H3, and H4 were accepted. The results also exposed that institutional support significantly moderates among the linkage of students' access to online learning activities and education sustainability of private and public universities in Saudi Arabia. Hence, the H6 was also accepted. Table 6 shows the direct and indirect association between the variables.

Table 6

A path analysis

Relationships	Beta	S.D.	T Statistics	P Values	L.L.	U.L.
IS -> ES	0.210	0.064	3.277	0.001	0.095	0.319
SALR -> ES	0.213	0.088	2.412	0.009	0.061	0.369
SALR*IS -> ES	0.032	0.057	0.556	0.290	-0.083	0.100
SAOLA -> ES	0.156	0.066	2.353	0.010	0.033	0.260
SAOLA*IS -> ES	0.127	0.064	2.004	0.024	0.023	0.226
TAULMS -> ES	0.084	0.051	1.656	0.048	0.022	0.185
TAURE -> ES	0.172	0.083	2.085	0.020	0.012	0.286

Figure 3 shows the structural model assessment of the variables of the study. Figure 4 and Figure 5 depicts graphically the SD and Mean of Students' Assess to Learning Resources (SALR) and Students' Assess to Online Learning Activities (SAOLA) respectively to exemplify the relationships.
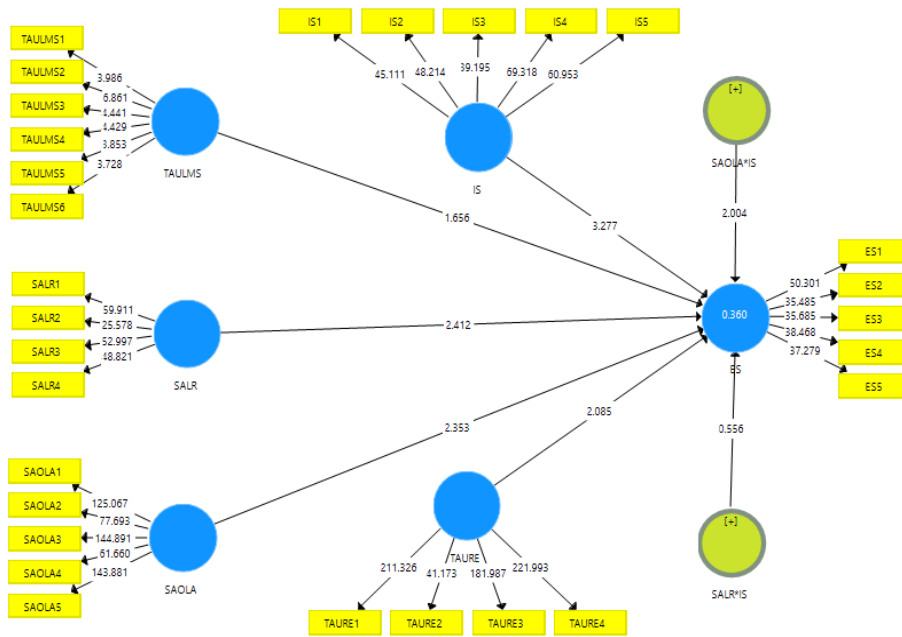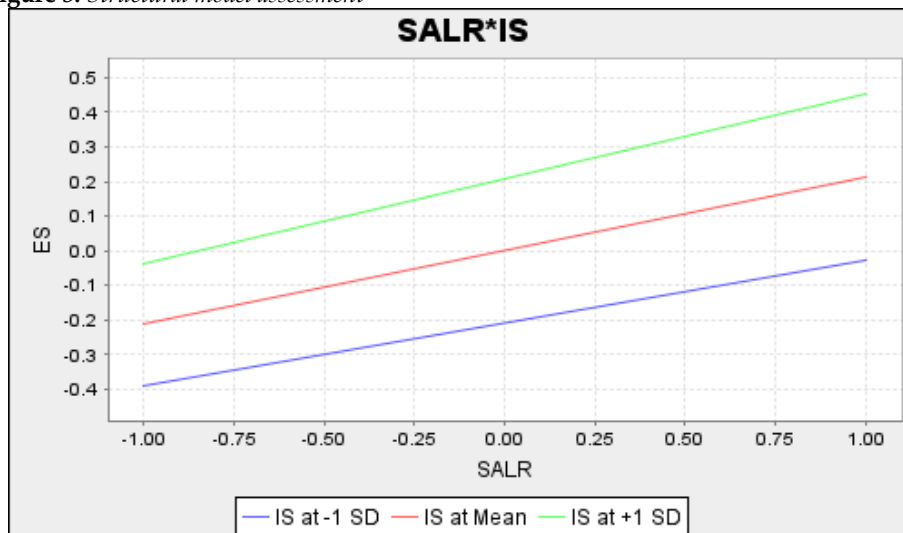

Figure 3: *Structural model assessment*
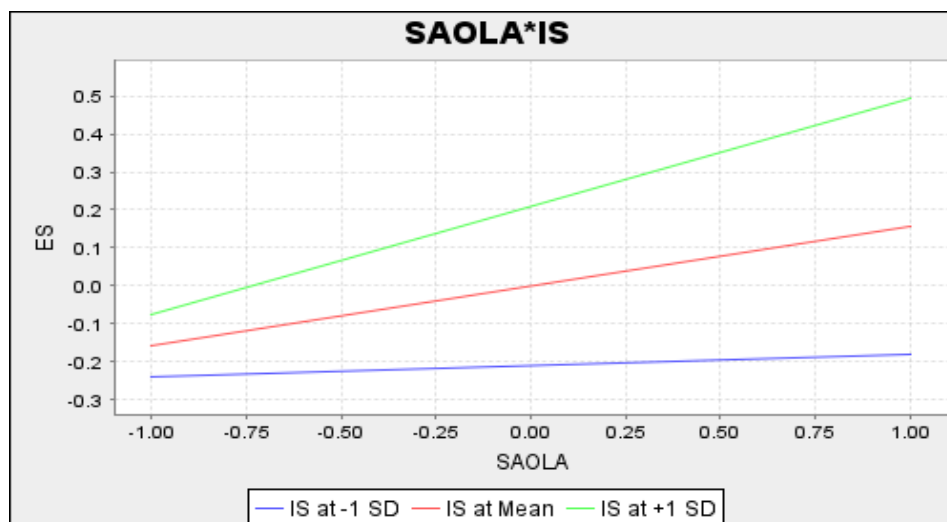

Figure 4: *SALR*IS*

Figure 5*: SAOLA*IS*

Discussion and Implications

The study results have indicated that teachers' ability to use LMS has a positive association with education sustainability during COVID-19. These results are also supported by a recent study of Maqsood et al. (2021), which states that teachers who have the ability to access the LMS from a digital device of their choice such as smartphone, tablet, desktop, and laptop, can easily understand the user interface. They have the ability to navigate, to view and track the online training practices and to judge if they are effective or any adjustment is required. They can also provide the learning facility to students 24/7 without any unnecessary break, guide them in a better way, and train them even without the regular personal classes. Hence, the teachers' ability to use the LMS develops education sustainability even during any pandemic. These results are also supported by the previous study of Rodriguez-Segura et al. (2020), which shows that the interaction with and use of the LMS and its effectiveness in developing sustainability in education in both normal situations and during a pandemic, require teachers' ability specific to LMS like the knowledge of appropriate LMSs like Moodle, Blackboard Learn, Schoology, TalentLMS, eFront, and iSpring Learn and to interact and use selected LMSs for teaching and to train the students even at home, there will be no barrier or deficiency in education.

The study results have revealed that teachers' ability to use research engines has a positive association with education sustainability during COVID-19. These results agree with the study of Sáiz-Manzanares et al. (2020), which reveals that the search engines are the software system through which information about any point or subject can be obtained in a systematic manner. The teachers who are proficient in using different search engines like google, google chrome, Microsoft Edge, Firefox, Bing, Yahoo, and contextual web search, create awareness in their students to use these search engines at the time of need when they are unable to have guidance from teachers or course of study. So, teachers' ability to use search engines develops education sustainability in pandemics like COVID-

19. These results are also in line with the previous study of Ifijeh and Yusuf (2020), which states that the educational institutions where the teachers have the knowledge and abilities to use search engines to facilitate teaching and learning for the students are found to have shown sustainable performance even during COVID-19 when the educational institutions like many other corporations have been closed or banned to carry their practices as usual.

The study results have also shown that students' access to learning resources has a positive association with education sustainability during COVID-19. These results agree with the study of Sobaih et al. (2021), which reveals that the students' access to a large number of effective learning resources like textbooks, lectures, speeches, performances, multimedia, and course content based audios, videos, images, and animations, enhances the information and knowledge among students, solve learning problems, reduce doubts, clarify things, and fulfil curiosity. Thus, in COVID-19, students' access to learning resources enhances education sustainability. These results are also supported by the past study of Portillo et al. (2020), which indicates that the educational institutions where students are provided with effective learning resources like the course of study, training practices, social media interaction, use of websites, and online learning conferences, the students need not worry about improving their learning the particular subjects and performing well even during a severe pandemic which restricts regular classes.

The study results have indicated that students' access to online learning activities has a positive association with education sustainability during COVID-19. These results are also supported by the recent study of Iyengar (2020), which highlights that the educational institutions where the students have access to online learning activities like real-world case studies, online debates, whiteboard teaching, classroom newspapers, trivia competition, comic strip, and video newscast, are more successful in getting improved results from them. This develops sustainability in education even during pandemics like COVID-19. These results match with the study of Zhuang et al. (2021), which shows that students' success and their engagement in the online learning activities prepare the students for tough periods like COVID-19 when they are not free to attend the regular lectures delivered in classrooms in education institutions. Thus, there is sustainability in education.

The results have revealed that institutional support does not play a moderating role between students' access to learning resources and education sustainability during COVID-19. These results are also in line with the past study of Alam and Asimiran (2021), which reveals that when an institution does not provide the effective support to its tutors and students in teaching and learning, respectively, it becomes difficult for the students to have access to effective learning resources, and also creates consistency in the quality education provision to the students. Thus, it does not improve the contribution of students' participation in the utilization of effective learning resources into the education sustainability development. The results have revealed that institutional support plays a moderating role between students' access to online learning activities and education sustainability during COVID-19. These results are also in line with the past study of Krishnamurthy (2020), which shows that the educational institutions where the education management and tutors have polite behavior and supportive conduct to students, there is improvement in students' access to online learning activities and sustainability in education. Thus, it improves the association between students' access to online learning activities and sustainability.

Conclusion, Implications and Limitations

The aim of the current article was to secure the education sector from the adverse impacts of COVID-19 with the context of the education sector of Saudi Arabia, a severely inflicted economy. The motive of the authors was to check the contribution of teachers' ability to use LMS, teachers' ability to use research engines, students' access to learning resources and students' access to online learning activities in education sustainability. The objective was also to determine the place of institutional education support between students' access to learning resources and students' access to online learning activities and educational sustainability. Questionnaires were designed, and the survey was conducted to the Saudi Arabian education system to search for the impacts of teachers' ability to use LMS and research engines, students' access to learning resources and to online learning activities and institutional support on education sustainability. The study concluded that when the teachers have the knowledge and skills to use LMS for operating, monitors and evaluating education processes, it is convenient to develop education sustainability in COVID-19. Similarly, in case teachers have the ability to interact with or use the search engines, they bring improvement in teaching methods so they can sustain education during COVID-19. The study indicated that students who have access to effective learning resources which can facilitate distance education sustain their education despite the COVID-19. Likewise, students having an approach to online learning activities initiated by their schools can better perform in education even in COVID-19. The study concluded that institutional support improves the relationship between teachers' ability to use LMS and research engines, students' access to learning resources and to online learning activities and educational sustainability.

The current study carries theoretical as well as empirical implications. This study has a great theoretical significance on account of considerable contribution to the education-based literature. This research is a detailed description of the teaching abilities and student facilities and their role in education sustainability. The study throws light on the influences of teachers' ability to use LMS, teachers' ability to use research engines, students' access to learning resources and students' access to online learning activities on the development of education sustainability in COVID-19. Both the teacher abilities and student facilities as the determinants of education sustainability have been examined but in diverse contexts. The present study, which has amalgamated the two factors teacher abilities and student facilities for education sustainability, is a great theoretical implication. This study examines the associating influences of institutional support on student access to learning resources, and student access to online learning facilities is a significant addition to the literature. This study has significance in the education sector of the countries which are inflicted by any health crisis like the COVID-19 pandemic as this study gives ways to develop sustainability in education. This study would prove a good help to policymakers while developing the policies regarding education sustainability during and after the COVID-19 pandemic. The educationists can form their policies in the light of this study. This study guides, with the policies to encourage teachers' ability to use LMS, teachers' ability to use research engines, students' access to learning resources and students' access to online learning activities, education sustainability can be developed in COVID-19.

The limitations associated with this study are expected to be removed in future studies. This study examines the role of teachers' abilities and students' facilities in developing education sustainability. There are several other factors like the financial abilities of parents and educational institutions, and technological developments also affect education sustainability but are not part of the research. The authors in future must add to the scope of this research with the analysis of the greater number of factors determining education sustainability. This study only looks at the moderating impact of institutional support on the nexus among students' access to learning resources and to online learning activities and education sustainability, although institutional support also influences the nexus among teachers' ability to use LMS and research engines and education sustainability. So, it is hoped that future authors must analyze institutional support as a moderator among the factors under study.

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