



The E-learning readiness of higher education institutions during times of crises

Galal Eldin Abbas Eltayeb*

Department of Management Information Systems, College of Business and Economics, Qassim University, Buraydah, Saudi Arabia

*Corresponding author. E-mail: g.eltayeb@qu.edu.sa

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ABSTRACT

During the COVID-19 pandemic, higher education institutions in Sudan faced challenges in maintaining educational processes, particularly in relying on E-learning and Learning Management System (LMS) platforms. The Open University of Sudan (OUS) was forced to use available E-learning platforms but encountered numerous obstacles and challenges. This study aimed to understand the reality of using virtual classrooms in distance learning programs at the Open University of Sudan from the perspective of faculty members. A field survey found that only 55.4% of respondents believed the LMS could fulfill its purpose due to the instability of the electric-power supply. The study also identified contemporary challenges facing Sudanese universities during the pandemic, revealing that distance learning is the optimal alternative for continuing studies. Strengthening internet service and stabilizing the electrical power supply are important factors contributing to the success of distance learning. Physical distancing measures have been criticized for their negative impacts on learning loss in vulnerable populations, and further research is needed to increase the quantity and quality of learning loss evidence. The study recommends encouraging faculty members to take advantage of virtual classroom technology to facilitate and improve educational practice, especially in the field of distance learning.

Keywords: Blackboard, Moodle, Learning management system, E-learning, Open University of Sudan, COVID-19

INTRODUCTION

The COVID-19 pandemic forced many countries to suspend all or part of their onsite governmental activities and rapidly roll out work-from-home policies. The education sector was similarly affected by the pandemic, most notably due to the possible spread of the SARS-CoV-2 virus among students and teachers. In the wake of the pandemic, many countries have moved from traditional face-to-face teaching to distance learning, relying on a Learning Management System (LMS). These E-learning systems allow teachers to prepare and share their educational content to ensure that their students' education continues, even throughout exceptional circumstances. LMS can ensure the continuity of education at all levels. However, the effectiveness varies due to the level of institutional readiness, national and regional requirements, and other challenges and obstacles. There is therefore considerable debate around

the effectiveness of LMS compared to traditional teaching methods. Al-Hassan reported that the Open University of Sudan (OUS) used the available infrastructure of governmental and university-based systems and found several barriers to seamlessly implementing an LMS, specifically the blackboard system the educational platform chosen by the Ministry of Higher Education and Scientific Research (MoHESR) (Al-Hassan IIK, et al. 2017). The OUS reported issues, mentioned by Abdullah, such as the stability of the electric-power supply, the presence of internet services, and the fundamental problems with the blackboard system (Ahmed AA, et al. 2020). In the move from face-to-face teaching methods, the OUS also faced the problem of introducing specialized training courses for students and faculty staff to access and use the online learning environment and familiarize themselves with the services offered.

Background

Oluwadamilola (2023), reported that the Blackboard® system (hereafter “Blackboard”) is an integrated e-LMS that allows students to interact with their course material at any time and from any location (Blackboard, Incorp. 2023). It manages the learning process while monitoring students and assessing them synchronously and asynchronously. Blackboard provides a secure learning environment where teachers can deliver their courses and lectures, incorporating various multimedia elements (text, images, audio, video, and graphics) and allowing learners to access the content according to their needs. Blackboard provides various tools to students to view the course material, interact with the content, and communicate with the instructor and other students. The system helps students to participate in classes without having to physically enter university buildings because their assignments and exams are all online, and communication uses e-mails and forums. Blackboard is one of the proposed systems for OUS that is implemented within narrow limits and is also consistent with the recommendation of the MoHESR. This study aims to utilize available resources and services on Blackboard to establish a stable, adequate, and efficient educational environment for our case.

Moodle, another system proposed for OUS, is suitable because its open source and its consistency with the recommendations of the MoHESR. This study aims to utilize the available resources and services on Moodle to establish a stable, adequate, and efficient educational environment for our case. Moodle is an open-source LMS developed by Martin Dogiamas as part of his research at Corten College in Australia (Moodle Pty. Ltd. 2023). He released Moodle’s first edition in 2002, and it has since become an open-source platform used by teachers, learners, and civil servants to create and manage online courses. Moodle stands for “modular object-oriented dynamic learning environment,” and the LMS offers a variety of tools to support teachers in creating online courses including the ability to create forums, tests, assignments, and individual and group activities. Additionally, the platform facilitates communication between students and teachers. Moodle also includes an area to save resources, and to manage user accounts, roles, and the authority of teacher access within the system. Due to its open-source nature, Moodle can be easily customized and adapted to meet the specific needs of different organizations.

The MoHESR issued guidelines during the COVID-19 pandemic that included closing kindergartens, Sudanese and foreign schools, religious schools, and learning institutes at all levels for one month (MoHESR, 2024). All festivals, camps, and tutoring classes were also suspended. On April 13, 2020, a complete lockdown was imposed in Khartoum State because the number of SARS-CoV-2 infections and resulting deaths had increased. On March 13, 2020, the Federal Ministry of

Health (FMOH), (2023) announced the Directorate General of Emergency and Epidemic Control (Ministry of Higher Education and Scientific Research). This move was prompted by the death of a visitor to the United Arab Emirates on March 12, 2020, the first recorded case of the SARS-CoV-2 virus in Khartoum. The distribution of COVID-19 cases from February 15, 2020 to March 7, 2024 is shown in Figure 1.

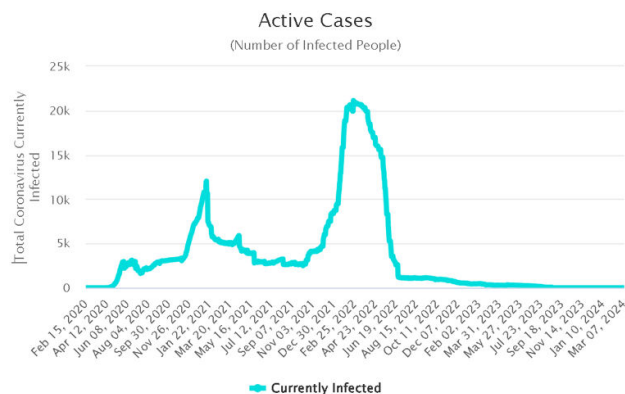


Figure 1: Distribution of active cases of COVID-19 by epidemic dates (February 15, 2020–March 07, 2024).

The OUS was established through Decision No. 164 of the Council of Ministers of Sudan in April 2002, corresponding to 2 Safar 1423 Hijri. The OUS was founded to provide a hybrid approach to education appropriate to its mission and goals that encompass the social, economic, and scientific conditions of higher education students not bound by time or location. The OUS has faculties of Arabic language, English language, computer science, education programs, administrative sciences, law, media, economics, and finance for undergraduate degrees. In addition, there are postgraduate programs. The OUS is present in 21 educational regions in the 19 states of Sudan, and it allows access *via* the internet, E-mail, and E-learning systems. For students, there is a specialized center that provides services such as printed and audio-visual teaching resources as well as classroom sessions under the supervision of academic supervisors. Also, 44 similar centers off-campus provide all or some of these services, a television channel, a radio channel, a YouTube channel, and Facebook and Twitter accounts. The OUS also has international centers outside of Sudan, in Qatar, Saudi Arabia, the United Arab Emirates, and Turkey. The OUS has a quarterly scientific journal that is open-access and published in Arabic and English.

LITERATURE REVIEW

The reality of using virtual classes in distance learning programs at the OUS was previously studied from the faculty’s perspective, notably before the pandemic. The analytic-descriptive curriculum was delivered to the community of faculty members, curriculum designers, facilitators, and assistants. The author’s survey was

completed by a group of 55 individuals, representative of the OUS stakeholders. The study concluded that virtual classes in E-learning programs in Sudanese universities are essential, although several difficulties in their use were highlighted. The study recommended that Sudanese lecturers should be encouraged and trained to take advantage of virtual classroom technology to facilitate and improve their educational practices.

Another study summarized the negative impact of the Coronavirus pandemic on Sudanese universities (World Health Organization, 2024). It reported issues such as disruption to students' regular studies, insufficient internet access, lack of preparation for students and parents to engage with E-learning, and difficulties in completing assessments due to the virtual setting and stakeholders' inexperience with the demands of distance learning. The study also examined the positive impact of the COVID-19 pandemic on Sudanese universities, including the development of new innovative curricula, study programs, alternative educational pathways, and the introduction of online learning *via* virtual classes, digital lectures, training, and open online conferencing, as well as digital training and teacher self-development.

Another study summarized the findings of a scientific symposium on distance education challenges that was held in Saudi Arabia on July 4, 2020. At the symposium, attended by several Sudanese academics, the MHESR described how universities were using virtual classroom platforms and E-learning programs. The description of the OUS experience of virtual classrooms was intended to serve as a model for E-learning in Sudan during the COVID-19 pandemic. The workshops and symposiums reflected OUS's experience with the potential of an E-learning workforce and its previous knowledge of open education systems. The plan had four axes, including the establishment of a unified platform for classes for all universities based on the Moodle platform. Moodle was deemed to be the most suitable system for Sudanese universities at that time, taking into account its benefits such as low cost, ease of use, and ability to manage several online courses, educational content databases, assessment systems, and question banks. As a result, the ministry of higher education commissioned several companies to implement online learning at the OUS. However, challenges to establishing E-learning in Sudanese universities included low levels of internet access, high communication costs, and the impact of sanctions against Sudan, which consisted of blocking software such as Zoom, Blackboard, Google Drive, and WiziQ. Sudanese universities were also suffering from two major problems: frequent electricity power outages (which can last up to 10 hours a day) and poor internet connectivity and availability in distant regions.

UNICEF, based on Article 28 of the convention on the rights of the child, states that every child has the right to education. In the case of Sudan, UNICEF believes that the E-learning platform should be adapted to the

Sudanese Arabic language and enriched with books and material resources. UNICEF also aims to introduce information and communication technology in formal education and to benefit from the content of programs such as the "educational passport" to provide good educational opportunities for students. Notably, Sudan has achieved significant improvements in primary education. Between 2008 and 2018, the total number of schools (public and private) increased by 2,800, providing education to an additional 1 million children. This effectively augmented the number of pupils who will pursue higher education. However, political instability and the effects of the COVID-19 pandemic have led to the long-term closure of educational institutions and uneven mitigation strategies, impacting the education of many students. To maintain its educational success, Sudan was the 14th country to implement the educational passport scheme.

The COVID-19 pandemic has had a significant impact on school systems globally. According to UNESCO, during the height of the restrictions in April 2020, approximately 1.6 billion students in 200 countries were affected by school closures: 94% of students and 20% of the world's population. It is estimated that the lockdowns lasted an average of 41 weeks with a significant negative impact on student learning, likely having long-term effects on education and future income. During the pandemic, education budgets and official aid programs for education decreased (Adnan M, et al. 2020; Adam EA, et al. 2021; UNESCO, 2020; Lennox J, 2021; Donnelly R, 2022). Due to mass closures, education systems were forced to adapt to the new reality of distance and online learning to ensure social distancing. Researchers examined the impacts of remote learning on students and proposed solutions to improve educational practices and outcomes. These included focusing on the human aspect and the role of teachers to overcome inherent challenges and difficulties. This study is based on some of these findings. Several studies have described the challenges of online learning and its inability to provide effective instructional support at the school level (WCHC, 2019; UNISEF, 2019; Mohammed Amer ME, 2020). Nevertheless, many tertiary educational establishments successfully embraced E-learning in response to this worldwide epidemic.

Another study examined E-learning as a communication channel in African societies (Uleanya, et al., 2023), focusing on universities, especially during the COVID-19 pandemic. The research found that many African nations have not yet adopted E-learning platforms, but the pandemic has spurred many to adopt them. However, challenges such as technical inadequacy, poor funding, and limited access to quality education persist. The study recommends revisiting the curriculum to align with student needs and current E-learning practices. Revising higher learning policies would promote E-learning and prepare institutions for the Fourth Industrial Revolution

(4IR). Government funding for technological tools to promote E-learning is also recommended. Adequate monitoring channels should be established to ensure students are disciplined in using E-learning platforms and lecturers are aware of the benefits.

Another study examines the challenges or resourcefulness of Blackboard learning prior to the COVID-19 pandemic era, (Makena, et al., 2022), where the Fourth Industrial Revolution necessitates the provision of computer applications technology at all schools to prepare students for future use. This includes rural students, who may not have access to computers at the tertiary level. Digital literacy must be included in the curriculum to prepare for emergencies such as COVID-19. Online learning must be a viable reality, allowing for a wider range of teaching and learning. Blackboard learning has highlighted the need for improved home working environments and desks, emphasizing social and digital inequality. Future research should address the social issues of rural higher education programs and focus on E-learning policies in rural universities. The study aligns with the technology acceptance model's view of efficiency in infused technology for lifelong learning.

Abdel Rahman's study highlights the importance of continuing the educational process in Sudan during global pandemics and the challenges faced by researchers (Abdel Rahman's, et al. 2022). The study suggests a strategy for utilizing electronic tools to continue the educational process, focusing on E-learning to foster a bond between teachers and make the transition smoother and more flexible, and the study recommends include addressing technical infrastructure, encouraging local and international telecommunications companies to connect and extend communication lines, providing support to deanships of E-learning at Sudanese universities, establishing and activating E-learning units in public schools, and promoting electronic portals for students and teachers. Software companies should be encouraged to produce educational systems, software, games, and applications that support various forms of e-learning. Teachers and university professors should teach according to blended learning methodologies to facilitate the process. Also, an electronic assessment should be integrated into classroom activities to train students to use these tools during pandemics. Focusing on the quality of media messages about the importance of online education during pandemics is crucial. Television channels should allocate time for educational programs for all stages, taking advantage of the wide geographical range of broadcasting.

Rakha's study found that blackboard collaborative breakout groups improved cognitive achievement compared to a control group that only received online lectures (Rakha AH, 2023). The experimental group maintained cognitive achievement despite suspension,

highlighting the importance of online learning promoting collaboration, engagement, and reinforcement. The study suggests incorporating active learning strategies in classrooms.

MATERIALS AND METHODS

Digital survey

A digital survey was created and distributed to 79 professors and academic support staff at the OUS. Complete responses were received from 56 individuals. For the quantitative variables, Likert scales were used to rate the research questions: 1) Strongly agree, 2) Agree, 3) Neutral, 4) Disagree, and 5) Strongly disagree.

Some items included open-ended comment sections. The survey included questions that were designed to investigate the following concerns:

- Is it possible to rely on E-learning during a pandemic?
- Is E-learning a viable alternative?
- Do students have reliable internet services?
- Do universities have reliable internet services?
- Have you experienced electric-power stability issues?
- Do faculty members need E-learning training?
- Are the IT services suitable?
- Were the lockdown decisions made for the higher education sector during the pandemic acceptable?

Statistical analysis

Statistical analysis was performed using SPSS statistical software (version 26.0; IBM Corp., Armonk, NY, USA). Because the data were not normally distributed, the responses were analyzed using non-parametric statistics such as the Kolmogorov-Smirnov test. The mean and Standard Deviation (SD) were presented as the mean \pm SD, while categorical variables were described with frequencies (n) and percentages (%). A significance level of 0.05 and a confidence interval of 95% were used to specify the statistical significance and precision of the results.

RESULTS

Table 1 summarizes the findings. The study showed that the continuity of education in any form is subject to consideration, and the success implications did not exceed a rate of 55.4%. Moreover, the educational requirements during the COVID-19 pandemic were only available to some educational institutions, including OUS, at a rate of 53.6%. The study found that 79% of respondents agreed with the government's decision to suspend education during the pandemic. However, 64.3% of respondents stated that quality of internet services requires urgent intervention from the government. The instability of the electric supply is a significant reason for the interruption of E-learning services, affecting their quality and continuity; this was

stated by 67.9% of respondents. A need for training and increasing the technical capabilities of human resources was not deemed to pose a significant burden on universities by 60.7% of respondents. Respondents stated that this may be due to the widespread public awareness of internet sciences and the availability of computer devices and specialized labs in many universities, especially the OUS.

The participants indicated that obtaining software and applications under the sanctions imposed on Sudan by

some international companies dramatically impacted their teaching methods, especially those related to learning platforms and supporting software. The responses suggested that the OUS course materials do not require significant effort to convert into digital content on LMS, benefiting from the university’s experience of open education programs (Table 1).

Table 1: Survey responses of university staff members.

Question	Mean (SD)	Agreement trends n (%)	Disagreement trends n (%)	p-value
Is it possible to rely on e-learning during a pandemic?	2.98 (1.33)	31 (55.4%)	25 (44.6%)	.000c
Is e-learning a viable alternative?	2.93 (1.43)	30 (53.6%)	26 (46.4%)	.001c
Do students have reliable Internet services?	3.00 (1.49)	29 (51.8%)	27 (48.2%)	.000c
Do universities have reliable Internet services?	3.13 (1.45)	36 (64.3%)	20 (35.7.8%)	.000c
Have you experienced electric-power stability issues?	3.18 (1.43)	38 (67.9%)	18 (32.1%)	.000c
Do faculty members need e-learning training?	3.02 (1.43)	34 (60.7%)	22 (39.3%)	.000c
Are the IT services suitable?	3.36 (1.26)	44 (79.0%)	12 (21.0%)	.000c

DISCUSSION

During the COVID-19 pandemic, most countries imposed total lockdowns. Educational institutions were forced to move from traditional face-to-face teaching to using LMS and e-content management applications. Sudanese universities faced significant challenges in providing alternative educational services. In Sudan, there were special circumstances that coincided with this closure such as complexity in the political situation and government instability. As a result, the Ministry of Health ordered a complete closure of educational institutions, particularly universities. When studying under such exceptional circumstances and anticipating the possibility of their recurrence, it was necessary to study the matter, its growth, and what should be done at each stage of its escalation. This called for holding meetings, seminars, specialized workshops, and future conferences which could result in several agreements and visions

accompanied by specific and disciplined policies and protocols.

Based on the study’s results, there has been a noticeable rise in the suitability of IT services, surpassing 50%–70%. Despite Sudan Telecommunication Group (Sudatel) having a well-established and up-to-date communication infrastructure, it is essential to examine the high level of preparedness and training among university faculty members and the quality of services they are able to provide. The current study demonstrates the need to provide possible solutions in an agreed procedural guide so that Sudanese institutions can effectively implement emergency educational policies. Moreover, policies that aim to bridge the gap between need and capacity are needed to effectively introduce e-learning methods into the curriculum. Planning should be undertaken that enables schools to seamlessly integrate LMS with traditional teaching methods during crises.

CONCLUSION

This study provides an overview of how OUS coped with the COVID-19 pandemic, as an example of Sudanese universities. It focuses on the challenges posed by E-learning and how appropriate teaching methods can be developed. The study acknowledges the difficulties encountered in continuing the educational process and identifies the fundamental elements that support the establishment, acceptance, and continuation of alternative education. This study highlights the inadequacy of E-learning and the impact of political issues and health decisions on the educational process. It also summarizes the perspectives of faculty members and their willingness to explore alternative teaching methods. This study suggests that all necessary resources such as electricity, internet services, and infrastructure are required for effective E-learning. The study also underlines the importance of developing stable and agreed-upon procedures to effectively address similar situations in the future.

LIMITATIONS OF THE STUDY

The study faced several challenges and delays when conducting the survey. Due to interrupted communication with the university staff, the data-generation stage took longer than anticipated. This was mostly because of frequent internet failure due to Sudan's continuing political unrest and the subsequent protests throughout the data-generation stage.

RECOMMENDATIONS

Sudanese universities and higher education institutions' top priorities should focus on establishing the necessary infrastructure for e-learning, the required equipment and resources, and ensuring continuous access to electricity and high-speed internet services. This study recommends that the government pressure relevant institutions to provide these services. In addition, this study suggests that conferences, symposiums, and workshops should continue to promote online education. Efforts should be made to attract researchers in this field to conduct more studies. Universities should also implement protocols to ensure the continuity of their work during a pandemic. This study recommends that software and technology requirements should not be linked to international political issues. Efforts should be made to lift the embargoes on software and technology. Finally, efforts should be made to standardize the higher education calendar to ensure equal opportunities and synchronization of efforts during pandemics.

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