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E-assessment during COVID-19 pandemic at a Saudi university: impact on assessment methods and course learning outcomes

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Abstract

The deployment of e-assessments has been so frequent in educational institutions worldwide during the COVID-19 pandemic. It is worth questioning the efficacy of this newly adopted evaluation method. The study aims to determine how far this testing effectively achieves the Course Learning Outcomes. It also tries to explore the extent of difference between the online assessment method from the pre-pandemic testing methods stated in the course specification. Another aim of the study is to check the acceptance of e-tests by the learners. This study employs a quantitative approach encompassing a Likert-type online questionnaire to gather the response of 70 faculty members at the university in Saudi Arabia. The primary result of this study is that e-assessment succeeds in attaining Course Learning Outcomes to a great extent. Though these newly adopted tests shifted away from the stated measurement methods in the course specification, the learners accepted them enthusiastically. It was discovered in the study that if educational institutes have well-structured e-learning infrastructures and regularly use these setups competently, they confront minor complexities to switching to online ones and achieve Course Learning Outcomes applying e-assessment systems.

Keywords: e-assessment, course specification, COVID-19 pandemic, learners' acceptance, Course Learning Outcomes

Introduction

Due to the COVID-19 pandemic, on-campus education in all educational institutions in most countries was largely unavailable from the beginning of 2020 until mid-2022. Some countries have already opened educational institutions with rigorous precautionary measures starting in mid-2021. Though the number of COVID patients has decreased worldwide, safety measures are still followed in educational institutions. They modify the rule based on the situation.

When the COVID-19 pandemic engulfed all countries and forced all educational institutions to be closed down, teachers had to switch from in-person classes to online spaces (Guangul et al., 2020; Mann et al., 2020; Jia & He, 2021; Maatuk et al., 2021; Pozo et al., 2021). This breakoff of schools, institutions and other learning spaces had detrimental effects on more than 94% of students worldwide (Pokhrel & Chhetri, 2021). This disruption changed the education sector globally from face-to-face education to an entirely online one without prior instructions, insight or a specific model to deal with this massive change (Ghanbari & Nowroozi, 2021; Panadero et al., 2022). This unexpected shift towards online teaching forces teachers to encounter some hurdles in educational institutes, and changing in-person assessment towards e-assessment is one of those difficulties (Ghanbari & Nowroozi, 2021; Almossa & Alzahrani, 2022). In education, assessment plays a decisive role in motivating students. Educational assessment demonstrates students' learning and values their achievement (Timmis et al., 2015; Huber & Skedsmo, 2016). Since students' results play a crucial role in education, evaluating students' progress was continuously questioned throughout the pandemic and was one of the most debated topics across all nations. Therefore, this article hopes to be a critical review of the assessment of students learning during the pandemic, predominantly focusing on *Intensive English Program-1 (ENG-011)* course at a public university in Saudi Arabia. For this paper, the opinions of English department teachers who teach this course and different decisions of higher-ups at the college level are considered primary data.

Effect of the pandemic on educational institutions in Saudi Arabia

In Saudi Arabia, the lockdown or curfew was announced on March 2, 2020; there were several phases of the lockdown afterwards, partial and complete, based on the region-wide severity of the pandemic. The end of the curfew was announced on July 21, 2020. While there is no prevailing lockdown decree, social distancing and

preventive measures are still in some domains. In all educational institutions, face-to-face teaching was restricted due to the ban on gatherings. These constraints opened the way for using digital technologies in the education sector in Saudi Arabia (Mann et al., 2020; Al-Samiri, 2021; AlMatham et al., 2022) and changed assessment practices in higher education (Almossa & Alzahrani, 2022).

It is worth mentioning that most universities in Saudi Arabia have been using digital learning management systems like *Blackboard* for a long time. So, it was not difficult for Saudi Arabia to switch from on-campus to off-campus teaching and learning. During the pandemic, two million virtual classes and more than six million panel meetings were arranged in 27 public universities in Saudi Arabia (United Nations, 2020).

Aim of the study

This study aims to answer two assessment-related issues: firstly, how the newly adopted e-assessment methods during COVID-19 differ from the listed assessment methods in the course specification of *Intensive English Program-1*(ENG-011)*;* secondly, how e-assessments affect the measurement of Course Learning Outcome (CLO) of this course.

There are three intensive English courses at the observed university: *Intensive English Program-1* (ENG-011), *Intensive English Program-2* (ENG-012) and *Intensive English Program-3* (ENG-019). Only the course ENG-011 is covered in this article. It is a level one first-year course for freshly admitted students. It is offered to business, computer science, engineering, humanities, and science college students. It is an English skill course comprising of six-credit hours course. The course duration is 16 weeks, and 12 hours of lecture every week. During the regular time, 85% of the course is traditional classroom-based, and the other 15% is online. *Unlock-1* and *Unlock-2* books published by Cambridge University Press are used for the course. The overall Course Learning Outcome (CLO) is mentioned in the following box.

Box 1: Course Learning Outcome of Intensive English Program 1 (ENG-011)

Intensive English Language course is designed to enhance English language proficiency among learners at the *A1 and A2 levels* of the Common European Framework of Reference for Languages (CEFR). It is also intended to develop academic skills and language to lead the learners to succeed in their studies. The course follows the integrated approach.

However, from the beginning of the pandemic, online instruction was adopted. An authorized learning management system (LMS), *Blackboard,* assesses students' performance, delivers course materials, and sends them announcements. Besides, *Blackboard Ultra* is used for giving lectures. Using any social media site to communicate with students is highly prohibited. Students inquire using official email, the course mailing system, and the discussion board incorporated with *Blackboard* to contact teachers.

Course Learning Outcomes of ENG-011

Course Learning Outcomes (CLOs) of Intensive English Program 1 (ENG-011) are mentioned in the following box.

Tab. 1: Course Learning Outcomes (CLOs)

Course Learning Outcomes	**Learning domain**	**CLOs-code**	**Assessment weightage**
(1) Define familiar every day and frequently used expressions related to areas of most immediate relevance (e.g., very basic personal and family information, shopping, local geography, employment).	Knowledge (K)	K-CLO1	30%
(2) Identify personal details such as where they live, people they know and things they have.		K-CLO2	
(3) Recognize simple and routine tasks requiring a simple and direct exchange of information on familiar and routine matters.		K-CLO3	
(1) Use familiar every day and frequently used expressions related to areas of most immediate relevance.	Cognitive skills (CGS)	C-CLO1	30%
(2) Express themselves and express personal details such as where they live, people they know, things they have.		C-CLO2	

(3) Communication in simple and routine tasks requiring a simple and direct exchange of information on familiar and routine matters.		C-CLO3	
(1) Develop language skills: listening, speaking, reading and writing.	Interpersonal skills (IPS)	IP-CLO1	20%
(2) Use tasks and activities that foster critical thinking.		IP-CLO2	
(1) Express opinions and ideas in everyday situations.	Communication skills (CMS)	CM-CLO1	20%
(2) Use the internet, Blackboard and different language learning software.		CM-CLO2	

Assessment system before and during pandemic

Table 2 focuses on the assessment system of ENG-011 during the normal circumstance before the pandemic.

Table 2: Regular assessment of Intensive English Program 1

Assessment types	
Online tests (15%)	Quizzes Assignments: Paragraphs / Emails / Essays
On-campus tests (85%)	Mid-exams (1 and 2) Speaking test is conducted as interview and presentation
	Final Exam

However, at the beginning of the pandemic, a college-level meeting was arranged with the Dean, the department head, and the faculty members to implement the changed academic approach due to the lockdown. The discussion covers issues like course coverage, Course Learning Outcomes and the readiness of the teaching staff for using LMS. Other important issues are also discussed in the meeting, like online exam patterns, grading of students, rules and regulations for conducting tests on LMS and scheduling tests of all skills. The revised assessment pattern is mentioned in table 3.

Tab. 3: Revised assessment of Intensive English Program 1 during the pandemic

Total Marks: 100 ***Each skill (Listening, Speaking, Reading and Writing) carries 25 marks***	
Assessment types	
Online tests (100%)	Assignments: Paragraphs / Emails / Essays
	Quizzes
	Mid-exams (1 and 2) Speaking test is conducted as interview, not presentation
	Final Exam

This revised assessment system affects the regular evaluation pattern in the following learning domains.

Tab. 4: Assessment summary and the pandemic effect

Learning domains	***Percentage of affected assessment***	***Pandemic impacted the regular assessment plan***
Knowledge (K)	10%	K-CLO3 is affected as there are no on-campus daily tasks and interaction with students
Cognitive skills (CGS)	10%	CGS-CLO2 is affected as there is no face-to-face communication. Even low online contact with students.
Interpersonal skills (IPS)	10%	IPS-CLO2 is affected since critical thinking, and face-to-face discussions are absent.
Communication skills (CMS)	10%	CMS-CLO1 is affected as there is no way to use the camera during the class.

Assessment in education before and during the pandemic

Assessment is essential to education (Loyd & Koenig, 2008; Blake & Muttock, 2012; Leyton Román et al., 2019). It is the daily business in education prevailing in different forms, purposes and levels (Huber & Skedsmo, 2016). It envelops various goals like motivating students, conferring guidance, boosting learning (Higgins et al., 2010), and detecting, collecting and interpreting information about their learning results (Farrell & Rushby, 2015).

E-assessment before pandemic

Regular assessment is a significant issue in the online education model (Rapanta et al., 2020). E-assessment has become popular over the last decade, especially in the tertiary education systems; many reputed universities worldwide offer online courses for undergraduate, postgraduate, and even Ph.D. levels. The advancement of the internet in the 1990s influenced the ramping up of blended or online learning (Palvia et al., 2018). Thus, distance learning brought education close to far-reaching students and reduced travelling time (Palvia et al., 2018).

Most importantly, the same on-campus teachers are teaching online courses. They have their assessment system to evaluate students, ensuring quality, integrity, reliability, and validity. In online education, e-Portfolios are highly recommended, allowing students to gather information about their learning that assists the instructor in observing students' progress (Rapanta et al., 2020).

On the other hand, in some areas of the world, online teaching platforms have already been used by teachers during the recent SARS crisis; this familiarity also prepares them to prepare complex functions like making online quizzes using different online platforms (Pietro et al., 2020). However, the SARS crisis was not catastrophic and devastating on the same scale as COVID-19.

E-assessment throughout pandemic

Due to sudden shift to online teaching, educators face various challenges they never experienced before. In particular, teachers encounter many barriers with the online assessment of the students. Most educational institutes prefer the asynchronous structure during the pandemic for the homey e-assessment arrangement. Evaluation in an asynchronous environment can be given to the students by posting the material online and allowing students the freedom to research and complete the assignment within the allotted period (Gupta et al., 2020). So, the e-assessment system and asynchronous education method get a new dimension during a pandemic. In the pandemic, this remote learning is called blended, hybrid, and distance learning (Ní Fhloinn & Fitzmaurice, 2021).

From the beginning of the COVID-19 pandemic, education providers of all levels of students are bound to change the direction of learning and assessment to the online one regardless of having many challenges (Gamage et al., 2020). Besides, institutions had to straight off duty according to the direction of the administration of the concerned institution and government. Moreover, institutions had to continue teaching and learning uninterruptedly (Al-Balushi et al., 2022). In addition, for online education, they had to ensure the readiness of information technology infrastructures, train teachers, students, administrative and technical staff for using technology, revise the academic calendar, and design rules, policies and procedures for online learning and assessments (Al-Balushi et al., 2022). On the other hand, the online evaluation method supports students, parents, teachers and authorities to keep them motivated and passionate and constantly monitor their progress.

The COVID-19 pandemic had a far-reaching effect on almost all social sectors, especially since most educational institutions have been closed since March 2020 (Huber & Helm, 2020). Governments had to close many schools and switch to designing suitable online lessons, homework, assignments, and student assessments (Winter et al., 2021). Educational institutions in different countries focused on curbing the spread of the virus by relying on distance online schooling (Pietro et al., 2020). Countries adopt various online education systems depending on their efforts, logistic facilities, suitability and circumstances. Many higher education providers worldwide have reciprocated this catastrophe by rapidly redeveloping online education programs or curricula to match the distance teaching approach (Khan et al., 2021). However, this radical shift in student learning only ensures that some students get appropriate technology and home support (Winter et al., 2021). Most countries use open sources like YouTube, Skype and Zoom, and some rely on institutional-supported technologies Moodle, LMS and Google Meet for online teaching (Joshi & Vinay, 2020). For instance, in the USA, the Centers for Disease Control and Prevention and other organizations use a single paid institutional account for using commercial online software (GoToMeeting) to use it for teleconferencing freely (Chick et al., 2020). Countries like Spain, Czechia, Serbia, Croatia, Poland and North Macedonia continue teaching students during the pandemic by broadcasting education remotely (Pietro et al., 2020). In India, higher education institutes adopt open teaching platforms like YouTube, google hangout, skype, zoom, and even WhatsApp for online teaching (Joshi & Vinay, 2020). In Saudi Arabia, tv channels and online platforms like Telegram, Zoom, Teams, WebEx, and Blackboard create remote environments (Al-Samiri, 2021).

Acceptance of e-assessment to students and teachers in countries

During the pandemic, teaching staff of all levels and ages are forced to deliver lectures from home within existing technical constraints, sometimes without proper technical backing (Rapanta et al., 2020). This pandemic bound some teachers to use digital technologies for the first time to facilitate students' learning (Pozo et al., 2021). Even universities were not ready to shift from classroom-based education to online (Chakraborty et al., 2020). Besides, despite having a deficiency of tools and regulations, and even experiences of virtualizing classrooms for providing distance education, they successfully overcame all difficulties (Perrotta et al., 2022). However, the most critical challenge for teachers is changing the teaching pedagogies and assessment systems from the university to the home environment (Joshi & Vinay, 2020). From students' perspective, most students lose interest in learning during the lockdown due to the physical shutdown of institutions (Pietro et al., 2020). Many forcibly quarantined tense students lose concentration on schoolwork (Pietro et al., 2020). Therefore, constant assessment plays a crucial role in keeping students engaged in education during the pandemic.

Assessment process during pandemic

During the pandemic, the course specification and the syllabus remain the same; changes happen with the course plan. All alterations are discussed below.

Use of LMS for homey reading and listening exams

All types of assessments of ENG-011 have been conducted at home from the beginning of the pandemic. Teachers are free to follow their evaluation system relying on the course specification and course plan. Teachers must make a question pool for each quiz or exam for reading and listening skills. For instance, if there are five marks for a quiz test and each question may carry 0.5 marks, the teachers should make more than 20 questions and choose a randomization option on the LMS so that students get different questions in the test.

However, for the final reading and listening skills exams, the university decided randomly, without relying on any statistical analysis, that if more than 30 students are in a course section, the teacher must prepare a question pool of at least 200 questions separately. On the other hand, if the number of students is less than 30, there should be at least 150 questions in the pool.

Besides, opening and closing times are specified for all sorts of assessments. If students face any technical problem during the exam, the teacher can check it from their system. So, the transparency of any test is assured, conforming to strict rules and regulations.

Using LMS for checking writing tasks

Before the pandemic, writing tests are on-campus and paper-based. Marks and feedback are written on the exam papers by teachers. For late submission of written assignments, marks are subtracted.

In contrast, all along the pandemic, due to the online assessment method, the in-person writing test is restricted to curb the virus spreading. Thus, *Blackboard* is used for evaluating students' writing skills. Students can submit their paragraphs, essays, or other assignments in any popular format (e.g., MS Word, PDF) using their students' accounts. Some points are deducted if they do not submit it on time. Similarly, some marks are deducted if students copy from each other or online sources.

New strategy for conducting speaking exams on LMS:

Speaking exams are conducted online, keeping the front camera off for students and teachers. Though the cameras are closed, the examiner ensures transparency of the tests by asking open-ended questions based on the topics in the book. At the beginning of the exams, students give their names and ID numbers. All speaking tests are recorded on LMS as proof. Different students get separate time slots for the tests.

Methodology, design and data collection

Data availability statement

Since it is a quantitative study, numerical data has been connected through the Google survey questionnaire which is used as the primary data for the study.

Data collection pattern

An online survey questionnaire is designed for data collection using Google Forms comprising two parts. In the first one, three profile-related questions are asked to determine the teaching department, gender and years of teaching English courses. The second portion focuses on questions highlighting assessment during the pandemic. There are ten close-ended questions in this part. It is mailed to 70 teachers at the selected university in Saudi Arabia who teach *Intensive English Program-1*. A Likert scale (1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 =

strongly agree) is used to get responses from participants. At the beginning of the questionnaire, the aims and outcomes of the survey are mentioned, along with the anonymity and confidentiality of the information. There were (n = 70) teachers who participated in the research.

Tab. 5: E-assessment during COVID-19 pandemic at a Saudi university: Impact on assessment methods and Course Learning Outcomes

Question	Response (*n* = 70)
(1) Assessment mode during the pandemic was different from pre-pandemic traditional assessments.	
strongly agree	31.43%
agree	48.60%
neutral	2.87%
disagree	5.70%
strongly disagree	11.40%
(2) Due to the differences in the assessment mode the number of examinees decreased.	
strongly agree	11.40%
agree	20.0%
neutral	14.30%
disagree	37.10%
strongly disagree	17.10%
(3) Exam attendance rate was higher during the pandemic than pre-pandemic regular online exam.	
strongly agree	25.71%
agree	37.14 %
neutral	22.85%
disagree	5.71%
strongly disagree	8.57%
(4) Exam attendance rate during the pandemic was higher than pre-pandemic on-campus exam.	
strongly Agree	14.28%
agree	48.57%
neutral	22.85%
disagree	5.71%
strongly disagree	8.57%
(5) Assessments were aligned with Course Learning Outcome (CLO) mentioned in the course specification.	
strongly agree	17.14%
agree	54.28%
neutral	22.85%
disagree	5.71%
strongly disagree	0.00%
(6) Assessments during COVID period posed no challenge in attaining Course Learning Outcome (CLO).	
strongly agree	8.57%
agree	34.28%
neutral	34.28%
disagree	17.14%
strongly disagree	5.71%
(7) Students faced technical issues like network coverage, unstable internet, lack of electricity etc.	
So many	5.71%
Many	20.00%
Some	25.71%
Few	5.71%
Very few	34.28%

(8) Students' performance in their online tests during the COVID period was same as pre-pandemic on-campus tests.	
strongly agree	2.85%
agree	8.57%
neutral	20.00%
disagree	40.00%
strongly disagree	28.57%
(9) Tests conducted during the COVID period rightly tested what they were intended to test.	
strongly agree	8.57%
agree	40.00%
neutral	28.57%
disagree	22.85%
strongly disagree	0.00%
(10) Lack of awareness about E-assessment among students negatively affected students' performance.	
strongly agree	2.85%
agree	60.00%
neutral	22.85%
disagree	14.28%
strongly disagree	0.00%

As demonstrated in question 1 above, 80.03% of teachers state that there is a change in assessment practices during the pandemic from those undertaken before the pandemic; In comparison, 17.1% of teachers stated that they did not find any difference in assessment before and during the pandemic. Though most of the faculties experienced the change in assessment practices throughout the pandemic, 54.2% (question 2) did not experience a reduction of examinees even during the critical situation. Even it is revealed in question 3 that in this acute time, 62.85% of teachers of this course see that students' attendance in online exams during the pandemic is more than in online exams before the pandemic. Since the exam attendance rate during the pandemic is higher than the standard pre-pandemic exam attendance rate, it indicates that the students well-accepts e-assessments. Besides that, the number of exam sitters is more than on-campus exam attendees; 62.85% of faculty members of that course experience this at that time.

On the other hand, despite the abrupt shutdown of on-campus activities and restrictions towards in-person exams, university authority remains independent of the Course Learning Outcome (CLO) mentioned in the Course Specification of *Intensive English Program-1 (ENG-011).* Question 5 demonstrates that 71.42% (n = 50) believe they successfully achieve all Course Learning Outcomes. The most exciting thing is that none of the teachers strongly disagreed with this question; however, a mixed opinion is exposed regarding the challenges of attaining CLO by applying e-assessment (question 6). Here, 42.85% (n = 30) of faculty members of this course agree that assessments during the pandemic rightly align with CLO, and the e-assessments posed no challenges in attaining them. However, 22.85% (n = 16) disagree with this idea, and 34.28% (n = 24) teachers take a neutral stance. Here, prompt decisions of university authorities and constant support of the government and education ministry play active roles in achieving CLO and overcoming challenges.

Question (7) regarding technical issues with conducting online exams via *Blackboard* Learning Management System indicates that the majority of faculty members get few complaints from students (39.99%; n = 28); some teachers go through (25.71%; n = 18) some technical debacles; and 25.71% (n = 18) faces too many technical problems. Here, a mixed opinion prevails because of the strengthening of internet connection. Network coverage varies from city to remote mountainous areas in Southern Saudi Arabia, where the observed university is situated. However, it does not demotivate students to participate in online exams, and the number of students did not abate during the exams because of prompt, effective decisions and taking precautionary steps before and throughout exam times by the e-learning department and technical teams of different colleges collaborate for the smooth running of online tests. Besides, 25.71% of teachers got fewer complaints regarding technical factors because during the regular on-campus time, before the start of each semester, all students sit for training for efficient use of Blackboard LMS before the pandemic; it is routine work done during the beginning of each semester. That means faculty members and students of this course are habituated to using the online exam system for the time being. Most significantly, when the classes and exams switch online during the pandemic, in the first few weeks, students and teachers at colleges again undergo prompt training to operate the online system smoothly and successfully participate in online exams. In addition, all teachers are instructed to conduct small quizzes and assignments and

submit any complaints and technical issues they face during small tests so that the university takes precautions according to the feedback, which ultimately assists in overcoming all difficulties during major exams. Furthermore, exam dates and instructions are sent to students repeatedly by SMS; demo exam videos are uploaded to the system before the exam to familiarize them with the online assessment system. Here, *Blackboard* plays a significant role.

When discussing students' performance in question 8, the ratios show that 68.57% of teachers disagree and strongly disagree that students' performance on online platforms was the same as pre-pandemic on-campus tests. Only 11.14% agree and strongly agree that students' results will be the same as pre-pandemic time, which is reflected during exams also. For instance, more than 40% of students got "A" grades in ENG-011, which is unusual in on-campus tests. That means doubt prevails regarding who sits for the home-based tests, as teachers are instructed to direct students to keep cameras of their electronic devices off. It shows that eLearning and technical experts should work on the transparency and reliability of online tests on LMS platforms in the future, even keeping cameras off.

When asked about teachers' perceptions of the goals of online tests (Q9), teachers come up with mixed opinions. 48.57% of teachers agree that tests during COVID, that is, online, one can test what they are planning to test. Here 28.57% faculty of this course take a neutral position. Only 22.85% of teachers disagree that tests during COVID lockdown cannot assess students according to expectations. Therefore, in Question 10, 62.85% of teachers agree that E-assessment among students negatively affected students' performance, whereas 14.28% disagree. It is because students perform overwhelmingly better than the expectation. Since teachers are not accustomed to fully online courses, they give mixed answers for or against the testing systems during the pandemic.

Discussion

It is revealed in the study that assessment practices and the number of exam attendees did not alter during the pandemic time in the *ENG-011* course at the selected university because students and teachers have been using online tests before the pandemic. University authority has been working on developing a sophisticated online learning environment for a long time. It indicates that if students are used to online testing and technological skills, there will be fewer problems in online assessment, which is also supported by Mottiar et al. (2022) as they say that literacy of educators in using various technologies such as video and audio feedback, quizzes, electronic submissions, and different software to create an online environment, moving towards an online system becomes easy. It is proved by KKU authority that, along with technological infrastructure availability, willingness and readiness to embrace digital solutions plays challenging roles in the rapid shift from a face-to-face educational environment towards a digital one (Cernicova-Buca & Dragomir, 2021).

The observed university´s authority is consistent with the Course Learning Outcome (CLO) mentioned in the Course Specification of *Intensive English Program-1*. *However,* teachers needed clarification about attaining CLO by applying e-assessment. However, KKU overcomes this constraint by making quick decisions to alter lectures and exams to be online. If the offline-designed course is modified and adjusted to fit the necessity of online learning (Baber, 2020), along with curriculum and evaluation based on the needs of students and types of assessment measures amid the pandemic (Dayagbil et al., 2021), it will not hinder attaining CLO. Alternatives to proctored on-campus exams like quizzes, open book exams, and take-home assignments play significant roles in evaluating students' performance against Course Learning Outcomes in remote assessing (Guangul et al., 2020).

It is revealed that if the internet connection is strong, students and teachers are trained and regularly use online learning and assessment systems; educational institutions take essential measures if any technical glitches arise during exams on *Blackboard* LMS or other online platforms, students take online assessment enthusiastically. However, challenges in applying e-learning, including poor internet connection, insufficient knowledge to use tech and weak content development, prevails more in developing countries than in developed ones (Aung & Khaing, 2015, as cited in Maatuk et al., 2021). According to Maatuk et al. (2021), e-learning fails for lack of good preparation to use e-learning, which revealed in the study shows that students and teachers agree that e-learning improves students' technical skills and improves academic standards; however, the high cost is the most significant barrier to implementing it. Besides, students need to be inspired to use LMS, because low LMS use by students is likely to result in less academic success (Broadbent, 2016); therefore, this platform gives them the freedom of a self-paced learning style and access to knowledge based on their comfort level (Dulkaman & Ali, 2016).

Since students' performance varies from on-campus to online platforms, work should be done on the transparency of e-assessment. However, recording the examinee's face, body movement, and speech, observing the examinee's surroundings, and monitoring the video and audio signals by the examinee, require a speedy network and expensive technology that, in some way, unfeasible to accomplish (Jia & He, 2021). Thus, they design an intelligent online proctoring system (IOPS) that is a lightweight system based on open-source software to ensure a stable and practical approach to meet the requirements of distance and online learning. Here, Rutgers (2020, as

cited in Guangul et al., 2020) suggests that proctored exams can be done remotely by using *Proctortrack* software, where the instructor can monitor the activity of students by using webcams during exam time. However, this can also be done on *Blackboard* or most LMS. So, the camera or webcam should be on at least during the exam time.

Conclusion

The pandemic outbreak swayed all walks of life, especially the education field. The adoption of e-assessment by Saudi universities to measure the learning outcomes of the learners was a requirement of the time in this altered scenario when the education sector all over the world was navigating through alterations, adaptations and uncertainty. However, it could have been smoother to apply e-assessment and needed to be free of challenges. The study shows that presently deployed e-assessment marks a clear difference from the assessment methods stated in the course specification before the pandemic. E-assessments are found to be well accepted by the learners of Saudi Arabia. Within the study's limited scope, it is revealed that in achieving Course Learning Outcomes, technologically solid setup, efficacy of the technical division to solve any problem swiftly, and the time-oriented decisions of concerned faculties and administrators during the pandemic to utilize e-assessment in a Saudi Arabian university context was a successful endeavour.

Competing interests

The authors declare no competing interests.

Ethical approval

This study does not require ethical approval because the survey was distributed to participants with their permission. We have taken the following steps to ensure that the study remains ethically sound. All participants names are concealed throughout the paper, as is the institution's identity, except for the country's name and level of the institution. The article makes no exact citations from the comments of the participants. It is impossible to identify them partially. Furthermore, only two researchers have access to the survey data, which is stored on a secure Google drive and will be deleted two years after the study is published.

Informed consent

A permission form was issued to all participants to explain the purpose of the study and the procedures taken to protect their identity. After reading all the points, they have to click the Yes/No button on the Google form to provide permission to gather information from them. The document includes both researchers' email addresses and phone numbers for communication with researchers. Before the interview is published, participants can withdraw, alter, or evaluate their replies. It is also stated that if participants withdraw from the research, the associated data will be returned to them.

Data availability

Data collected as a part of this research is saved in the Google Drive. If there is any questions or concerns about how your data will be collected or stored, please contact the researcher.

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