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Assessment of Factors Affecting and Influencing Performance online Learning by using Blackboard Learning System in College of Sciences and Arts

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Abstract

Educational approaches have substantially improved and changed in recent years. Technologies have evolved, particularly since all educational activities moved to an e-learning format. This necessitated the introduction of different teaching strategies and educational management techniques. For these reasons, learning management systems such as WebCT, Blackboard, and Learning Spaces are currently accessible. They provide a variety of services, including the creation and distribution of online learning materials, the recording and transcription of lectures, and the facilitation of communications among diverse users. Learning management systems have allowed stakeholders to create platforms that facilitate convenient and adaptable web-based teaching. We can address a range of aspects and features that have shaped the concept of performance in relation to the learning process. Performance during e-learning and distant learning is a major challenge for management because a variety of factors can influence learning. In the present study, we analyzed and evaluated the factors that could affect the effectiveness of distance learning and e-learning from the perspective of the faculty and students at the College of Sciences and Arts at Unaizah, Qassim University (Unaizah, Kingdom of Saudi Arabia). Our objective was to examine the factors that influence the quality of online learning when using the Blackboard learning management system, as well as its advantages and disadvantages. The study's findings will be valuable to universities attempting to integrate technology into their teaching and learning processes and will help to increase the productivity of online learning.

Keywords: Students' Performance; E-learning; Course; Systems; Blackboard; Academic.

Introduction

Learning management systems (LMSs) are academic technologies that integrate several factors to provide superior integrated media for learning. They provide attractive platforms for developing and disseminating educational resources, as well as encouraging user communication and collaboration. Because it provides a consistent interface to numerous

stakeholders, such as students, teachers, writers, and administrators, an LMS is often used as a source of learning resources.

By allowing advanced interactions between instructors and learners as well as quick access to learning resources, an LMS offers flexibility in terms of space and time. For various interactions, it also acts as a single point of contact for students, educators, and administrators [1]. LMSs have been used by a number of universities to enhance their existing resources and facilitate distance learning. Universities typically employ LMSs to manage their teaching and learning resources. However, the success of LMSs in institutional settings is heavily reliant on the faculty's approval of the technology, as faculty have a substantial impact on student LMS use [2].

Teaching has evolved dramatically, with most of it now taking place on digital platforms and from a distance. Most countries' educational systems have evolved. As a result, traditional education is transitioning to online or remote learning. As a result, the primary focus of educational institution management is student achievement, which is influenced by a variety of factors. Consequently, the application of information and communication technology in education may improve the delivery of university services. More than just a technological challenge emerges when creating an e-learning environment: the success of online or distance learning depends on a number of factors.

As a result, educators require increased awareness of online instruction. Several researchers have determined the efficiency of digital technology in life-long e-learning and continual professional development. E- learning was created in response to a global scarcity of faculty educators, and transitioning to e-learning has various benefits, including encouraging students to engage in self-directed learning and upgrading curricula. The Blackboard method was implemented as an interactive instructional strategy by Qassim University's College of Sciences and Arts (Unaizah, Kingdom of Saudi Arabia).

Many researchers have discussed the benefits of these technologies in the education system. Qassim University uses the Blackboard learning management system to provide educational sessions such as lectures, tutorials, seminar presentations, and open discussion forums. Evaluations are also completed online using Blackboard. These exams reflect the nature of online learning and empower students to take charge of their own education. Shifting from traditional teaching to e-learning, where the teacher is mostly a facilitator, allows learners to exhibit their critical thinking and problem-solving abilities through online evaluation.

A learning management system (LMS) ensures a secure and efficient flow of information to and from students. Teachers can examine students' performance using the LMS's statistical analysis features. Participants, both teachers and students, will be able to use the system effectively if they have a basic working knowledge of computers. Various factors determine how a learning management system is used. Several researchers have examined the factors that influence LMS usage. In this study, we analyzed the factors influencing the quality of online learning when employing the Blackboard learning management system, along with its advantages and disadvantages.

Literature Review

Among university students, the importance of ICT in teaching and learning is apparent [3], [4]. Improved student attitudes, critical reasoning, and learning interest are all advantages of using technology in teaching [5]. ICT assists students in collaborating on projects and provides access to a variety of problem-solving activities Because many HEI students are "digital natives", technology must be integrated throughout teaching and learning [7]. Although teaching and learning technologies, when adopted, have been embraced by and benefitted HEIs [8],[9] formerly disadvantaged HEIs continue to confront problems with completely embracing learning management systems [3], [10], [11]. Technology boosts student engagement by allowing students to learn at any time and from any location [12]. In order to provide students with the abilities they will need in the workplace, ICT is essential [13]. Regardless of their academic discipline, current students are expected to use ICT effectively, and businesses expect graduates to have strong ICT abilities and be remarkably dynamic [14], [15]. HEIs in South Africa, however, confront a variety of challenges that limit their ability to embrace technology The majority of adoption concerns occur in historically disadvantaged HEIs [16], [17]. As web-based learning platform can benefit both students and teachers while assisting in the achievement of curriculum objectives [18]. E-learning is used by universities, other educational organizations, and commercial businesses all around the world. It is gaining popularity, and more institutions are seeking to develop e-learning technology [19].

Face-to-face learning combined with e-learning, bridges the gap between students and instructors [20]. Students prefer to take courses that integrate information technology and activities supplied through e-learning systems are more beneficial than traditional classroom activities [21].

Researchers have been investigating a number of questions about how students use LMSs, such as whether LMSs work among university students [22] and which elements are required in an LMS for students in a traditional learning setting to gain the most from it [23]. Despite the uncertainty about the relevance of LMSs to students in higher education institutions, their adoption is increasing [23], [24]. This is due to the perceived advantages of adopting LMSs [22]-[24].

A learning management system (LMS) facilitates rapid communication [25]. Blackboard, Canvas, eCollege, Moodle, and Sakai are among the most frequently mentioned learning systems in the literature [26]. Blackboard allows students to access content and connect with one another outside of the classroom [27]. Students with a variety of learning needs can use BB's features to participate and collaborate in the ways that are most beneficial to them [25]. Students' learning styles, interests, prior knowledge, cognitive levels, comfort zones, and socialization requirements should all be considered when selecting the most suitable LMS [28]. Electronic teaching and learning, commonly known as e-learning, is made possible by LMSs. Introducing technologies in HEIs raises a number of challenges [14], [29]-[33].

In the beginning, institutions thought that online learning would result in substantial cost savings for course delivery and would reduce the requirement for instructor involvement in course delivery. In practice, the result has been the reverse. Online teachers recognize that their role in the learning environment necessitates a high level of involvement, and that this involvement necessitates a set of skills and knowledge they are unlikely to have gained through traditional teaching methods. Some factors and attributes appear to substantially influence the quality of online learning in the current context, and feedback from our courses has identified a number of factors that influence the quality of online learning.

Blackboard Learning Technology

We chose this system for our study because it is currently a popular education technology that is used by more than 150 million learners and teachers worldwide [34], [35]. A variety of learning management systems (LMSs) are currently available to meet the demands of students and teachers. After assessing the academic needs of their students and faculty, educational institutions choose their systems based on internal policy requirements. LMSs are becoming increasingly popular around the world, with adoption rates increasing at a rapid rate. Blackboard, Moodle, WebCT, and LAMS are the most extensively used LMS platforms, with Blackboard emerging as the top platform for most higher education institutions [36]. Blackboard is a widely used Internet program that has been implemented by a number of major educational institutions as an online learning resource for students, which facilitates the distribution of crucial items, such as documents, student reports, assignments, and other announcements, to students from teachers. Other actions involving students are enabled by Blackboard's technology. Another real-time activity enabled by Blackboard is live chat rooms, which allow students and professors to share documents, queries, and resources. Blackboard has entered the realm of higher education. Blackboard is well-designed and keeps up with technical advancements, and a number of important educational institutions are at the forefront of technical advancements. Since the use of Blackboard by such institutions has grown rapidly, many students have used this software. As such, understanding the impact of technology-focused seminars on users has become crucial [37]-[39].

Classrooms have become more accessible as a result of Blackboard's technology, and achievement has improved across the educational sector [40]. Students and teachers can now easily communicate using integrated services and media, including teleconferencing, assignments, discussion groups, evaluations, and video conferencing, which, according to research, fosters creativity and innovation [41].

Blackboard was intended to provide digital learning flexibility while encouraging adaptability in the learning experience [42]. Traditional face-to-face classrooms and other teaching and learning methods are quickly being replaced by modern technology. Additionally, this technology includes many characteristics that enable students, particularly English language learners, to communicate more effectively and exchange ideas simply [43] The technology precisely recreates the ambience of a typical classroom while improving the overall experience and entirely overhauling the teaching and learning processes, saving time and resources [44]. English professors who use Blackboard to teach students can easily

construct online courses and arrange their classes. They may also manage their calendars and provide compelling lectures from the convenience of their own homes or businesses [45].

Materials and Methods

In recent years, both students and lecturers have become more comfortable designing and deploying web-based education (e-learning) systems [46], and this form of teaching now has an important role in the learning process [47] E-learning functions as a new training approach that complements existing methods [48], having the ultimate goal of fostering a more advanced society that encourages creativity and innovation [49]. In reality, this new paradigm shifts the focus of education away from teachers and toward students [50].

Despite many researchers having studied the elements that influence e-learning performance, research into the interplay between the four factors of students, lecturer, course, and infrastructure in e-learning performance has been minimal. As such, in this study, we examined and evaluated how those four elements impact the effectiveness of distant learning and e-learning in order to assess their importance in e-learning performance.

A total of 425 participants responded to the survey. The lecturers and students in this sample were from the College of Sciences and Arts at Qassim University, Unaizah, which was using a technology-based teaching technique: the Blackboard learning system. For IT research, case studies and empirical studies are acceptable [51] This study was a questionnaire-based empirical study conducted at Qassim University's College of Sciences and Arts, Unaizah. We identified our research variables after a thorough examination of the literature. To measure each variable, we created an initial set of questions. Two academic experts reviewed each item in the questionnaire for its content, scope, and aim (content validity). We measured the model's variables in the questionnaire using a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree). A total of 425 people responded to the research questionnaires; however, 25 of them were excluded because their responses were unengaged.

Research approach:

We used descriptive statistics and regression analysis, which are categorized as quantitative approaches. We structured the questionnaires in four categories based on the four factors we aimed to study, which were students, lecturer, course, and infrastructure. Questionnaires were distributed online to the College of Sciences and Arts at Qassim University, Unaizah.

Participants:

A sample of 400 participants was accepted after review. Our sampling technique included two categories, students and lecturers, and we randomly sampled between the groups. The following tables and figures depict characteristics of the samples. We chose the College of Sciences and Arts at Qassim University, Unaizah, because they had quickly changed from traditional to distance learning, and because we worked in the Department of Computer Science at the college. In addition, it is one of the largest colleges in the University.

Table 1: Student demographics

Department	Students		Total
	M	F	
Biology	16	10	26
Sharia	0	51	51
Physics	0	1	1
English	2	21	23
Arabic Language	13	29	42
Computer Science	0	158	158
Total	31	270	301

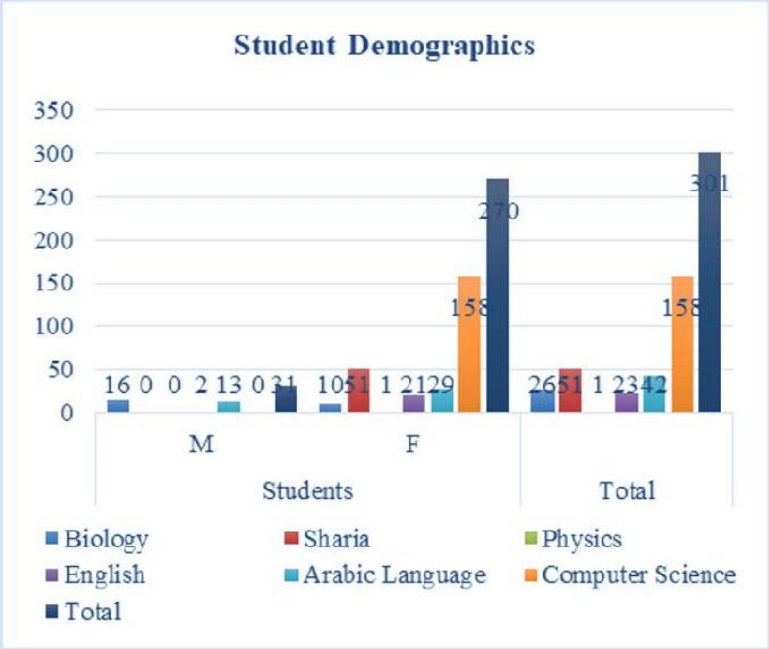

Figure 1: Student demographics

Table 2: Lecturer demographic

Department	Lecturer		Total
	M	F	
Biology	2	0	2
Sharia	2	25	27
Physics	4	4	8
English	8	0	8
Arabic Language	12	7	19
Mathematics	10	5	15
Geography	0	3	3
Computer Science	3	14	17
Total	41	58	99

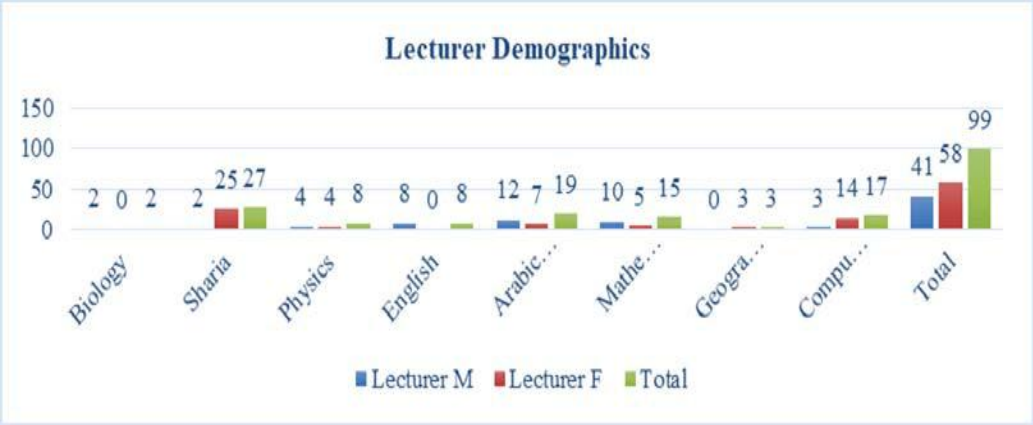

Figure 2: Lecturers demographic

Table 3: Lecturers ranks

Rank	Lecturer		Total
	M	F	
Professor	3	0	3
Associate professor	13	6	19
Assistant professor	20	19	39
Lecturer	6	25	31
Teaching Assistant	1	6	7
Total	43	56	99

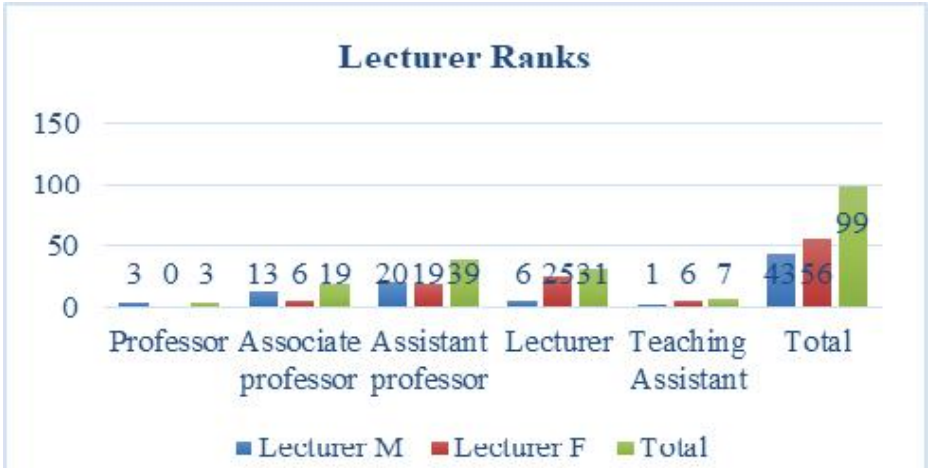

Figure 3: Lecturers ranks

Procedures and Instruments

We used Google Drive to provide questionnaires based on the different research factors. We distributed the questionnaire link to the sample of students and lecturers, and guidelines were provided by researchers. Our instruments affecting the quality of e-learning were students, lecturer, course, and infrastructure. Each instrument included five items (questions). The validity of the questions was tested using a sample of 25 experts, professors, students, and employees. Cronbach's alpha was 0.773, indicating the testing tool was reliable, but other

questions were updated once more to confirm the validity of research instruments. The questionnaire items were created based on previous studies in the field.

Data Collection and Analysis Techniques

Data were collected by online questionnaires. Questions were closed and answers were ratings between 1 and 5 (strongly agree, agree, normal, disagree, and strongly disagree). The data were quantitively analyzed using descriptive statistics and regression analysis. Our descriptive statistical analysis using SPSS included mean and standard deviation to describe e-learning infrastructure and cognitive competence in College of Sciences and Arts at Qassim University, Unaizah. In addition, we analyzed the four factors and subfactors and ran an estimation test on a structured model to investigate the pathways of the factors affecting the quality of e-learning. We also discussed factor loadings and cross loadings.

Results

New technologies can revolutionize how teachers educate and students learn. These technologies have a substantial impact on the variety and expansion of online materials and traditional instructional methods [52], [53] "If we want to improve online learning, we need to improve online learning engagement" writes [54]. As a result, an online learning theory was introduced, proposing the notion that online involvement necessitates online learning in a more influential way. As a result, when learners collaborate and participate, online education becomes beneficial.

The teaching-learning process has recently incorporated a new and vital component, with a variety of current technologies gradually replacing old resources [43]. Knowledge acquisition and transfer have become easier because of the availability of adaptable, cost-effective, and efficient technologies [55]. E-learning technologies remove hurdles to the transmission of ideas and intellectual collaboration, including long distances and transit costs. E-learning networks, often known as learning management systems (LMSs), are Internet-based learning systems that have been quickly adopted by educational institutions around the world to notably improve students' and teachers' learning experiences [56], [57].

E-learning technologies allow for straightforward teaching, learning, communication, and resource-sharing [58]-[60]. For example, an LMS allows teachers to oversee materials and tasks while planning exams and keeping track of the learners' progress [61]. They also assist educators in efficiently communicating with students and provide immediate access to course materials [62]-[64]. Learners can use teacher-provided materials, submit assignments, and communicate with others about their classes [37], [65]. However, critically, an LMS cannot entirely replace the traditional/conventional classroom environment in a short period of time [66] The major purpose of a learning management system is to enhance the existing system by offering course information in a format that is easily accessible outside of traditional educational facilities and classrooms [60], The learning and teaching paradigm has been completely disrupted by new digital technologies, which had remained unchanged since the late 1990s due to continuous but insufficient development. Furthermore, unlike some earlier worldwide socioeconomic and political difficulties, the COVID-19 pandemic prompted

educational institutions to speed up their shift toward LMS systems by integrating long-term virtual technologies for teaching and learning, especially in the English language [66], [68], [69]. The main goal of using a learning management system is to improve an existing system by providing course information in a format that can be accessed outside of traditional educational settings and classrooms [60], [67]. Furthermore, unlike previous global socioeconomic and political challenges, the COVID-19 pandemic spurred educational institutions to improve their LMSs by including long-term virtual technologies for teaching and learning, particularly in the English language [66], [68], [69].

Our questionnaire was constructed to identify the factors that affect the quality of e-learning using Blackboard. The questionnaire included 25 questions. The questions were grouped by five factors—students, lecturer, course, infrastructure, and quality. The demographic data were anonymously collected.

We analyzed the collected data using SPSS version 23 to ensure the data were reliable and there were no missing data or unengaged responses. We checked the response data, and no data were missing, but some unengaged responses had standard deviations equal to zero, which we excluded. In addition, we performed a reliability test, and the overall result was accepted with a Cronbach's alpha (α) of 0.753 Table 4. During the analysis, we noticed some items that scored below the accepted value. These noticed items were marked as nominated to be excluded, including Cour3, Proof3, Proof5, and Study4, which are shown in Table 5. However, the items nominated for exclusion were tested during the factor analysis.

Table 4: Reliability statistics

Cronbach's Alpha	NO of Items
.753	25

Table 5: Reliability statistics for all items

	Std. Deviation	Cronbach's Alpha if Item Deleted	N
COUR1	.8590	.743	400
COUR2	.9208	.750	400
COUR3	.9200	.761	400
COUR4	.8262	.746	400
COUR5	.7958	.747	400
Proof1	.7528	.739	400
Proof2	.8027	.743	400
Proof3	.9812	.754	400
Proof4	.7608	.739	400
Proof5	.8582	.766	400
STUD1	.9904	.740	400
STUD2	1.0087	.741	400
STUD3	1.0049	.750	400
STUD4	.8055	.754	400
STUD5	.9758	.746	400

Infra1	.9928	.741	400
Infra2	1.1058	.737	400
Infra3	.9498	.733	400
Infra4	.9746	.733	400
Infra5	.9613	.740	400
Quality1	.8225	.746	400
Quality2	.6671	.743	400
Quality3	.6530	.744	400
Quality4	.6762	.749	400
Quality5	.5968	.744	400

Table 6: The extraction results before the item' exclusion

Items	Initial	Extraction
COUR1	.444	.493
COUR2	.451	.564
COUR3	.208	.169
COUR4	.374	.371
COUR5	.390	.447
Proof1	.559	.654
Proof2	.518	.644
Proof3	.290	.325
Proof4	.480	.497
Proof5	.257	.179
STUD1	.414	.402
STUD2	.493	.999
STUD3	.412	.670
STUD4	.101	.055
STUD5	.405	.483
Infra1	.296	.296
Infra2	.538	.602
Infra3	.617	.739
Infra4	.599	.587
Infra5	.432	.408
Quality1	.240	.185
Quality2	.384	.370
Quality3	.545	.705
Quality4	.474	.528
Quality5	.456	.504

The study had five factors; each factor had five measured items. The data were analyzed using factor analysis in SPSS. The extraction method was maximum likelihood. The extraction showed that some items were far below the score of 0.3, which meant they should

be excluded from the study. These items were Cour3, Proof5, Study4, and Quality1, which were all noticed during the statistical analysis except Quality1. Therefore, the following items were excluded from the study: Course3, Proof5, Study4, and Quality1. However, Proof3 was retained because it scored above 0.3 during the extraction procedure. Table 6 lists the extraction results before the items' exclusion, while Table 7 lists the extraction scores after the items were removed. In addition, the goodness-of-fit test for the factor analysis was significant, with a value less than 0.001. The pattern matrix illustrated that each item was load under the perfect place with scores over 0.4 which are presented in Table 8.

Table 7: The Extraction scores after the items were removed

	Initial	Extraction
COUR1	.443	.503
COUR2	.440	.581
COUR4	.330	.356
COUR5	.381	.433
Proof1	.548	.668
Proof2	.511	.659
Proof3	.275	.313
Proof4	.444	.485
STUD1	.413	.414
STUD2	.488	.557
STUD3	.409	.453
STUD5	.391	.411
Infra1	.293	.300
Infra2	.534	.619
Infra3	.603	.724
Infra4	.592	.600
Infra5	.429	.423
Quality2	.323	.323
Quality3	.541	.710
Quality4	.469	.545
Quality5	.446	.500

Table 8: The pattern matrix

		Factor			
	1	**2**	**3**	**4**	**5**
Infra3	.877				
Infra2	.853				
Infra4	.597				
Infra1	.561				
Infra5	.498				
Quality3		.864			
Quality4		.719			

Quality5		.643			
Quality2		.527			
STUD2			.730		
STUD3			.702		
STUD5			.604		
STUD1			.597		
COUR2				.796	
COUR5				.662	
COUR4				.565	
COUR1				.555	
Proof2					.849
Proof1					.771
Proof4					.548
Proof3					.457

Table 9: The model fitness values

Model	RMR	RMSEA	GFI	CFI
Default model	.038	.033	.945	.975

After the pre-analysis of the collected data and the factor analysis, we constructed a model using AMOS to calculate our estimates. Figure 4 depicts the model's construction. The assessment data were imported from SPSS to estimate the pathway of the proposed model. Furthermore, the goodness of fit of the constructed model was based on four measures including the root mean square residual (RMR), goodness-of-fit index (GFI), comparative fit index (CFI), and root mean square error of approximation (RMSEA). A score of less than 0.05 for RMR and RMSEA indicates a perfect fit, along with a value greater than 0.9 for GFI and CFI. As can be seen from the model perfectly fits the data. In addition, the estimation result presented in Table 10.

Table 10: Path estimation

	Estimate	S.E.	C.R.	P	Label
Quality<---Infrastructure	.102	.040	2.574	.010	par_17
Quality<---Student	-.253	.070	-3.613	***	par_18
Quality<---Course	.161	.063	2.566	.010	par_19
Quality<---Professor	.384	.070	5.498	***	par_20
Infra3<---Infrastructure	1.000				
Infra2<---Infrastructure	.962	.064	14.933	***	par_1
Infra4<---Infrastructure	.812	.055	14.759	***	par_2
Infra1<---Infrastructure	.577	.061	9.505	***	par_3
Infra5<---Infrastructure	.692	.065	10.716	***	par_4
Quality3<---Quality	1.000				
Quality4<---Quality	.916	.065	14.005	***	par_5
Quality5<---Quality	.809	.058	13.899	***	par_6

Quality2<---Quality	.723	.066	11.005	***	par_7
STUD2<---Student	1.000				
STUD3<---Student	1.313	.146	9.004	***	par_8
STUD5<---Student	1.249	.139	8.972	***	par_9
STUD1<---Student	.945	.093	10.124	***	par_10
COUR2<---Course	1.000				
COUR5<---Course	.812	.086	9.422	***	par_11
COUR4<---Course	.712	.077	9.297	***	par_12
COUR1<---Course	1.038	.092	11.246	***	par_13
Proof2<---Professor	1.000				
Proof1<---Professor	1.069	.074	14.528	***	par_14
Proof4<---Professor	.863	.066	13.016	***	par_15
Proof3<---Professor	.904	.098	9.201	***	par_16

Discussion

After running an estimation test on the structured model to investigate the pathways of the factors that affected the quality of e-learning using BB, we discovered the following:

- All the paths were significant, with values of less than 0.05.
- The path from professor to quality scored the highest value with 0.384, whereas the path from student to quality scored -0.253.
- We estimated all the factors by the measured variables with scores higher than 0.577.
- After we removed the items nominated for exclusion, the Cronbach's alpha value was 0.773 (Table 11).

Table 11: Reliability final value

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.773	.782	21

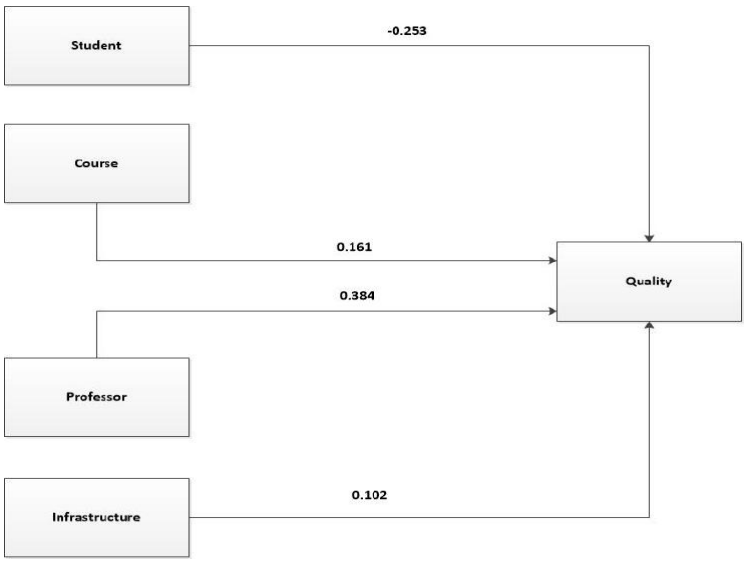

Figure 4: The model construction with the pathways score

The use of a learning management system (LMS) widely varies among users: some use it extensively, while others use it infrequently, and a variety of factors determine how it is used. Several researchers have examined the elements that influence LMS usage. Identifying these characteristics is crucial because it can help universities maintain and raise their level of use while also improving the quality of online learning to avoid a situation where usage drops and the benefits of using LMSs are not realized. The goal of using technology in teaching and learning is to help students and instructors to complete activities more effectively and efficiently. As a result, technological and task features must align.

A teacher's specific abilities and knowledge can aid in ensuring a high-quality learning experience. When learners can form a community through the learning process, online learning substantially improves. The community's opportunities stem from knowledge gained via the articulation, discussion, and sharing of information. Creating a community in an online setting requires a certain level of ability from the online teacher. In this context, our findings contribute to the flow of knowledge by filling a gap in our understanding of the factors determining the utility of the Blackboard LMS. They also contribute to the adoption and growth of e-learning at Qassim University's College of Sciences and Arts and can assist lecturers who plan to use the Blackboard LMS for their courses in developing effective Blackboard methods. Instructors who are already using the system may want to reconsider their approach in relation to our findings. Other professors may be inspired to adopt the Blackboard LMS in their classes as a result of the findings.

Conclusion

To fully benefit from learning management systems such as Blackboard, higher education institutions must find ways to make technology use enjoyable and identify aspects that improve online learning. They can accomplish this by training students and lecturers to use technology and providing them with ICT equipment to use for learning. Furthermore, using the LMS to its maximum potential by taking advantage of the capabilities of the BB platform can provide variety and encourage lecturers and students to embrace technology, hence improving online learning. As a result of our findings, we must also urge academics to encourage the use of learning management systems, as their endorsement could help to improve these systems.

Blackboard has a considerable impact on the teaching-learning process, according to previous research. Blackboard has added a new dimension to education by providing substantial educational benefits to both students and teachers. It has contributed to the strengthening of communication between teachers and students. Despite a high number of users reporting excellent experiences with the Blackboard system in terms of its effectiveness, the system's acceptance is being slowed by a variety of bugs and issues. Because it is consistent, trustworthy, and familiar to most teachers and students, the use of Blackboard is popular in higher education.

Our goal in this study was to examine the quality of e-learning in higher education from the perspectives of lecturers and students. We focused on input from lecturers and students in the

College of Sciences and Arts at Qassim University, Unaizah, on the Blackboard learning system. Our findings will be helpful to schools who are attempting to integrate ICT into their teaching.

Creating an e-learning environment involves more than a technological task. The success of online education or distant learning depends on various things being considered. Furthermore, in order to promote distant education, the government and educational institutions must work together more closely. Students and lecturers must be educated on how to apply online learning by investing in e-learning infrastructure and providing relevant resources, seminars, and training. The most important aspect of a successful educational process is the software and hardware supporting the e-learning infrastructure.

Our findings revealed that the professor, course, and infrastructure all have a favorable impact on the quality of online learning. The administrative and faculty staff's services and assistants' attitudes are highly well-received by students. Students in online courses suffer technical issues that have a detrimental impact on their experience, and we found that the student factor had a small impact on the quality of online learning.

References

1. P. Georgiakakis, A. Papasalouros, S. Retalis, K. Siassiakos, and N. Papaspyrou, “Evaluating the usability of web-based learning management systems,” THEMES Educ., vol. 6, no. 1, pp. 45-59, 2005.
2. K. A. Al-Busaidi and H. Al-Shihi, “Instructors’ acceptance of learning management systems: A theoretical framework,” Commun. IBIMA, vol. 2010, no. 2010, pp. 1-10, 2010.
3. O. Matarirano, N. Jere, H. Sibanda, and M. Panicker, “Antecedents of Blackboard Adoption by Lecturers at a South African Higher Education Institution-Extending GETAMEL,” Int. J. Emerg. Technol. Learn., vol. 16, no. 1, pp. 60-79, 2021.
4. H. M. ABU-DALBOUH, “Application Of Decision Tree Algorithm For Predicting Students’performance Via Online Learning During Coronavirus Pandemic,” J. Theor. Appl. Inf. Technol., vol. 99, no. 19, 2021.
5. C. Dede, Learning with Technology. 1998 ASCD Yearbook. ERIC, 1998.
6. P. Forcheri and M. T. Molfino, “ICT as a tool for learning to learn,” in Communications and networking in education, Springer, 2000, pp. 175-184.
7. Z. Hussein, “Leading to intention: The role of attitude in relation to technology acceptance model in e-learning,” Procedia Comput. Sci., vol. 105, pp. 159-164, 2017.
8. S. Walker, D. Prytherch, and J. Turner, “The pivotal role of staff user experiences in Moodle and the potential impact on student learning,” in 2013 Second International Conference on E-Learning and E-Technologies in Education (ICEEE), 2013, pp. 192-197.
9. U. T. Alturki, A. Aldraiweesh, and D. Kinshuck, “Evaluating The Usability And Accessibility Of LMS ‘Blackboard’ At King Saud University. Contemporary Issues in Education Research (Online), 9 (1), 33.” 2016.

10. C. Sehoole and H. De Wit, "The regionalisation, internationalisation, and globalisation of African higher education," Int. J. African High. Educ., vol. 1, no. 1, 2014.
11. P. Zaharias and C. Pappas, "Quality management of learning management systems: A user experience perspective," Curr. Issues Emerg. eLearning, vol. 3, no. 1, p. 5, 2016.
12. C.-T. Chang, J. Hajiyev, and C.-R. Su, "Examining the students' behavioral intention to use e-learning in Azerbaijan? The general extended technology acceptance model for e-learning approach," Comput. Educ., vol. 111, pp. 128-143, 2017.
13. S. Dawson, L. Heathcote, and G. Poole, "Harnessing ICT potential: The adoption and analysis of ICT systems for enhancing the student learning experience," Int. J. Educ. Manag., 2010.
14. H. Bustos Andreu and M. Nussbaum, "An experimental study of the inclusion of technology in higher education," Comput. Appl. Eng. Educ., vol. 17, no. 1, pp. 100-107, 2009.
15. M. Delgado-Almonte, H. B. Andreu, and L. Pedraja-Rejas, "Information technologies in higher education: Lessons learned in industrial engineering," J. Educ. Technol. Soc., vol. 13, no. 4, pp. 140-154, 2010.
16. R. Chetty and S. Pather, "Challenges in higher education in South Africa," Tell. Stories Differ. Engag. 21st century students through Digit. Storytell., pp. 1-6, 2015.
17. Mekoa, "Challenges facing Higher Education in South Africa: A change from apartheid education to democratic education," African Renaiss., vol. 15, no. 2, pp. 227-246, 2018.
18. Maikish, "MOODLE: A free, easy, and constructivist online learning tool," Multimed. Internet@ Sch., vol. 13, no. 3, p. 26, 2006.
19. M. Hölbl and T. Welzer, "Students' feedback and communication habits using Moodle," Elektron. ir Elektrotechnika, vol. 102, no. 6, 63-66, 2010.
20. L.-L. Hsu, "Blended learning in ethics education: A survey of nursing students," Nurs. Ethics, vol. 18, no. 3, pp. 418-430, 2011.
21. S. A. K. Alkhanak and I. A. G. Azmi, "Information technology usage and attitudes towards online resources-Students perspective," African J. Bus. Manag., vol. 5, no. 7, pp. 2582-2589, 2011.
22. N. A. Adzharuddin and L. H. Ling, "Learning management system (LMS) among university students: Does it work," Int. J. e-Education, e-Business, e-Management e-Learning, vol. 3, no. 3, pp. 248-252, 2013.
23. J. Little-Wiles and L. L. Naimi, "Student Perceptions of and Experiences in Using The Blackboard Learning Management System.," Glob. Educ. J., no. 4, 2011.
24. J. Mtebe, "Learning management system success: Increasing learning management system usage in higher education in sub-Saharan Africa," Int. J. Educ. Dev. using ICT, vol. 11, no. 2, 2015.
25. D. Borboa, M. Joseph, D. Spake, and A. Yazdanparast, "Perceptions And Use Of Learning Management System Tools And Other Technologies In Higher Education: A Preliminary Analysis.," J. Learn. High. Educ., vol. 10, no. 2, 2014.
26. S. M. Green et al., "The development and evaluation of the use of a virtual learning environment (Blackboard 5) to support the learning of pre-qualifying nursing students undertaking a human anatomy and physiology module," Nurse Educ. Today, vol. 26, no. 5, 388-395, 2006.

27. S.-S. Liaw, "Investigating students' perceived satisfaction, behavioral intention, and effectiveness of e-learning: A case study of the Blackboard system," Comput. Educ., vol. 51, no. 2, pp. 864-873, 2008.
28. Blackboard, "Course A: Fundamentals in Digital Teaching and Learning," p. 63, 2018.
29. F. Abdullah and R. Ward, "Developing a General Extended Technology Acceptance Model for E-Learning (GETAMEL) by analysing commonly used external factors," Comput. Human Behav., vol. 56, pp. 238-256, 2016.
30. J. H. Al-Ammary, A. K. Al-Sherooqi, and H. K. Al-Sherooqi, "The acceptance of social networking as a learning tools at University of Bahrain," Int. J. Inf. Educ. Technol., vol. 4, no. 2, p. 208, 2014.
31. O. A. Awofala, O. S. Olabiyi, A. A. Awofala, A. A. Arigbabu, A. O. Fatade, and U. N. Udeani, "Attitudes toward Computer, Computer Anxiety and Gender as determinants of Pre-service Science, Technology, and Mathematics Teachers' Computer Self-efficacy.," Digit. Educ. Rev., vol. 36, pp. 51-67, 2019.
32. F. D. Davis, "Perceived usefulness, perceived ease of use, and user acceptance of information technology," MIS Q., pp. 319-340, 1989.
33. Hanif, A. F. Siddiqi, and Z. Jalil, "Are Computer Experience and Anxiety Irrelevant? Towards a Simple Model for Adoption of E-Learning Systems.," Int. J. Eng. Pedagog., vol. 9, no. 5, 2019.
34. N. Alkhaldi and A. M. Abualkishik, "Predictive Factors for the Intention to Adopt a Mobile Blackboard Course Management System: The Case Study of University of Hai'l in Saudi Arabia," Indian J. Sci. Technol., vol. 12, no. 19, pp. 1-12, 2019.
35. J. A. Alokluk, "The effectiveness of blackboard system, uses and limitations in information management," Intell. Inf. Manag., vol. 10, no. 06, p. 133, 2018.
36. M. A. Mohsen and C. P. Shafeeq, "EFL Teachers' Perceptions on Blackboard Applications.," English Lang. Teach., vol. 7, no. 11, pp. 108-118, 2014.
37. D. L. Butler and M. Sellbom, "Barriers to adopting technology," Educ. Q., vol. 2, no. 1, pp. 22-28, 2002.
38. T. L. Larkin and S. I. Belson, "Blackboard technologies: A vehicle to promote student motivation and learning in physics," J. STEM Educ. Innov. Res., vol. 6, no. 1, 2005.
39. E. J. Servonsky, W. L. Daniels, and B. L. Davis, "Evaluation of Blackboard as a platform for distance education delivery.," ABNF J., vol. 16, no. 6, 2005.
40. S. Iffat Rahmatullah, "Blackboard as online learning management system in Saudi context: Challenges and prospects," Blackboard as Online Learn. Manag. Syst. Saudi Context Challenges Prospect. (June 25, 2021), 2021.
41. H. Motlhaka, "Blackboard Collaborated-Based Instruction in an Academic Writing Class: Sociocultural Perspectives of Learning," Electron. J. e-Learning, vol. 18, no. 4, pp. pp336-345, 2020.
42. R. Omar and Z. Al-Musabi, "The effectiveness of using the Blackboard mobile learning application in developing trends towards e-learning among the students of the University of Najran," Int. J. Educ. Spec., vol. 6, no. 7, pp. 126-136, 2017.
43. J. C. Chen, T. Dobinson, and S. Kent, "Lecturers' perceptions and experiences of Blackboard Collaborate as a distance learning and teaching tool via Open Universities

Australia (OUA)," Open Learn. J. Open, Distance e-Learning, vol. 35, no. 3, pp. 222-235, 2020.
44. N. H. Banafi, "The impact of blended learning on medical students' engagement and achievement with English language terminology: a case study of teachers' and students' self-efficacy and attitudes at Jazan University Saudi Arabia," 2018.
45. Al-Nofaie, "Saudi University Students' perceptions towards virtual education During Covid-19 PANDEMIC: A case study of language learning via Blackboard," Arab World English J. Vol., vol. 11, 2020.
46. M. Paechter, B. Maier, and D. Macher, "Students' expectations of, and experiences in e-learning: Their relation to learning achievements and course satisfaction," Comput. Educ., vol. 54, no. 1, pp. 222-229, 2010.
47. K. Franceschi, R. M. Lee, S. H. Zanakis, and D. Hinds, "Engaging group e-learning in virtual worlds," J. Manag. Inf. Syst., vol. 26, no. 1, pp. 73-100, 2009.
48. S. Ghazinoory and M. Afshari-Mofrad, "Ranking different factors which affect E-Learning outcomes," Int. J. Comput. Theory Eng., vol. 4, no. 2, p. 234, 2012.
49. Kim and R. Santiago, "Construction of E-Learning Environments in Korea," Educ. Technol. Res. Dev., vol. 53, no. 4, pp. 108-115, Apr. 2005, [Online]. Available: http://www.jstor.org/stable/30221214.
50. B.-C. Lee, J.-O. Yoon, and I. Lee, "Learners' acceptance of e-learning in South Korea: Theories and results," Comput. Educ., vol. 53,no. 4, pp. 1320-1329, 2009, doi: https://doi.org/10.1016/j.compedu.2009.06.014.
51. J. J. Baroudi and W. J. Orlikowski, "The Problem of Statistical Power in MIS Research," MIS Q., vol. 13, no. 1, pp. 87-106, Apr. 1989, doi: 10.2307/248704.
52. H. M. Abu-Dalbouh, "A questionnaire approach based on the technology acceptance model for mobile tracking on patient progress applications.," J. Comput. Sci., vol. 9, no. 6, pp. 763-770, 2013.
53. H. Coates, "A model of online and general campus-based student engagement," Assess. Eval. High. Educ., vol. 32, no. 2, pp. 121-141, 2007.
54. S. Hrastinski, "A theory of online learning as online participation," Comput. Educ., vol. 52, no. 1, pp. 78-82, 2009.
55. M. Tschandl, B. Mayer, and S. R. Sorko, "An interdisciplinary digital learning and research factory: The Smart Production Lab," Procedia Manuf., vol. 45, pp. 491-496, 2020.
56. H. S. Aldosari and M. A. A. Mekheimer, "The Bandwagon Effect in the Adoption of ELearning Systems in Language Learning-An Appraisal," GSTF J. Comput., vol. 2, no. 4, 2014.
57. Eldridge, "Exploring faculty adoption and utilization of Blackboard at a community college in the Kentucky community and technical college system.(3691866), University of Kentucky," ProQuest Diss. Theses Glob. database, 2014.
58. H. M. Abu-Dalbouh, "An Integrated Expert User with End User in Technology Acceptance Model for Actual Evaluation.," Comput. Inf. Sci., vol. 9, no. 1, pp. 47-53, 2016.

59. H. Abu-Dalbouh et al., "A proposed website to evaluate the academic performance in college of sciences and arts in unaizah," Res. J. Appl. Sci. Eng. Technol., vol. 11, no. 12, pp. 1305-1319, 2015.
60. J. Poon, "Blended learning: An institutional approach for enhancing students' learning experiences," J. online Learn. Teach., vol. 9, no. 2, pp. 271-288, 2013.
61. M.-H. Lin and H. Chen, "A study of the effects of digital learning on learning motivation and learning outcome," Eurasia J. Math. Sci. Technol. Educ., vol. 13, no. 7, pp. 3553-3564, 2017.
62. S. Al-Fadhli, "Students' Perceptions of E-learning in Arab Society: Kuwait University as a case study," E-Learning Digit. media, vol. 5, no. 4, pp. 418-428, 2008.
63. R. Ayres, "Learner attitudes towards the use of CALL," Comput. Assist. Lang. Learn., vol. 15, no. 3, pp. 241-249, 2002.
64. Bacher-Hicks, J. Goodman, and C. Mulhern, "Inequality in household adaptation to schooling shocks: Covid-induced online learning engagement in real time," J. Public Econ., vol. 193, p. 104345, 2021.
65. H. Coates, R. James, and G. Baldwin, "A critical examination of the effects of learning management systems on university teaching and learning," Tert. Educ. Manag., vol. 11, pp. 19-36, 2005.
66. M. Mahyoob, "Challenges of e-Learning during the COVID-19 Pandemic Experienced by EFL Learners," Arab World English J., vol. 11, no. 4, 2020.
67. B. J. L. Landry, R. Griffeth, and S. Hartman, "Measuring student perceptions of blackboard using the technology acceptance model," Decis. Sci. J. Innov. Educ., vol. 4, no. 1, pp. 87-99, 2006.
68. H. M. ABU-DALBOUH and S. A. ALATEYAH, "Predictive data mining rule-based classifiers model for novel coronavirus (COVID-19) infected patients' recovery in the Kingdom of Saudi Arabia," J. Theor. Appl. Inf. Technol., vol. 99, no. 8, 2021.
69. X. Xie, K. Siau, and F. F.-H. Nah, "COVID-19 pandemic-online education in the new normal and the next normal," J. Inf. Technol. case Appl. Res., vol. 22, no. 3, pp. 175-187, 2020.