

Utilizing Learning Management Systems During COVID-19 and Beyond: A Forward-looking Perspective

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Abstract This study examines the utilization of electronic educational platforms in Saudi universities during the COVID-19 crisis. Questionnaires are distributed to selected universities, focusing on three main aspects: 1) the current state of platform usage during the pandemic, 2) the role of Saudi universities in implementing and leveraging platforms, and 3) the challenges encountered in adopting educational platforms. Insights from teaching staff and students provide a comprehensive understanding of the effectiveness of these platforms in addressing the challenges posed by COVID-19. Additionally, a comparative analysis is conducted among top Blackboard-using universities to assess its role in mitigating the pandemic's impact. The study aims to develop a forward-looking vision for educational platforms based on the findings from the first and second research objectives, as well as the Kingdom Vision 2030. The results reveal a positive adoption of educational platforms during the pandemic and highlight the positive contribution of Saudi universities in responding to the challenges. Moreover, the questionnaires do not identify any significant obstacles that hinder the effective implementation of distance learning platforms. This research contributes to the understanding of platform effectiveness and informs strategies for its future use, ensuring the continuous improvement of educational practices.

Keywords: Learning management system; Blackboard; teaching methods; e-Learning; higher education

1 Introduction

The COVID-19 pandemic, declared by the World Health Organization (WHO), originated in Wuhan, China, and quickly spread worldwide. COVID-19, caused by the novel coronavirus, belongs to a family of viruses known to cause respiratory and gastrointestinal diseases. Since its emergence in December 2019, there have been 767,364,883 confirmed cases and 6,938,353

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deaths globally [1]. To ensure the safety of students and teaching staff, universities worldwide have taken measures such as postponing or canceling campus events and transitioning to distance learning platforms [2]. In Saudi Arabia, as soon as COVID-19 was declared a pandemic, the Ministry of Health launched a large-scale campaign to educate the public about the virus and implemented measures such as quarantine and curfews [3]. The Kingdom of Saudi Arabia has witnessed a significant number of confirmed cases, ranking highest among Arab countries in the Persian Gulf region [4, 5].

In response to the crisis, educational institutions in Saudi Arabia swiftly transitioned to 100% online teaching, prioritizing education spending and emphasizing online education [6, 7]. The COVID-19 pandemic is considered the worst pandemic of this century, primarily due to the lack of clear strategies to combat it [8]. Studies conducted during the early stages of the pandemic revealed that a significant number of Saudi university students experienced anxiety, although only 35% reported anxiety-related symptoms. Students relied on various coping strategies, such as seeking social support, finding satisfaction, maintaining mental well-being, and displaying humanitarian behavior. These findings highlight the importance of developing guidelines to address the pandemic's impact on education, health, and society [8]. The transition to online learning presents several challenges, including training teaching staff, ensuring institutional support, providing internet access, promoting student participation, facilitating online assessment, and adapting teaching methods [9]. Educational institutions must undergo continuous training and development to overcome the challenges posed by the pandemic [10].

The Saudi government, in collaboration with the private sector, has taken steps to address the situation. They have developed and implemented 19 apps and platforms to provide comprehensive health services and care. Additionally, the adoption of a distance learning infrastructure aligned with the Kingdom's Vision 2030 demonstrates a commitment to continuous education, with a focus on incorporating artificial intelligence to address future outbreaks. Neglecting the integration and utilization of mobile phone apps may hinder progress in this area [11].

This review examines significant studies that shed light on how universities in Saudi Arabia and other countries have addressed the challenges posed by the COVID-19 pandemic. For instance, a study conducted at King Khaled University Faculty of Pharmacy evaluated the impact of the pandemic on administrative duties, research, and societal engagement. The transition to distance learning was carried out smoothly without significant obstacles, and the majority of teaching staff preferred virtual lectures over face-to-face ones. The study also revealed that technology played a crucial role in supporting distance learning, while research, community service, and participation in scientific meetings were minimally affected by the suspension of in-person activities [12].

Another study conducted at the College of Medicine (COM) of Alfaisal University in Riyadh examined the impact of the pandemic on distance learning. The majority of respondents expressed increased confidence in the effectiveness of medical distance learning, with 76% indicating a preference for merging distance learning into their educational practices during the pandemic [13].

A cross-sectional study investigated the relationship between COVID-19 awareness, precautionary measures, and socioeconomic factors among residents of Riyadh, Saudi Arabia. The study found that a significant proportion of participants had moderate awareness levels (58%) and exhibited proper precautions (81%) in response to COVID-19. However, there were slight gender differences, with males demonstrating higher awareness levels and females exhibiting greater adherence to precautionary measures. The study emphasized the importance of preparedness through public health education programs to effectively respond to future crises [3].

In a study conducted at King Abdulaziz University, the impact of web video conferencing (WVC) and case-based discussions (CBD) on students' perceptions of the quality of teaching in the pediatric department was evaluated. The majority of students (82%) found the online lectures challenging and recognized the active involvement of teaching staff in encouraging student participation. The study revealed that teaching techniques played a more significant role than technical aspects in determining student perceptions of the quality of online lectures. Furthermore, there was no significant correlation between students' perceptions and technical skills [14].

Numerous studies have examined the effectiveness of distance learning during the pandemic in various countries [9, 10]. A study conducted among 30,383 students from 62 countries explored the impact of COVID-19 on students' satisfaction and performance in the transition to distance learning. The findings revealed that students were generally satisfied with the support provided by their instructors and university public relations departments. However, they expressed concerns about computer skills and the increased workload, which hindered their ability to fully grasp and adapt to the new teaching approach. Despite these challenges, the study highlighted the positive impact of distance learning on student performance [15].

In Poland, a study involving 1,692 students, both graduates and undergraduates, assessed their acceptance of the shift to online learning during the pandemic. The study employed the General Extended Technology Acceptance Model for E-Learning (GETAMEL) and SmartPLS 3 software. The findings demonstrated that students generally accepted and were satisfied with the transition to online learning, with enjoyment and self-efficacy playing significant roles. The study emphasized that online learning allowed the educational process to continue despite the suspension of in-person classes. Consequently, it underscored the importance of preparedness among students and teaching staff for future epidemics or pandemics, emphasizing the role of educational platforms [16].

A questionnaire-based study conducted among medical students at Lumbini Medical College in Nepal sought to gather students' opinions on online medical education. Among the participants, one-third admitted to never attending online classes, and two-thirds rated online classes as inferior to traditional ones. The majority of students (77.8%) expressed a preference for traditional classroom teaching in the future [17].

The remainder of this study is organized as follows: Section 2 provides a brief overview of learning management systems. Section 3 describes the research's methodology employed in this study. Section 4 presents the results and discussions, and findings. Finally, Section 5 concludes the study and suggests avenues for future research.

2 Learning Management System

A Learning Management System (LMS) is an online system or program used in distance learning to facilitate the administration, documentation, tracking, and recording of educational activities. It is widely employed by educational institutions and companies to deliver courses, train employees, and maintain records. LMS enables the delivery of educational content such as text, images, audio, video, and graphics, while also managing course registration, skill analysis, tracking, and reporting. The key features of LMS include streamlining training processes, leveraging technology for positive learning outcomes, and providing flexibility for engagement and motivation in learning anytime and anywhere [18, 19, 20].

There are several LMS platforms available, including Moodle, Canvas, Edmodo, and Blackboard. Blackboard is a popular LMS that supports various online activities for students, allowing them to interact with peers and instructors, access recorded classes, review teaching

materials, and attend virtual lectures from any location [21].

In response to the COVID-19 pandemic, the Saudi Arabia Ministry of Education, specifically for higher education, expanded the use of Blackboard to enable students to continue their education remotely. Saudi universities, comprising 66,552 instructors offering 254,638 courses, serve a student population of 1,116,054 across different academic stages (as of 2020). These institutions swiftly transitioned their courses and students to online learning, with more than 60,463 virtual classrooms being attended daily.

This study aims to achieve the following objectives:

- Identify the role of electronic educational platforms, particularly Blackboard, in Saudi universities during the COVID-19 pandemic.
- Conduct a comparative analysis among selected Saudi universities to assess the role of Blackboard in responding to the challenges posed by the pandemic. The study focuses on the top ten universities based on the number of Blackboard users.
- Develop a forward-looking perspective on the educational platform Blackboard. This perspective will be informed by the findings from the first two objectives and aligned with the goals of Saudi Arabia's Vision 2030.

3 Research Methodology

This study employs a descriptive survey approach to investigate the use of educational platforms in Saudi universities during the COVID-19 pandemic. The methodology is described as follows:

- The study population consists of two groups: students enrolled in Saudi universities during the academic year 1440-1441 H and faculty members teaching at Saudi universities during the pandemic. The sample for this study includes 185 randomly selected individuals from various Saudi universities, with 114 students and 71 faculty members participating in the survey.
- Data collection is conducted using an electronic questionnaire designed with Google Forms. The questionnaire comprises three subsections with a total of fifty-three questions addressing various aspects of the study. The first section evaluates the current usage of educational platforms during the pandemic and contains 14 questions. The second section assesses the role of educational platforms in light of the pandemic and includes 23 questions. The third section aims to identify problems and obstacles encountered in the active use of educational platforms and programs in Saudi universities during the pandemic, consisting of 16 questions. The responses to these questions are measured using a 6-point Likert scale. In addition, respondents are asked to indicate an alternative platform to Blackboard from a list of 13 well-known platforms. The responses to this part are analyzed based on their frequencies.
- To ensure the content validity of the questionnaire, a two-stage validation process is conducted. In the first stage, 30 experts specializing in education technologies, measurement, evaluation, and computer science review the questionnaire. They assess the relevance of the research variables, the suitability of the questions for the research objectives and sections, and the appropriateness of the questionnaire's scale. The reviewers' feedback and suggestions are incorporated to modify the questionnaire, achieving an agreement level

of 80% among the experts. In the second stage, the questionnaire is pilot-tested with a sample of 50 students and 50 instructors. The Pearson correlation coefficient is calculated for each question within its respective section to evaluate the validity of the questionnaire. The results indicate that all question statements are valid at a significance level of 0.001. Furthermore, the reliability of the questionnaire is assessed using the Cronbach alpha coefficient, which demonstrates significant coefficients at a significance level of 0.001. This indicates the stability of the questionnaire statements and the reliability of the obtained results.

4 Results and Discussions

This section presents and discusses the results of the study, which were analyzed using four measures: mean, Pearson correlation coefficient, t-test, and linear contrast. The results are organized according to the three main objectives of the study.

4.1 Analysis based on the first objective: Examining the reality of universities' role in activating different educational platforms in university education to overcome the COVID-19 pandemic and achieve the goals of distance learning.

This objective comprises nine sub-objectives, which are as follows:

1. The reality of different educational platforms in university education during the COVID-19 crisis from the students' perspective.

To assess the students' perspectives on the use of different educational platforms during the pandemic, their responses to the questionnaire were analyzed using the t-test. The results of the t-test are presented in Table 1.

Table 1: Results of the t-test on a sample of students

	Sample	Exp. Avg.	V. Avg.	Std	F. degree	T-score	Sig. Level
1st axis		70.77	52.5	18.13		10.76	
2nd axis	114	107.89	80.5	26.01	113	11.24	0.001
3rd axis		48.43	56.0	20.86		-3.86	
Total		227.1	189	35.96		11.31	

* Exp. Avg is Experimental Average. V. Avg. is Virtual Average. Std. is Standard Deviation.

* F. degree is Freedom Degree. Sig. Level is Significance Level

According to Table 1, the "T-score" for the first sub-objective, which assesses the reality of using educational platforms and programs in Saudi universities during the COVID-19 pandemic, was 10.76, indicating a significant positive activation of educational platforms during the pandemic ($p < 0.001$). The second sub-objective, which examines the reality of the role played by Saudi universities in activating educational platforms and programs during the pandemic, had a "T-score" of 11.24, also indicating a significant positive role of Saudi universities in utilizing educational platforms during the pandemic ($p < 0.001$). In contrast, the third sub-objective, which focuses on identifying problems and obstacles in activating educational platforms and programs in Saudi universities during the pandemic, had a "T-score" of -3.86, indicating that there were no significant obstacles or problems negatively affecting the activation of distance learning platforms during the pandemic ($p < 0.001$).

The overall "T-score" for the entire questionnaire administered to the students was 11.31, which was significant at the 0.001 level. This result suggests that Saudi universities have successfully played a positive role in activating distance learning platforms and have overcome any negative effects caused by the COVID-19 pandemic on university-level learning.

2. Perception of staff members on the use of educational platforms in university education during the COVID-19 crisis In this regard, the responses of teaching staff members were analyzed based on the questionnaire, and a one-sample "t-test" was conducted to examine the results. The findings are presented in Table 2.

Table 2: Results of the (t-test) for a sample of teaching staff members

Sample	V. Avg. is Virtual Average.	Std	F. degree	T-score	Sig. Level
1st axis	72.33	52.5	12.09	13.81	
2nd axis	113.01	80.5	16.29	16.8	0.001
3rd axis	47.49	52.5	16.74	-2.51	
Total	232.84	185.5	27.32	14.59	

Exp. Avg is Experimental Average. V. Avg. is Virtual Average. Std. is Standard Deviation. F. degree is Freedom Degree. Sig. Level is Significance Level

Based on the findings presented in Table 2, it can be observed that the "T-Score" of the first axis was 13.81, indicating a significant positive activation of educational platforms as perceived by teaching staff members during the Corona Pandemic ($p < 0.001$). Similarly, the "T-Score" of the second axis was 16.80, signifying the positive role of Saudi universities as perceived by teaching staff members in utilizing educational platforms during the pandemic ($p < 0.001$). On the other hand, the "T-Score" of the third axis was -2.51, suggesting that there were no significant obstacles or negative impacts hindering the activation of distance learning platforms during the pandemic ($p < 0.01$). Overall, the combined "T-Score" for all questionnaires administered to the teaching staff members was 14.59, signifying a significant positive perception of the role played by Saudi universities in promoting distance learning platforms and overcoming the adverse effects of the pandemic on the university level ($p < 0.001$).

3. The utilization of Blackboard alternatives in university education from the students' perspective during the COVID-19 crisis

To assess the effectiveness of Blackboard alternatives as educational platforms, the average ratings for each platform were computed. Figure 1 presents the average ratings for each one.

Based on the data presented in Figure 1, it is evident that the utilization of Blackboard alternatives as educational platforms, from the students' perspective during the Corona crisis, was relatively low. The average rating for most of the listed Blackboard alternative platforms was below the virtual average of 3.5. However, it is worth noting that the "Google app for education" received a slightly higher average rating of 3.66, placing it in the top position among the listed Blackboard alternatives. This preference for the Google app for education could be attributed to its widespread availability and the fact that it is free for students to use.

4. The utilization of Blackboard alternatives in university education during the COVID-19 crisis from the perspective of teaching staff members Based on the analysis depicted in

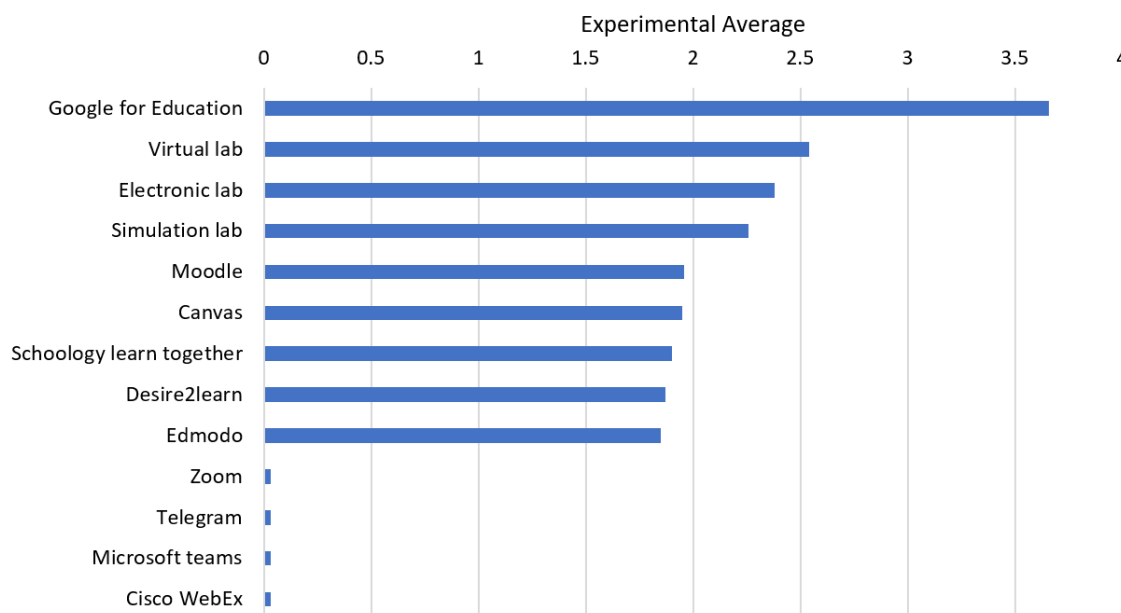


Figure 1: Average ratings of Blackboard alternatives as educational platforms from the students' perspective

Figure 2, it is apparent that the adoption of Blackboard alternatives as educational platforms was relatively low among teaching staff members. The virtual average rating of 3.5 surpassed the ratings of all other listed Blackboard alternatives. This finding suggests that teaching staff members preferred to utilize the Blackboard platform itself. Several factors can explain this preference. Firstly, the Blackboard platform is widely implemented and standardized across all Saudi universities, providing a consistent approach to university education. Additionally, the Electronic Education Deanship has demonstrated a strong commitment to conducting training courses for teaching staff members in universities, emphasizing the ease of use and comprehensive features offered by Blackboard. These features encompass a wide range of functionalities such as setting up virtual classes, administering tests, assigning tasks, facilitating seminars and discussions, maintaining blogs and diaries, exchanging files, managing tasks, disseminating announcements, engaging in electronic mail communication, utilizing marketing content tools, and establishing Wiki webs. The familiarity and convenience associated with these features likely contribute to the continued prevalence of Blackboard as the preferred platform among teaching staff members.

5. Variations in the Activation of Educational Platforms in University Education during the COVID-19 Crisis: A Comparison of Students across University Types

This section aims to investigate whether there are differences in the degree of activation of different educational platforms in university education during the COVID-19 crisis, specifically among students belonging to different types of universities. To achieve this objective, the One-Way Analysis of Variance (ANOVA) equation was applied to analyze the responses of students and identify any variations based on university type. The results of this analysis are presented in Table 3.

Based on the findings presented in Table 3, the F-score value of 1.480 did not reach significance at any of the predetermined significance levels commonly used in educational

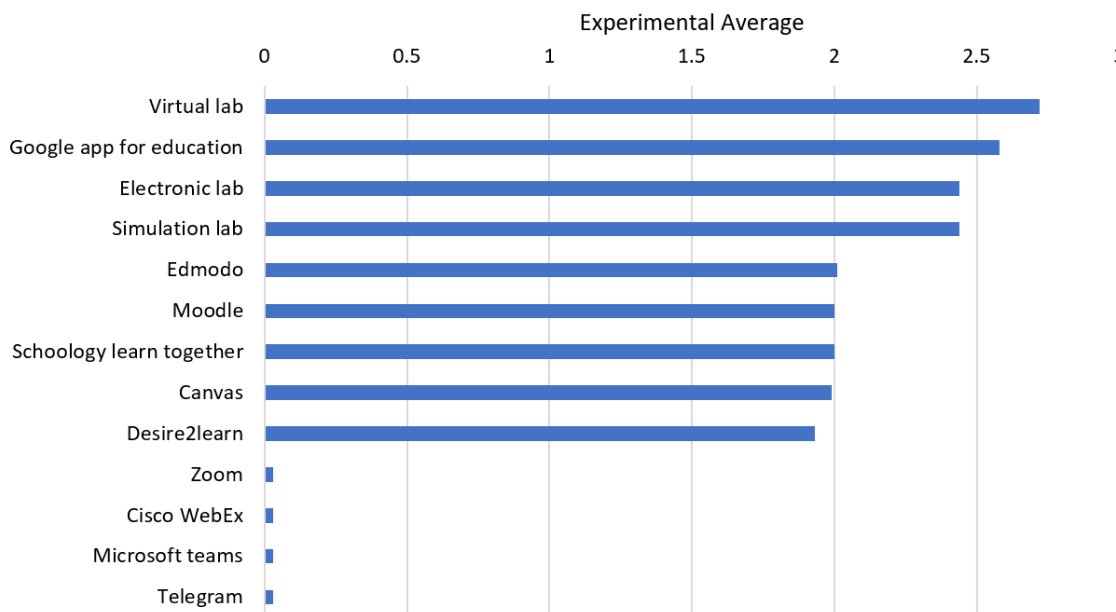


Figure 2: Average ratings of Blackboard alternatives as educational platforms from the teaching staff members’ perspective

Table 3: Results of variance analysis.

Source of Variance	Sum of squares	F. Degree	Avg. of squares	F-Score	Sig. Level
Between Groups	5670.265	3	1890.088		
Within Groups	140458.472	110	1276.895	1.48	0.224
Total	146128.737	113			

sciences. Therefore, it can be concluded that there are no significant differences in the students’ responses based on the type of university they belong to. This result suggests that students from various Saudi universities had a positive response to the role of educational platforms in facilitating the continuity of the educational process during the COVID-19 pandemic.

6. Variations in the Degree of Activating Different Educational Platforms in University Education During the COVID-19 Crisis among Students Based on Program Type

To investigate this objective, the One-way Analysis of Variance equation was applied to examine the variations in student responses based on their program type (i.e. diploma – bachelor- masters). The results are presented in Table 4.

Table 4: Results of Variance Analysis based on the Program Type Variants.

Source of Variance	Sum of squares	F. Degree	Avg. of squares	F-Score	Sig. Level
Between Groups	933.682	2	466.841		
Within Groups	145195.055	111	1308.064	0.357	0.701
Total	146128.737	113	466.841		

Based on the results presented in Table 4, the F-score of 0.357 was not significant at any level of significance. The highest significance level observed was 0.701. Therefore,

no significant differences were found in the students' responses based on their study program (diploma, bachelor, or master's). This finding suggests that regardless of their program type, students from Saudi universities had a positive response to the utilization of educational platforms in mitigating the negative impacts of the COVID-19 pandemic. The uniformity of educational criteria across different programs might contribute to the absence of significant differences in their responses.

7. Variations in the Degree of Activating Different Educational Platforms in University Education During the COVID-19 Crisis among Students Based on Specialization

To investigate whether there are differences in the degree of activation of different educational platforms in university education during the COVID-19 crisis among students based on their specialization (i.e. humanistic, mixed, scientific), a One-Way Analysis of Variance (ANOVA) was employed. This analysis aimed to determine if there were significant variations in the students' responses based on their specialization type. The results of the analysis can be found in Table 5.

Table 5: Results of One-Way Analysis of Variance according to the type of specialization.

Source of Variance	Sum of squares	F. Degree	Avg. of squares	F-Score	Sig. Level
Between Groups	1852.396	2	926.198		
Within Groups	144276.34	111	1299.787	0.713	0.493
Total	146128.737	113			

Table 5 illustrates that the F-Score (0.713) did not reach significance at any of the pre-determined significance levels. With a value of (0.493), which exceeds all other levels, no significant variations were found in the students' responses based on their specialization (i.e. humanistic, mixed, scientific). This outcome suggests that Saudi university students, regardless of their field of study, demonstrated a positive response to the utilization of educational platforms in mitigating the challenges posed by the COVID-19 pandemic.

8. Variations in the Degree of Activating Different Educational Platforms in University Education During the COVID-19 Crisis among Teaching Staff Members Based on University

To investigate this objective, a One-Way Analysis of Variance equation was utilized to examine the differences in response among teaching staff members based on the university they belong to. The results are presented in Table 6.

Table 6: Results of variance analysis for teaching staff members according to the university.

Source of Variance	Sum of squares	F. Degree	Avg. of squares	F-Score	Sig. Level
Between Groups	1506.325	2	753.163		
Within Groups	50770.971	68	746.632	1.009	0.37
Total	52277.296	70			

Based on the findings presented in Table 6, the F-Score (1.009) was not statistically significant at any of the predetermined significance levels. With a p-value of 0.370, there are no significant variations in the responses of teaching staff members based on the university they belong to. This suggests that regardless of the university they are affiliated with, teaching staff members in Saudi universities have shown a positive response to the

utilization of educational platforms in mitigating the challenges posed by the COVID-19 pandemic.

9. Variations in the Degree of Activating Different Educational Platforms in University Education During the COVID-19 Crisis among Teaching Staff Members Based on Scientific Titles

To examine whether there are differences in the degree of activating different educational platforms in university education during the Corona crisis among teaching staff members based on their scientific titles (Professor, Associate Professor, Assistant Professor, Lecturer, Demonstrator, and equivalents), a One-Way Analysis of Variance was conducted. The results of this analysis are presented in Table 7.

Table 7: Results of the analysis of variance for the teaching staff members according to the scientific title.

Source of Variance	Sum of squares	F. Degree	Avg. of squares	F-Score	Sig. Level
Between Groups	2693.357	3	897.786		
Within Groups	49583.939	67	740.059	1.213	0.312
Total	52277.296	70			

Based on the results presented in Table 7, it can be observed that the F-Score (1.213) did not reach statistical significance at any of the predefined significance levels. With a significance level of (0.312), there are no significant variations in the responses of teaching staff members according to their scientific titles (Professor, Associate Professor, Assistant Professor, Lecturer, Demonstrator, and equivalents). This indicates that teaching staff members in Saudi universities had a consistent positive response to the role of educational platforms in mitigating the impact of the Corona Pandemic, regardless of their scientific titles.

4.2 Comparative Study of Educational Platform (Blackboard) Usage and Response to the Corona Pandemic in Selected Saudi Universities

To address the second objective of this research, a comparative analysis was conducted to examine the utilization of educational platforms, specifically Blackboard, and their effectiveness in facing the challenges posed by the Corona Pandemic in Saudi universities. The data used for this analysis was obtained from the statistics of electronic learning activities in Saudi universities, which were published by the Ministry of Education on the 2nd of Sha'aban 1441H.

According to the available data, the number of users utilizing Blackboard services in Saudi universities was recorded as 669,611. The usage of Blackboard varied across different activities, including discussions (1,630,428), electronic assessments (540,337), and scientific research (2,423,204). Furthermore, virtual classes emerged as a viable alternative for remote lectures, with a total of 60,463 virtual classes conducted and 868,896 class attendances recorded (source: Ministry of Education, <https://www.moe.gov.sa/ar>).

To facilitate comparisons among universities regarding the use of Blackboard as an educational platform during the Corona Pandemic, this study focuses on the top ten universities with the highest number of Blackboard users. The statistics obtained from these universities will be presented, highlighting the most utilized features and providing percentages for comparative analysis. The detailed results are presented in Table 8.

Comparisons based on the data presented in Table 8 reveal the following findings:

Table 8: Average of daily uses of Blackboard in Saudi Universities as well as the courses number.

University	Login users	% of the total	Dissc. board	% of the total	Asses.	% of the total	Virtual Classes	% of the total	Courses	% of VC
King Abdulaziz	48505	7.2	3135	0.6	47233	8.7	5085	8.4	18377	27.7
Qassim	46634	6.9	2230	0.4	48056	8.8	12452	20.5	20823	59.7
Imam Muhammad	45958	6.8	262	0.5	45958	8.5	3137	5.1	18098	17.3
King Khalid	45494	6.7	31169	6.9	81943	15.1	1396	2.3	15865	8.8
Taif	41143	6.1	2834	6.2	29618	5.4	3074	5	12686	24.2
Jazan	40676	6	12373	2.7	38136	7	2301	3.8	2500	92
King Saud	27695	4.1	243	0.05	3350	0.6	1005	1.6	5176	19.4
Umm Al-Qura	25678	3.3	27702	6.1	20133	3.7	1165	1.9	23006	5.06
Tabuk	25211	3.7	13732	0.3	19447	3.5	2824	4.6	7912	35.6
King Faisal	24805	3.7	13102	2.9	10446	1.9	758	1.2	1553	48.8
Total	371799	54.5	106782	28.9	344320	63.2	33197	54.4	-	-
Total of Univ.	669611	-	-	-	540337	-	60463	-	-	-

* Discc refers to discussion. Asses. refers to assessments. VC refers to virtual classroom.

1. King Abdulaziz University (KAU) secured the top position in terms of user engagement. With 48,505 login users, it accounted for 7.2% of the total users. However, the utilization of the Discussion Board was significantly low, with only 3,135 uses (0.6% of the total). Similarly, virtual classes comprised 5,085 sessions (8.4% of the total), indicating an average utilization rate. Only 27% of the courses (18,377) were taught through virtual classes, suggesting that distance learning at KAU was still in its early stages, and the usage of assessments, Discussion Board, and virtual classes remained limited.
2. Qassim University ranked second in terms of user engagement, with 46,634 login users (6.9% of the total). The utilization of the Discussion Board was significantly lower compared to the number of users, with only 2,230 uses (0.4% of the total). Assessments accounted for 48,056 instances (8.8% of the total), reflecting a similar user ratio. Virtual classes were highly utilized, with 12,452 sessions (20.5% of the total), indicating a strong emphasis on virtual learning. Approximately 59.7% of the courses (20,823) were taught through virtual classes, demonstrating a moderate utilization of virtual platforms for teaching and assessments at Qassim University.
3. Imam Muhammad University ranked third in terms of user engagement, with 45,958 login users (6.8% of the total). However, the utilization of the Discussion Board was extremely low, with only 262 uses (0.05% of the total). Assessments accounted for 45,958 instances (8.5% of the total), similar to the user ratio. Virtual classes were moderately utilized, with 3,137 sessions (5.1% of the total), compared to other universities. Approximately 17.3% of the courses (18,098) were taught through virtual classes, indicating that a majority of courses (82.7%) were not delivered via the Blackboard system. This suggests that distance learning at Imam Muhammad University was still in its early stages, with virtual classes being conducted through alternative platforms, while assessments were prioritized.
4. King Khalid University ranked fourth in terms of user engagement, with 45,494 login users (6.7% of the total). The utilization of the Discussion Board was moderate, with 31,169 uses (6.9% of the total) compared to the number of users. Assessments accounted for 81,943 instances (15.1% of the total), reflecting a good user ratio. Virtual classes comprised 1,396 sessions (5.1% of the total), which was a considerable percentage compared

to the overall virtual class count. Among the courses taught at the university (15,865 in total), 11.3% were delivered through the Blackboard system, while the majority (88.7%) were taught using other methods. This indicates that distance learning at King Khalid University was still in its early stages, with a focus on the Discussion Board rather than virtual classes and assessments.

5. Taif University ranked fifth in terms of user engagement, with 41,143 login users (6.1% of the total). The utilization of the Discussion Board was relatively low, with 2,834 uses (0.1% of the total) compared to the number of users. Assessments accounted for 29,618 instances (5.4% of the total), indicating a moderate utilization rate relative to the user base. Virtual classes comprised 3,074 sessions (5% of the total), which was a moderate ratio compared to other universities. Among the courses taught at Taif University (12,686 in total), 24.2% were delivered through virtual classes, while the majority (75.8%) were not taught using the Blackboard platform. This suggests that distance learning at Taif University was still in its early stages, with a preference for alternative virtual class platforms, resulting in low utilization of virtual classes, moderate usage of assessments, and limited use of the Discussion Board.
6. Jazan University ranked sixth in terms of user engagement, with 40,676 login users (6% of the total). The utilization of the Discussion Board was moderate, with 12,373 uses (2.7% of the total) compared to the number of users. Assessments accounted for 38,136 instances (7% of the total), reflecting a moderate utilization rate. Virtual classes comprised 2,301 sessions (3.8% of the total), which was a low ratio compared to the overall virtual class count. Among the courses taught at the university (2,500 in total), a significant majority (92%) were delivered through virtual classes. This indicates that Jazan University, in its early stages of distance learning, heavily relied on virtual classes for most courses, assessments, and the Discussion Board to a lesser extent.
7. King Saud University ranked seventh in terms of user engagement, with 27,695 login users (4.1% of the total). The utilization of the Discussion Board was very low, with only 243 uses (0.05% of the total) compared to the number of users. Assessments accounted for 3,350 instances (0.6% of the total), indicating a minimal utilization rate relative to the user base. Virtual classes comprised 1,005 sessions (1.6% of the total), which was significantly lower than the overall number of virtual classes across universities. Among the courses taught at the university (5,176 in total), 19.4% were delivered through the Blackboard system, while the majority (80.6%) were taught using alternative educational platforms. This suggests that distance learning at King Saud University, in its early stages, did not primarily rely on the Blackboard platform. Moreover, the utilization of assessments and the Discussion Board was limited compared to the number of users.
8. Umm Al-Qura University ranked eighth in terms of user engagement, with 25,678 login users (3.3% of the total). The utilization of the Discussion Board was high, with 27,702 uses (6.1% of the total) compared to the number of users. Assessments accounted for 20,133 instances (3.7% of the total), reflecting a relatively low utilization rate. Virtual classes comprised 1,165 sessions (1.9% of the total), which was very low compared to the overall number of virtual classes across universities. Among the courses taught at the university (23,006 in total), only 5% were delivered through the Blackboard system, indicating that alternative platforms were preferred. The utilization of assessments was low compared to the number of users, while the performance of the Discussion Board was moderate.

9. Tabuk University ranked ninth in terms of user engagement, with 25,211 login users (3.7% of the total). The utilization of the Discussion Board was moderate, with 13,732 uses (3% of the total) compared to the number of users. Regarding virtual classes, there were 2,824 sessions (4.6% of the total), indicating a moderate utilization rate among all universities. Among the courses taught at Tabuk University (7,912 in total), 35.6% were delivered through virtual classes, while the majority (64.4%) were not taught using the Blackboard system. This suggests that distance learning at Tabuk University had limited use of virtual classes, assessments, and the Discussion Board within the Blackboard platform. Alternative platforms were preferred instead.
10. King Faisal University ranked tenth in terms of user engagement, with 24,805 login users (3.7% of the total). The utilization of the Discussion Board was moderate, with 13,102 uses (2.9% of the total) compared to the number of users. Assessments accounted for 10,446 instances (1.9% of the total), indicating a low utilization rate relative to the user base. Virtual classes comprised 758 sessions (1.2% of the total), which was significantly lower than the number of classes offered by other universities. Among the courses taught at the university (1,553 in total), 48.8% were delivered through virtual classes, while the remaining 51.2% were taught without relying on the Blackboard virtual class system. This indicates that King Faisal University used the virtual class feature extensively for distance learning, while the utilization of assessments and the Discussion Board was relatively weaker compared to the number of users and courses.

In summary, this comparative analysis reveals varying levels of user engagement with the Blackboard system across the ten universities. While some institutions showed high utilization of certain features like the Discussion Board or virtual classes, others had limited usage. These differences can be attributed to factors such as the stage of development of distance learning at each university, the availability of alternative platforms, and institutional preferences. The findings provide valuable insights into the adoption and utilization of the Blackboard system for distance learning in Saudi Arabia universities.

4.3 Analysis Based on the Third Objective: Building a Prospective Vision to Activate Educational Platforms in University Education in Line with the Kingdom Vision 2030

The third objective aims to build a prospective vision for electronic educational platforms in university education that aligns with the Kingdom Vision 2030G. To accomplish this, we conducted an analysis of the results using four steps:

4.3.1 Reasons for Building a Prospective Vision to Activate Electronic Platforms

The analysis of the first objective revealed the presence of obstacles faced by students and teaching staff members in using the Blackboard platform. Students expressed their challenges and concerns through questionnaire responses regarding the obstacles and problems they encountered while using distance learning platforms. The following points summarize their feedback:

- Difficulty in effectively communicating their needs or concerns to instructors.
- Preference for face-to-face communication over distance learning.
- Disruptions caused by internet disconnections, leading to difficulties in attending lectures on time.

- Financial constraints hindering access to devices and internet for distance learning.
- Extended lecture hours, causing inconvenience for students.
- Technical errors preventing students from attending lectures.
- Challenges in understanding course content due to distance communication with instructors.
- Poor internet connection during lectures, negatively impacting the learning experience.
- Inconvenient test timings for students.
- Lack of the option to review previous questions during tests in most courses.
- Psychological pressure and stress caused by an overwhelming number of courses, leading to emotional distress.
- Excessive assignments in a single course, making it difficult for students to complete all requirements.
- Occasional difficulty accessing Blackboard due to service disruptions.
- Increase in tests and assignments during distance learning compared to normal circumstances.
- Inconvenient lecture timings for most courses.
- Teaching staff members facing challenges in adapting to distance learning.
- Some instructors lacking proficiency in utilizing various features of Blackboard.
- Some instructors assuming students have ample time and assigning tests, research, or assignments during weekends, causing increased pressure throughout the week.
- Family problems affecting students' performance during lectures.
- Imbalance in grades due to excessive assignments.
- Discrepancies between distance learning materials and test content.

Similarly, teaching staff members identified obstacles and problems they faced during distance learning through the questionnaire. The following points summarize their feedback:

- The need for updating and fixing issues with the Blackboard program, which frequently encountered problems.
- Continuous internet disconnection issues due to limited communication towers.
- Lack of responsibility from communication companies during the COVID-19 pandemic, failing to increase the number of communication towers, especially in rural areas.
- Communication companies prioritizing financial gain over supporting distance learning, by not providing discounted packages or reducing subscription fees for students.

- Inadequate participation from communication companies in supporting distance learning initiatives.
- Limited internet network coverage in remote villages, preventing students from accessing lectures on Blackboard.
- Inflation in students' marks compared to previous years.
- Students' familiarity with electronic assessments, resulting in higher marks than deserved.
- Disqualification of teaching staff members from various methods of electronic assessment.
- Lack of familiarity with the types of tests conducted through Blackboard among teaching staff members.
- Students developing strategies to avoid attending distance lectures by falsely claiming disconnections.
- Teaching staff members lacking experience in using distance learning assessment methods.
- Insufficient evaluation methods to assess teaching staff members' skills.
- Work pressure and late lectures until evening hours causing confusion for some teaching staff members.
- The need to use multiple educational platforms based on specialization, leading to inconsistency.
- Enhancing social participation to contribute to the development of distance learning mechanisms.

The analysis of the second objective revealed that universities, particularly those ranked in the top ten for distance learning platform usage, primarily relied on virtual classes. However, these classes did not encompass all courses but were limited to a smaller selection. Additionally, electronic assessment became the predominant method for final assessments during the COVID-19 pandemic. The relative limitation of these two approaches suggests an underutilization of the diverse potential of Blackboard, which can be seen as a wasted opportunity.

By considering the results of the first and second objectives, we can now work towards building a prospective vision for educational platforms in university education that aligns with the Kingdom Vision 2030G.

4.3.2 Objectives of Building a Prospective Vision to Activate Electronic Platforms

The main objective of this research is to develop a vision that promotes the activation of the Blackboard Platform, specifically. This vision encompasses several sub-objectives that serve the educational process in university education. The following are the sub-objectives:

1. Promote learning through electronic platforms under normal circumstances and during times of crisis, aligning with the 2030 vision for learning in general and for university education in particular.

2. Enhance interactive capabilities between learners and teaching staff members by utilizing electronic learning platforms to facilitate optimal learning experiences, even during crisis situations such as the COVID-19 pandemic.
3. Develop interactive programs within the Blackboard platform to be leveraged for distance learning purposes.
4. Enhance and explore new mechanisms for electronic assessment to achieve desired assessment goals in general and electronic assessment goals in particular.
5. Foster competition among teaching staff members in utilizing Blackboard system mechanisms to enrich the learning process and attract students to distance learning.
6. Encourage student engagement and investment in learning through educational platforms, particularly in remote areas such as villages and the countryside.
7. Reduce financial costs associated with student learning, as face-to-face learning often incurs significant expenses, while distance learning through platforms can be more cost-effective.
8. Utilize electronic learning platforms as repositories of extensive knowledge and skills, serving as references accessible anytime and anywhere, providing feedback to students, teaching staff members, and educational institutions.
9. Serve as a reference for evaluation, assessment, and measurement, offering accurate statistics about platform usage.
10. Ensure quality by implementing the best usage criteria of the Blackboard platform to fulfill the mission of the university.

4.3.3 Employment of the 2030 Vision on Electronic Learning Platforms

The Council of Economic Affairs and Development has adopted a list of programs, including the education program, to achieve the 2030 vision. The current study focuses specifically on the education program. The Human Resources Development Program within this program aims to enhance the education and training system at all stages, from early education to lifelong continuing education, in order to meet global standards. The program also aims to develop various components of the education system, including teaching staff members, governance, assessment systems, quality, curricula, vocational education pathways, and educational environments, to align with modern and innovative trends in education (Ministry of Education, The National Centre for Electronic Learning).

This program includes several initiatives, such as:

1. Establishing partnerships with global educational institutions to exchange experiences, share knowledge on the latest educational advancements, support research collaboration, facilitate student exchanges, offer scholarships, and organize scientific events like conferences and workshops.
2. Promoting competitions and student clubs that foster innovative solutions for social, scientific, or national challenges.

3. Attracting private investments to finance the construction of educational buildings and diversify educational systems.
4. Implementing a comprehensive information electronic services system for universities.
5. Establishing smart university systems that provide integrated smart electronic services for teaching staff members.
6. Transitioning to digital learning to support the progress of both students and teachers.
7. Supporting scientific research and development in universities (<https://www.moe.gov.sa/ar>).

4.3.4 Criteria

The National Centre for Electronic Learning has developed a set of criteria to assess the quality of electronic learning in higher education institutions in the Kingdom. The degree to which these criteria are met is evaluated based on the practices implemented by higher education institutions. The criteria are categorized into basic and advanced criteria, with two main axes: one related to the authorities involved in electronic learning practices and the other related to technical aspects.

4.4 Prospective Vision for Activating Learning Management System Platforms

Prospective vision for activating electronic educational platforms Based on the previously outlined justifications, aims, 2030 vision, and criteria, we present the key aspects of our prospective vision for activating electronic platforms in university education, aligned with the Kingdom Vision 2030.

4.4.1 The First Axis: Requirements of the Prospective Vision for Activation

The following actions are essential for the successful implementation of the prospective vision:

1. Identification of a specialized technical team proficient in educational platform systems, particularly Blackboard, and other relevant platforms. This team will oversee the mechanisms of distance learning.
2. Separation of the educational Blackboard system from other electronic services used by the university for digital transactions.
3. Development of a dedicated application or program with specific technical characteristics exclusively for the Blackboard platform. This application will be accessible for download on mobile phones or computers.
4. Activation of interactive programs to facilitate student attendance in virtual classes through the Learning Management System (LMS) technique.
5. Establishment of a distance learning measuring and evaluation center responsible for identifying distance learning criteria for teaching staff members. The center will also monitor and evaluate various aspects such as tests, questionnaires, statistics, and overall performance.

6. Integration of a specialized communication system with the platform through collaborations with local or global communication companies.
7. Provision of special packages that activate the Blackboard service exclusively for students and teaching staff members at affordable prices.

Additionally, efforts must be made to qualify and develop users through the following tasks:

1. Cultivation of a distance learning culture as an excellent alternative, especially during normal circumstances, crises, or situations that require remote learning in villages and remote areas.
2. Empowerment of users (students and staff members) to practice and utilize the various applications and mechanisms offered by Blackboard for effective learning.
3. Maximal utilization of Blackboard applications in learning by mandating the installation and use of specific applications by teaching staff members, based on the adopted course and assessment requirements.

4.4.2 The Second Axis: Execution Steps

To implement the prospective vision, the following execution steps should be taken:

1. Organization of qualifying and development workshops tailored to the specialized needs of users, enabling them to acquire the latest technical skills in the field of distance learning.
2. Scheduling workshops for teaching staff members to create interactive lectures, leverage learning techniques, and effectively implement them in their teaching based on specific criteria identified by the Distance Learning Agency.
3. Conducting workshops to assist teaching staff members in constructing tests (question banks) according to the specific criteria set by the Distance Learning Agency and the measurement and evaluation centers.
4. Adoption of teaching courses through virtual classes systems and development of question banks that can be utilized for courses taught in multiple departments or faculties.
5. Integration of selected courses into the Blackboard system, allowing students to engage in self-learning throughout the semester. Students will evaluate their progress based on predetermined criteria established by the measurement and evaluation center.

4.4.3 The Third Axis: Measurement and Evaluation

To ensure effective measurement and evaluation practices, the measurement and evaluation center carries out the following activities:

1. Collaborating with the Distance Learning Agency and specialists in measurement and evaluation, each from their respective faculty and specialization, to develop a comprehensive plan that raises awareness about the importance of measurement and evaluation in alignment with the university's vision, mission, and the Kingdom Vision 2030.

2. Conducting an analysis of the current evaluation tools employed by the university for assessing student performance. This analysis aims to evaluate the effectiveness of the existing tools and identify areas for improvement.
3. Emphasizing the need for incorporating scientific criteria into the assessment tools to ensure the accuracy, reliability, and validity of the evaluation process. By utilizing evidence-based assessment practices, the university can maintain a high standard of quality in evaluating student learning outcomes.
4. Promoting a culture of evaluation among teaching staff members and students. Recognizing evaluation as a comprehensive process, efforts are made to increase awareness and understanding of the importance and benefits of ongoing assessment. By fostering a culture of evaluation, both teaching staff members and students are encouraged to actively engage in the evaluation process and utilize the feedback received to improve their teaching and learning practices.

By implementing these strategies across the three axes of our prospective vision, we aim to activate learning management system platforms effectively in universities education. This approach is aligned with the Kingdom Vision 2030, fostering a modern and efficient educational environment that supports distance learning and embraces technology to enhance the quality and accessibility of education.

5 Conclusions and Future Work

In conclusion, the role of electronic educational platforms, specifically Blackboard, in Saudi universities during the COVID-19 pandemic has been recognized. A comparative analysis was conducted among selected Saudi universities to assess the role of educational platforms in addressing the challenges posed by the pandemic. The study focused on universities that ranked among the top ten in terms of Blackboard users and developed a prospective vision for the future of Blackboard educational platforms based on the study's objectives and the Kingdom Vision 2030. Based on the findings of the study, several recommendations have been made to activate distance learning platforms in alignment with the Kingdom Vision 2030. These recommendations include: 1) The universities should adopt the proposed vision for activating distance learning platforms and develop an institutional strategy for its implementation, adhering to the criteria set forth by the Kingdom of Saudi Arabia Vision 2030. 2) Establishing effective monitoring and evaluation mechanisms to assess the performance of teaching staff members in activating distance learning platforms. Regular evaluation studies should be conducted at the end of each semester to gather insights that contribute to the continuous improvement of these platforms. Additionally, student involvement in the evaluation process should be emphasized. 3) Building global partnerships for the development and training of technicians in the field of programming to enhance the technical capabilities of the universities in implementing and maintaining distance learning platforms. 4) Maintaining continuous awareness of the importance of activating distance learning platforms and leveraging their various applications to save time, effort, and resources.

In future research, the following areas will be explored: 1) Conducting in-depth studies on the factors influencing the activation of distance learning in universities and the impact of various variables on its effectiveness. 2) Investigating the effectiveness of distance learning strategies in enhancing students' motivation for achievement in the universities. 3) Exploring

the perspectives of students and teaching staff members on the contribution of different variables to the activation of electronic platforms.

Data Availability

The data used to support the findings of this study are available from the authors upon request.

Conflicts of Interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

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