PIONEERING ONLINE ASSESSMENT SOLUTIONS: EMPIRICAL EXPERIENCES FROM EDUCATIONAL PRACTITIONERS

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ABSTRACT

The emergence of E-learning has shaped the university's new pedagogical, environment to guarantee business continuity in worse pandemics. Assessment is an end process of learning however, measuring it to globally accepted standards is still a nightmare in universities. It is not clear whether the assessment spells out the tasks posed to learners? illustrate an observable demonstration of the learners' ability? or have a detailed scoring criterion? no wonder stake holders still doubt assessment online. The research examined qualitative literature regarding the innovative strategies for online educational assessment sustainable and scalable. To gather empirical qualitative data on this subject, a systematic review of literature was undertaken. The study responded to one major research question. "What are the experiences of educational practitioners reported in empirical qualitative research studies pertaining innovative strategies for online educational assessment?" We conducted a qualitative review of the scientific literature published between 2010 and 2022 using the PRISMA framework, thematic analysis was employed to generate themes and patterns. Education databases, like ERIC were used for the article search. Search phrases utilized for this systematic review included "Strategies for online assessment" and "Assessment of E-learning." 16 articles were included in the analysis for this study. findings point to the Asynchronous Online Discussion, E-portfolios, Distance Project based assessment, Online proctored Exams, Online non-proctored exams as sustainable strategies. The study demonstrates a potential solution to online assessment in universities and restores confidence among educational partners and funders.

KEYWORDS

Assessment, Open Distance, Approaches, Electronic, Learning.

1. INTRODUCTION

The Facts and Factors study indicates that the global online education industry was valued at USD 217 billion in 2022 and is projected to grow to USD 475 billion by 2030, with an estimated compound annual growth rate (CAGR) of approximately 9.1% from 2023 to 2030. In terms of technology, the mobile e-learning segment is expected to drive most of the growth, while higher education institutions and K–12 schools will see the fastest CAGR. The expansion of cloud-based applications and increased engagement in web-based question-and-answer activities are anticipated to contribute to the global growth of distance learning and educational sectors[69].

Online learning has an impact that is unavoidable, and institutions of higher learning cannot ignore its exponential growth and dissemination [1]. New delivery methods, including e-learning and blended learning, are being introduced and taken up by higher education institutions in

emerging economies as a result of the ongoing development of cutting-edge technology for teaching and learning. Open Distance and electronic Learning (ODeL) was founded with the strong intention to raise educational standards [2]. Despite the fact that e-learning is expanding quickly, according to Kisanjara et al. [3], it still remains in its infancy, particularly in emerging economies. "E-learning in education" is defined by Mohamad et al. [4] as "a process of learning through formal and informal use of all digital media, like the internet, intranet, ipads mobile phones, or others".

According to Morris et al. [5], digital technologies "also allow a more student-centric approach that can reach increasing numbers of students at a lower cost" (p. 45) and can "also be used to enhance the quality of teaching and learning in higher education." For instructors and students to manage their academic activities, the majority of universities and colleges create a Learning Management Systems (LMS) [6]. According to Anderson [7], learning management systems are made to encourage and support learning through collaborative platforms and socially constructive instructional methods, examples of LMS common for higher education include Sakai, Canvas, Moodle, Blackboard among others [70]

Among the tasks carried out in an LMS are, but are not limited to, developing and providing content, keeping track of student engagement, evaluating student performance, and helping learners. Students typically have access to the same LMS and are exposed to a variety of digital tools for completing graded assignments, working with classmates on projects, taking part in discussions, gathering and keeping their learning artifacts (through e-portfolios), as well as additional learning activities. In order to ensure that the e-learning process is effective, the lecturer's role and knowledge are crucial [8, p. 29].

Owing to the COVID-19 epidemic, instruction shifted to online platforms in order to prevent transmission, as well as social and physical isolation [9]. At all educational levels, from kindergarten through higher education, the overall learning process was changed to digital means. [10, p.324], whereas this appeared to address emergency learning needs, the emergence of "smart" institutions has shaped the university's new pedagogical, andragogical and heutagogical environment declared as a situation of no turning back to the physical presence to guarantee academic business continuity in similar and or worse pandemics than Covid 19 [11]. The development of the ability's graduates requires to be proficient in their chosen fields can be effectively supported through enhancing their assessment procedures.

Following the guidelines of authentic assessment is one strategy for accomplishing such a shift [12]. By establishing a connection between what is evaluated in the classroom with what graduates are anticipated to have learned throughout the course of their education outside of the classroom, authentic assessment helps to connect both education and employment [12]. It affects how well and deeply students acquire knowledge as well as their acquisition of more advanced cognitive skills. It additionally helps learners become more self-assured and practice on their own. It can also increase drive and self-regulation as well as learning participation, [13].

The use of technology enhanced learning has brought assessment strategies that differ from conventional assessment, such as take-home and open web exams (which includes proctored exams and Multiple-Choice Questions (MCQs), online portfolios, webinars, peer review assessments, and continuous assessment [14, p.82].

One of the final steps in teaching is assessment of student learning, though migrating from the traditional mode of assessment in a physical environment to globally accepted innovative strategies for online educational assessment is still an academic quagmire among many higher education institutions specifically to lecturers as well as students and parents to ensure that

learners feel assessed more fairly and with less anxiety online in addition to addressing such questions as does the assessment expose the learner to stimulus material?, does it offer the learners more than one opportunity? And does the assessment offer more than one way to learners to demonstrate their learning? [15]. It is no wonder that stake holders still doubt whether effective learning really takes place online.

2. PURPOSE

The research examined qualitative literature regarding the innovative strategies for online educational assessment that academic experts in higher education believe to be sustainable and scalable. To gather the available empirical qualitative data on this subject, a systematic review of the literature was undertaken as a component of this exploratory study. The study responds to one major research question. What are the experiences of educational practitioners reported in empirical peer reviewed qualitative research studies pertaining innovative strategies for online educational assessment?

3. LITERATURE REVIEW

Employers want graduates who are proficient in digital literacy, problem-solving, decision-making, and critical thinking [16]. The global economy is unable to produce graduates that are unprepared for the workplace, where facts and figures are fast-moving, contentious, and fluid [17]. Graduates must have proficiency with computers, according to the business sector. Technology utilization has revolutionized the educational landscape; as a result, thanks to its effective implementation, education is no longer restricted to the four walls of the classroom and traditional school hours. For the purpose of delivering education to the public on a worldwide scale, online learning makes use of technical resources and instruments [14, p. 81].

Thus, the success of students' learning is greatly influenced by the utilization of online teaching and learning. As a result, student evaluation in higher educational institutions must be consistent with online instruction and learning [18]. Assessment "tends to impact each component of a student's learning experience," according to [14, p. 81].

According to Mudau [14, p. 81]. Assessment is one of the key components of every teaching and learning environment. It is well established that how students believe they will be evaluated affects what they learn and how they approach it. Even though the process of evaluating students is not new, teachers frequently have difficulties in developing assessments. The difficulty has grown as more educational institutions have adopted online and remote learning as delivery methods, necessitating a revision of the traditional methods of instruction and evaluation to consider the instructional approach of virtual education [19].

Once a learner can demonstrate his expertise, skills, and beliefs in connection with the course they are currently taking, that assessment is regarded as genuine. The definition of validity may be further broadened to guarantee that an assessment involves "face validity" (the assessment tests what it is meant to test), "content validity" (the assessment addresses the subject matter being examined), "construct validity" (the assessment of fundamental graduate results) and "concurrent validity" whether achievement remains consistent across multiple tasks assessing a similar educational outcome [19, p.1206].

The ODeL framework is predicated on the notion that contemporary electronic devices and other digital resources can help the learning of every student. 'Assumption' is the most important word here. Additionally, it is expected that ODeL learners have access to their course materials and

communicate with the instructors without necessarily having to make eye contact by making the best use of contemporary digital devices. Increased contact in ODeL, reduces the transactional gap between the instructors and learners. Consequently, using distant electronic communication, modern technological innovations produce e-learning, online learning, or digital learning [20, p.113].

ODeL also makes the premise that learner-centered concepts in education serve as its guiding principles. Instructional designers in ODeL ought to consider the student's learning path into account. Additionally, instructional technology could prove effective assuming it were designed using the conversational approach. The conversational framework of learning and instruction is capable of being facilitated by the use of specialized technology. For example, video conferencing may be utilized to encourage communication and discussion among learners who are located in different places as well as between lecturers and their students.

These conversations and debates give learners an opportunity to study one another's points opinions (peer-to-peer assessment) and enhance their problem-solving abilities. In some cases, lecturers may use online discussion boards to encourage group work, synthesis, as well as reflection. These three tasks eliminate any potential physical barriers between the learners and the lecturers, the students and the course material, as well as the learners individually [20, p.113].
Blogs are used by some instructors to support online learning. Blogs encourage reflection on instructional and educational procedures among students, professors, and/or online tutors. They offer a sort of assistance that permits asynchronous interactions between pupils and aids in learning. An additional tool that is frequently utilized to support ODeL is the use of a podcast. the advantages of podcasts include enhancing comprehension and attempting to clarify key elements in the learning material. However, podcasts typically assist in combining of concepts learned throughout learning. These could additionally be helpful in giving students examples or demonstrations of the subject matter being studied [20, p.114].

4. METHODS

We conducted an in-depth qualitative review of the scientific literature [21], published between 2010 and 2022 linked to assessment of online learning using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) framework ([22], In order to understand pertinent knowledge of instructors' expertise using technological tools to facilitate online assessment, this study adopted an interpretive epistemological paradigm [23].

Thematic analysis was employed to uncover additional themes and patterns across the integrated manuscripts post-classification. This methodology aligns with [24, p. 328], theme-based analysis (TA) approach, which involves identifying and examining patterns of meanings (themes) in qualitative evidence [25]. Thematic analysis is versatile, suitable for analyzing various types and sizes of qualitative data to address diverse research inquiries, and adaptable to different theoretical frameworks Braun & Clarke, [24, p. 329]. In this review, thematic analysis was employed to create codes and themes. Codes captured characteristics in each paper relevant to the study topics, while themes were derived from coding to identify broader patterns [26]. The literature's general patterns were identified through the application of a six-phase approach [24].
Ethics approval and consent to participate was not necessary because this was a meta data
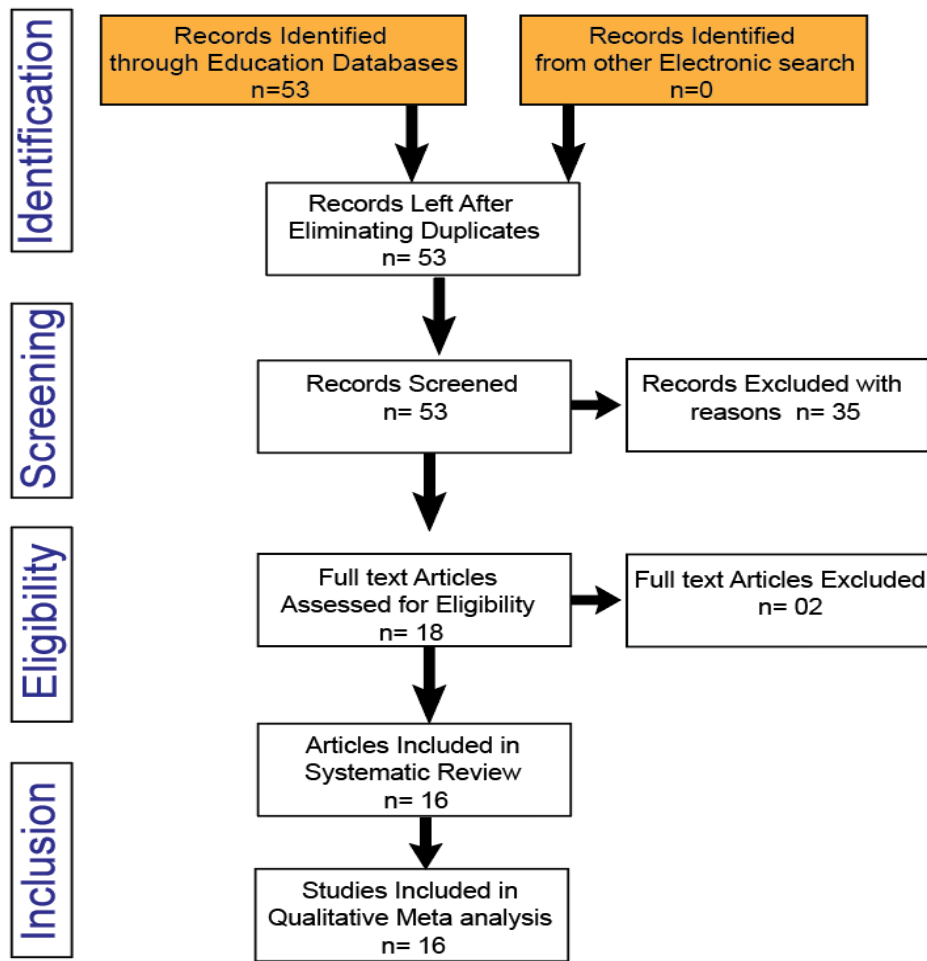analysis based on published literature.

Illustration of the systematic review procedure using Prisma.

A number of education databases, including Education Research Complete, ERIC, Taylor & Francis online, and Research Gate, were used for the article search. Combinations of the five search phrases utilized for this systematic review were "Strategies for online assessment", "evaluation of online learning", "E-learning assessment strategies", "Virtual education assessment methods", "Open distance Learning assessment techniques" to identify the main subject of interest. Then, in order to find qualitative articles for inclusion, the additional search terms "qualitative," "interview," "focus group," and "case study" were added one at a time to the combinations of the first search terms with the AND addition. The 2010–2022 publication year range was chosen to include relevant articles. Also, the publications had to be empirical studies that were related to universities, colleges, seminaries, or other higher education institutions. The original pool of 53 publications for the study's evaluation was created using this technique. These articles were further assessed by being read more carefully in comparison to exclusion criteria i.e. If the sampled journals were not qualitative in nature, studies not conducted from Universities, colleges or higher education and all those that were not related to the five phrases. This method led to the inclusion of a total of 16 articles in the analysis for this study. The table below contains specific information regarding these articles.

Table 01 Descriptions of the publications that were incorporated in the systematic review.

	Article Author	Geographical context	Participants
1	Douglas, etal (2020).	Australia	225 Students 09 Instructors/ Facilitators
2	Adebunmi, Y. A., & Ayodele A. O. (2021)	Gauteng, South Africa	05 Lecturers
3	Arslan, K. (2022).	Turkey	69 Student teachers
4	Mudau, P. K. (2021).	South Africa	04 Lecturers
5	Modise, M. P. (2021)	South Africa	51 students
6	Mapundu & Musara 2019).	South Africa	48 Male and Female Students
7	Tse, C.T., Scholz, K.W., & Lithgow, K. (2018)	Canada	17 Instructors
8	Watson, C. E., Kuh, G. D., Rhodes, T., Light, T. P., & Chen, H. L. (2016).	USA	Systematic review
9	Şenel & Şenel 2021, p. 239	Turkey	42 Students
10	Vurdien, R., & Puranen, P. (2022).	Finland	34 Teachers (Spaniards & Finish)
11	Matheson, R., Wilkinson, S.C., and Gilhooly, E. (2012)	United Kingdom	17 Students
12	Eric Zhi-Feng LIU & Chun-Yi LEE (2013)	Turkey	12 Students
13	LaPrad, J. G., & Hyde, A. M. (2017).	USA	138 Students
14	Puspitasari, E. (2020)	Indonesia	6 teachers and 6 students
15	Ilgaz, H., & Afacan Adanır, G. (2020).	Turkey	163 students
16	Alshraideh, D. S. (2021)	Saudi Arabia	120 Students

Included Articles and Their Features (Listed by Publication Year).

4.1. Theoretical Framework

For the goal of directing this research, the Technological, Pedagogical and Content Knowledge (TPACK) hypothesis developed by Mishra [27] was specifically adopted. TPACK was created by [27] to support teachers in using technology for learning efficiently [28, p. 70]. Additionally, this framework was selected since it has been shown to be useful in a variety of instructional settings, the expertise and skills that instructors must possess to properly incorporate technology in their classroom instruction are laid forth in TPACK. The work of [27] TPACK stands at the heart of each of these tripartite relational sets of information since content, pedagogy, as well as technological knowledge are all relevant throughout any instructional setting. [27, p.1026], [29. 2022, p. 459]
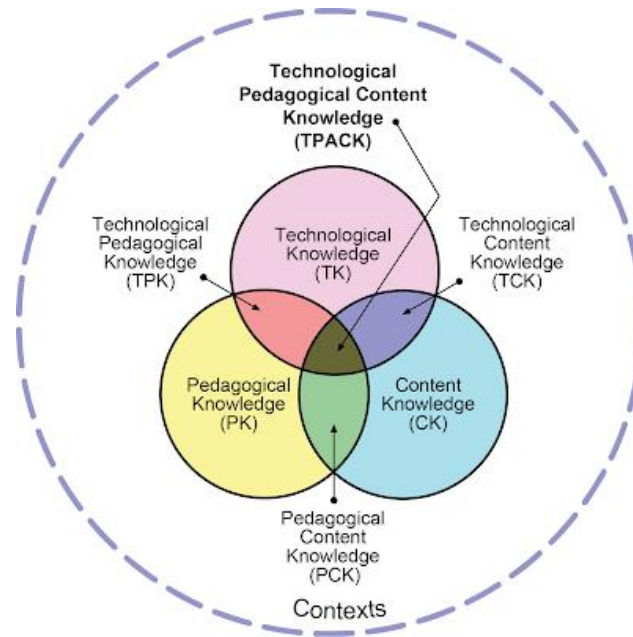
Knowledge components of the TPACK framework Koehler [27], p. 63

The TPACK model is thought by the researchers to be the ideal paradigm for this particular investigation. This idea was designed to describe the special expertise instructors require to successfully employ technology to communicate topic material. According to Koehler [27, p. 63], TPACK entails presenting material using a range of digital tools in productive ways as well as utilizing technology to address various issues that students may have in their educational setting. The TPACK's main components are further explained accordingly.

Technological Knowledge. The term "technological knowledge" abbreviated as (TK) in the framework refers to a teacher's understanding of various digital devices, which encompasses both the capacity to recognize the appropriate devices for content delivery and the ability to instruct using those devices [30, p. 522]. In Open Distance and Electronic Learning (ODeL) situations, where teaching and learning take place at various times as well as diverse locations, technological knowledge is critical in ensuring that learning is relevant. utilizing an appropriate LMS (Canvas, Moodle, Sakai etc.) in assessing learning outcomes in the present research, lecturers are required to demonstrate their proficiency with technology. [29, p. 458], [27, p. 63].

Technological Pedagogical Knowledge. abbreviated as **(TPK).** Understanding how technology can be used to facilitate the transmission of material is known as technological pedagogical knowledge (TPK) [31, p.105] By virtue of the routine connections and contacts that an instructor makes, both pedagogy/ andragogy approaches as well as technological advancements impact one another. To be able to effectively teach and guide learners as well as conduct an effective assessment plan, the lecturers are expected to demonstrate a thorough awareness of technology tools and how they can be implemented professionally inside the Learning Management System (LMS) such as Canvas, Moodle, Sakai etc. [32, p.4], [30, p. 521], [27, p. 63].

4.2. Technological Content Knowledge (TCK)

Technological Content Knowledge refers to the knowledge and abilities that instructors gain to assist them in choosing the most appropriate technologies to support the learners to effectively engage through the material [27]. TCK was defined by Kurt [33] as the connections and points of

contact between technologies and material [30, p. 521]. An instructor should ideally be aware of the precise technologies that are most effective for meeting subject-matter learning objectives. In the context of this study, the teachers are required to pick from a variety of LMS technologies such as Canvas, Moodle, Sakai etc. which most effectively support achieving the learning objectives of the various course components. They must use technical resources from the LMS Canvas, Moodle, Sakai etc. portfolio, including as announcements, blog posts, forums for discussion, instructional files, audio files, as well as online conference resources, to improve the completion of various activities. [34, p.1009], [32, p.4], [30, p. 521].

4.3. Community of Inquiry (CoI)

The initially developed Community of Inquiry approach was built on pedagogical, cognitive, and social presence, defined as "the design, facilitation, and direction of cognitive and social processes to support learning" when a teacher is present. The facilitator's capacity to actively participate in an online education transaction. Social presence is defined as "participants' capacity to establish interpersonal connections and identify with the community." The ability for individuals to show themselves as genuine individuals through a communication medium is referred to as "social presence" in this idea. According to Modise, [35, p.286] of his book, "Cognitive Presence," it is the capacity of students to create and verify meaning through ongoing discussion and reflection.

Accordingly, the Community of Inquiry framework for inquiry-based teaching and learning is used to organize the learning process in online or blended environments. The model offers chances for peer instruction, self-reflection, interaction, and active cognitive processing. The value of creative communities of inquiry in the online assessment whether in-person, online, or mixed, is demonstrated through guidance from lecturers at the appropriate time, which promotes participation and shared application activities. [36, p.366]

5. DISCUSSION OF RESEARCH FINDINGS

Five major themes emerged from the analyzed articles, are discussed in the section below.

1. Asynchronous Online Discussion Boards
2. E-portfolios
3. Online Proctored Exams
4. Online non-proctored Examinations
5. Distance Project Based Assessment

5.1. Asynchronous Online Discussions Boards

Asynchronous Online discussion boards are LMS fora where users can interact, post and answer to each other. These are used for full-class or small-group discussion sections. Students address topics on the discussion board, add their personal experiences and insights, draw on each other's thoughts, evaluate case studies, etc. The discussion board allows students to comment, post assignments and interact with each other according to the course context. Discussions are held asynchronously and different threads for different purposes are created [37].

Asynchronous Online discussion boards are known to sustain ongoing conversations during the course to enable the learners establish relationships and remain focused on the content of the course; They also restrict the number of terms that students can use in each post (e.g. 200 terms)

to enable them to make their points concise. It also improves the manageability of daily discussion posts around other course evaluations [38], [39].

5.1.1. Strategic Process

Discussion boards are used for problem-solving programs in community groups. Teachers develop a dilemma and encouraging students to think together. Only the final solution to the question is evaluated and when exchanging suggestions or opinions with the class there is no pressure. Supplementary details can be made available to classes halfway through the exercise to enable students to rethink their original role. Teaching staff usually review relevant feedback and explore how to react to responses earlier in the semester [40].

5.2. E-Portfolios

A portfolio, irrespective of whether it be physical or digital (also referred to as an e-portfolio), serves as an operational record with room to collect, arrange, and exhibit instructional materials like Assignments, work samples and journals, that highlight various competencies that students have developed in their particular courses or modules. [41], argue that a variety of e-portfolio tasks, such as creative writing tasks, studies, podcasts, reflection diary entries, blog posts, digital video clippings (DVDs), and PowerPoint presentations, among others, might serve as proof. The e-portfolio pedagogy can be utilized as another kind of assessment to exhibit skills and successes, reflection, and use appropriate of communication channels. [42, p.195], [43, p. 65]. A process and a product are both included in an e-portfolio. Learners can go beyond simply studying for the aim of gaining information by applying the expertise, abilities, and principles that they have learned to real-world circumstances through the e-portfolio process. By completing a variety of learning tasks that serve as formative assessments and summative exams, students increase their knowledge. Through the feedback they get from fellow students and lecturers, they can improve their competencies. Depending on the environment in which they are employed, these e-portfolios can serve a variety of functions; nevertheless, for this study, the assessment portfolio was the primary focus [14, p. 83].

For the anticipated preparation, teaching staff take time to become familiar with the interface (Canvas, Moodle or Sakai etc) intended to be used ahead of the course and they build detailed guidance and goals for students use as a preparation strategy [44], 2018.
At the beginning of the project, academic experts also provide students with a simple rubric, which is transparent and easy to use when assessing. Midway through the course, teaching staff make students apply a draft portfolio to enable them to start working earlier and get feedback [45]. Lecturers provide spaces within in the course for reflection, and students apply these elements to their portfolio. Provide some insightful leading questions [46].

5.3. Online Proctored Examinations

Proctoring an online examination serves the purpose of upholding academic integrity in the interest of managing academic online dishonesty such as reading from books, sitting in on exams for another individual, asking questions of people during exams, discussing with people during exams, using internet-based tools, and getting answers from different sources beforehand. [47, p.374].

A few examples of steps taken when proctoring an online exam include locking down the internet browser and operating system to safeguard against dishonesty, limiting access to one's computer's non-exam functions, being capable of view the examination area in every direction, monitoring eye movements, and capturing images while taking the examination [48]. For a secure online

exam with a live webcam microphone, and a reliable internet connection, online proctoring solutions are add-ons built into a learning management system. These tools also come in more sophisticated versions that are capable of taking images at predetermined intervals. It can be noticed that they each have unique qualities [49, p.370].

To stop academic deviations during digital examinations and to guarantee examination safety, numerous add-ons with various functions have been created. Proctoring add-ons that are connected with learning management systems (LMS), which lockdown open apps on users' computers while they taking the online examination, Block audio and music output, block copy-paste, and the ability to take screenshots, deactivate the virtual machine, put more monitors in a frozen state, observe eye movements, listen for noise, Check the room and the face, take a picture, keep track of and document actions to limit irregular behaviors during an online examination. [49, p.370]. Some of the digital proctoring software's renown and used previously in universities and higher education institutions include:

5.3.1. Mega Proctoring

ME Education Technologies and Consulting Service created the Mega proctoring Google Chrome add-on, which can be integrated with Moodle and utilized for online examinations [48]. With capabilities like movement monitoring and authentication to spot any academic deviations during online examinations, this add-on offers the necessary circumstances for a secure examination as a virtual proctor in online examinations. Students need to install this add-on in order to participate in the current online exam. The list of websites viewed by users compiles information such the date visited, network monitoring, clicks made, mouse location, and keystroke recording. Throughout the examination, he records audio recordings as well as sporadic images. [49].

5.3.2. Moodle Proctoring

Moodle Proctoring is a Moodle Quiz plugin that uses the webcam to take the user's picture in order to identify whoever is participating in a virtual examination on Moodle. By downloading the Moodle add-on manager or via GitHub, users are able to view their examinations. The plug-in programmatically snaps a picture at a certain moment and saves it in Moodle data in the form of small.png format. Participation to the examination is prohibited if the user does not permit the usage of its webcam, and while taking the assessment, it alerts the virtual assessor to any inappropriate conduct [50], [49], [47, p.374].

Subsequent to the above, the plug-in assists in shooting arbitrary images using the webcam whereas the learner takes the examination and requests prior user consent to operate the recording device [51]. By viewing the image, the student giving permission can begin responding to the examination questions. The plugin aims to stop the person using it from acting suspiciously throughout the examination. It resembles a video service that records each minute of activity [52, p. 281].

5.3.3. Proctorio

An add-on for the Google Chrome browser called Proctorio is used to proctor examinations online. As a result, it offers the option of sitting for the exam wherever. It is compatible with the current LMS platform [49, p.372]. Through screen recording with a computer's webcam and microphone, monitoring internet activity, locking some computer functionalities, and recording with a webcam and microphone, it attempts to prevent academic inappropriate conduct that the learner may display during the online examination. It also includes tools like fast results to the

notebook, plagiarism surveillance, flagging of questionable conduct, evaluation of the examination space, as well as verification. [53], [49, p.371], [52, p. 281].

5.3.4. E-Proctoring

E-proctoring is a piece of computer science technology that works together with Moodle and uses cutting-edge artificial intelligence algorithms to analyze and confirm the authenticity of users [54], [55]. The application blocks the operating system from external scripts, tools for interaction, and online resources that aren't related to exams. Utilizing functions like verification of identity, occasional snapshots, system surveillance, and activity recording, it attempts to mitigate academic misconduct which might happen during the online examination. [49], [56].

5.4. Online Non-Proctored Exams

A Take-Home Exam (THE) is a term used to describe the evaluation and measurement process, emphasizing the circumstances rather than a specific examination technique. In these tests, aligning with the methodology of open-book and open-web (OBOW) exams, learners have the freedom to utilize various study materials. Take-home examinations consist of open-ended questions, providing students an opportunity to showcase their understanding of a specific issue or subject within a limited time frame while utilizing available resources [57, p. 239]. Advantages of Take-Home Examinations in Online Education include:

Higher Test Security: When take-home exams involve unrestricted assignments or questions assessing high-level skills, test security can be enhanced. Including open-ended questions in exams makes it challenging for dishonesty and plagiarism to impact grades [58]. Such examinations, requiring original responses or adopting an open-book format, are recognized as effective strategies to reduce cheating [59].

Measuring and Improving Advanced Skills: Take-home exams are recommended for evaluating learners' excellent abilities, contributing to the development of advanced skills and professional growth when used for formative assessment [58].

Supporting Learning: Take-home exams facilitate learning by aiding learners in developing, exploring, and applying knowledge and abilities in a practical setting [59]. The collaborative nature of these exams, with a limited assessment window of 12-48 hours, can enhance teamwork strategies and promote social engagement and cooperation among students [60].

Decreasing Exam Anxiety: Research suggests that open-book exams, like take-home exams, are less stressful than closed-book exams [57, p. 240]. The reduced anxiety associated with take-home exams is particularly valuable in light of the global epidemic's adverse effects on learners' scholarly well-being [61].

Higher Content Validity: Take-home exams typically offer better content validity than other forms of online assessments, allowing longer answer timeframes for learners. This format enables the assessment of most academic objectives relevant to the assignment [62].

Comprehensive Feedback: Take-home exams provide learners with an opportunity to receive detailed feedback, promoting their engagement and motivation in remote learning [57, 2021, p. 240].

5.5. Distance Project Based Assessment

According to Al Mulhim [63], project-based learning (PBL) stands as a student-centered instructional approach fostering engagement across various learning environments, promoting both independent and collaborative work towards specific objectives over time. Extensively utilized in educational practice, PBL is supported by a breadth of literature [64, p. 392], [63], [65]. Moreover, it is asserted that PBL offers manifold benefits, including heightened student achievement, motivation, positive attitudes towards learning, self-assessment capabilities, autonomy in learning, and the cultivation of advanced cognitive skills such as practical reasoning, innovative thinking, and teamwork abilities [64], [63], [66].

Even though the project team and supervisor don't have face-to-face meetings, distance project-based learning (DPBL) closely resembles traditional PBL as it occurs online. DPBL has seen extensive adoption in higher education institutions during the COVID-19 pandemic. [63, p. 235; [67, p.95], [66], [68]. To effectively support students in this educational setting, instructors must closely monitor and prepare their learners, while also establishing effective channels of communication to alleviate stress caused by uncontrollable factors such as internet connectivity issues [63, p. 236]. Additionally, studies on DPBL during the pandemic suggest its viability as a substitute for traditional face-to-face instruction [68, p.33], [67, p.94], especially in imparting practical knowledge. However, the debate surrounding this topic remains unresolved, underscoring the need for further research before fully endorsing either perspective.

6. CONCLUSION

In conclusion, this study delved into the pressing issue of online educational assessment in the context of the emergent e-learning landscape within universities, particularly accentuated by the challenges posed by pandemics. The research sought to address the persistent concerns regarding the clarity, effectiveness, and global standardization of assessment practices in online environments, which have often left stakeholders skeptical. The findings highlighted several promising approaches, including asynchronous online discussions, e-portfolios, distance project-based assessment, online proctored exams, and online non-proctored exams. These strategies not only present viable alternatives but also provide avenues for assessing learners' abilities through observable demonstrations and detailed scoring criteria, thus addressing the ambiguity surrounding online assessment practices.

By synthesizing insights from 16 relevant articles, this research contributes to the growing body of knowledge aimed at enhancing the efficacy of online educational assessment. Importantly, the study not only identifies potential solutions but also underscores the significance of restoring confidence among educational partners and funders in the effectiveness of online assessment modalities. As universities continue to navigate the complexities of e-learning and adapt to evolving pedagogical environments, the findings of this study offer actionable insights for educators, administrators, and policymakers seeking to ensure the integrity and reliability of assessments in online settings.

Ultimately, this research underscores the importance of ongoing innovation and adaptation in educational practices, particularly in the face of unprecedented challenges such as pandemics. By embracing innovative strategies for online assessment, universities can not only guarantee business continuity but also foster a culture of continuous improvement and excellence in teaching and learning.

CONFLICTS OF INTEREST

The authors assert the absence of any conflicts of interest.

APPROVAL FOR ETHICS AND CONSENT TO PARTICIPATE

This study constitutes a rigorous meta-analysis of published literature, ensuring comprehensive data synthesis and analysis.

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