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Online assessment in higher education: A systematic literature review

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Abstract Online assessments have become increasingly common in education due to technological advancements and the growing demand for flexible, accessible, and scalable evaluation methods. In higher education, the shift towards digital learning has further accelerated the adoption of online assessment tools. However, limited research explores how students' readiness, engagement, and acceptance influence their academic performance, satisfaction, and overall learning engagement in online settings. This article presents a systematic literature review based on the PRISMA method (Preferred Reporting Items for Systematic Review and Meta-Analyses) in order to examine various dimensions of online assessments in higher education. The review focuses on four major themes: technology integration, pedagogical impact, learning engagement, and students' acceptance and readiness. A total of eleven peer-reviewed research articles published between 2015 and 2025 were systematically selected from four academic databases: ScienceDirect, ERIC, Taylor & Francis, and SpringerLink. The findings synthesise key insights from each study, revealing both opportunities and challenges in implementing effective online assessment practices. The review highlights the necessity for a unified approach that integrates technological infrastructure, evidence-based pedagogical strategies, and consideration of student-centred variables to ensure successful outcomes. Moreover, the importance of training for both educators and students in the use of digital tools is emphasised. The research contributes to the ongoing development of online assessment frameworks that are reliable, equitable, and pedagogically effective within dynamic digital learning environments. Future research is likely to examine ways to enhance personalisation, reduce cognitive overload, and address issues related to academic integrity and learner motivation in online assessment environments.

Keywords: technology-enhanced assessment, digital pedagogy, learner readiness, student engagement, virtual learning environments

1. Introduction

Online testing has become increasingly popular in education over the past several years, driven by technological innovation and the need for flexibility in testing modes. Nguyen et al. (2023), Hill and LoPalo (2024), and Rautela et al. (2022) state that online examinations offer significant convenience and flexibility for both students and educators, allowing examinations to be taken from any location and at any time. Studies by Hill and LoPalo (2024) and Stradiotová et al. (2022) have shown that students often perform better in online examinations compared to traditional in-person examinations, particularly low-performing students. Anthony and Noel (2021) argue that the adoption of online testing has accelerated, especially during the COVID-19 pandemic, when educational institutions worldwide had to switch to online teaching. While online testing has various advantages, such as flexibility, scalability, and efficiency, it also raises issues related to accessibility, fairness, and academic integrity (Ngema, 2024; Shivshankar, 2024; Dritsas & Trigka, 2025; Rehan, 2023). Nguyen et al. (2023), Rautela et al. (2022), and Jubaedah et al. (2020) concern about creating and maintaining academic integrity are prevalent in online testing environments. Various technical and systematic tools are being developed to address these issues. The transition to online testing can negatively impact students' study habits and face-to-face interactions with peers and teachers (Stradiotová et al., 2022; Spangler, 2016).

The successful completion of online examinations relies on various factors, such as technological readiness (Tang et al., 2021; Kaushik & Agrawal, 2021), digital literacy (Getenet et al., 2024), and the availability of stable internet connections (Alzubi & Nazim, 2025). While these variables promote successful participation, Maleki (2024) and Mahlangu and Makwasha (2023) claim that discrepancies in digital access and literacy can pose severe challenges to the fairness and efficacy of online assessments. These disparities may result in uneven testing outcomes, which are detrimental to children from low-income families and undermine the legitimacy of online testing (Tate & Warschauer, 2022). It is consequently essential to investigate

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these inconsistencies to assess the greater impact of online testing on learning outcomes, as well as to identify technological and institutional impediments.

Ahmed and Sidiq (2023) argue that online testing has evolved as a rising major component of education, altering traditional assessment techniques while increasing students' flexibility and accessibility. Yadav (2024) writes that digital technologies such as Kahoot, Quizizz, and Google Forms have become a staple at the tertiary level beyond the rapid adaptation of virtual assessments during pandemic times. However, as Banerjee (2020) notes, long-standing problems still exist, especially for students from underprivileged sections, who continue to face barriers to digital access. Issues of fairness in automated grading systems and the ethics of remote proctoring of students' privacy and academic integrity have been questioned in research (Tate & Warschauer, 2022; Chikwe et al., 2024; Clark & Gorski, 2002; Banerjee, 2020). As such, these issues are worthy of further research for advancing equitable and ethical assessment practices. Firsthand, students' experiences with digital assessments remain under researched despite the growing body of research on online learning (Ndibalema, 2021).

To understand the entanglement of technology and learning in today's digital learning environment, it is essential to explore how technological advancements are integrated into educational processes and their impact on learning outcomes (Elen & Depaepe, 2024). In addition, few studies have explained how factors such as technological acceptance and digital readiness interact to influence learning outcomes (Huang, 2022; Alshammari & Alkhwaldi, 2025; Ursu et al., 2020; Rafiee & Abbasian-Naghneh, 2021). As such, this study conducts a structured literature review examining online examinations within a higher education context, with an emphasis on technology integration, pedagogical impact, engagement in learning, and acceptance and willingness of the students. In addition, this study is expected to provide insights to help teachers, policymakers, and institutions examine students' perceptions, readiness, and engagement, offering solutions to reduce digital gaps, ensure academic integrity, and enhance learning outcomes.

Although online examinations are still evolving, their impact on student learning remains an important area of research. The literature predominantly examine the technical conduct and institutional policies of online examinations, and their use in higher education has been increasingly significant (Baticulon et al., 2021; Cram et al., 2022; Babbar & Gupta, 2022). Few studies address students' attitudes, particularly how their preparation, participation, and acceptance influence their performance and learning experience (Al-Raimi et al., 2024; Cole & Doherty, 2025; Sotardi & Brogt, 2020; Dang, 2021; Oyetade et al, 2024). Additionally, Sannicandro et al. (2024) and Eshet (2024) indicate that studies avoid addressing the long-term implications of online examination tools, such as their ability to evaluate learning outcomes and their impact on academic integrity. The lack of an overarching synthesis of current research on this topic reveals a research gap. As a result, a systematic analysis is needed to identify trends, issues, and best practices in online assessment while also addressing pedagogical and technical factors that impact its success. This research is guided by the following aims: 1) to analyse the impact of technology integration on digital evaluation efficiency in higher education and 2) to investigate students' acceptability of and preparation for online assessments and their impact on learning results.

2. Materials and Methods

This paper used the PRISMA method (Preferred Reporting Items for Systematic Review and Meta-Analyses) checklist as a methodological foundation for conducting a thorough structured review. The selected papers were reviewed and classified via a 27-point assessment list and a four-stage procedure that addresses three research issues in a methodical manner. The PRISMA structure consists of four successive phases—identification, screening, eligibility, and inclusion—which ensures a thorough and transparent evaluation.

2.1. Identification phase

This study developed five specified criteria for detecting and choosing relevant publications. A thorough literature review was undertaken utilising four academic databases, ScienceDirect, Taylor & Francis, ERIC, and SpringerLink, to locate works in the humanities and social sciences. The databases were chosen because they provide access to high-quality papers that met the study's aims. The inclusion criterion was that the articles were published between 2015 and 2025 and written in English. Additionally, only open-access research papers were considered to ensure broad accessibility. The final criterion mandated full-text availability to facilitate unrestricted access to the selected studies. A thorough overview of the five inclusion criteria used in the selection process is given in Table 1.

In addition to the quintet of preestablished parameters, this study's identification procedure incorporates targeted query phrases and key terms. Each database search was systematically conducted across four scholarly archives to identify relevant research on online assessment in higher education. The inclusion criteria included research articles published within the last ten years; studies focused on higher education institutions; and research addressing technological, pedagogical, and institutional aspects of online assessments. Additionally, this study considers students' acceptance and readiness as key factors in the analysis.

Table 1 Inclusion and exclusion criteria for the articles.

Criteria	Inclusion	Exclusion
Database	ScienceDirect, Taylors & Francis, ERIC, and SpringerLink	Other databases
Publication years	2015-2025	Articles before 2015
Language	English	Articles written in other languages than English
Document type	Research articles	Books, book chapters, seminar papers
Access to full text	Open access	Limited or no access

Tables 1 and 2 outline the criteria and search strategies used to identify pertinent studies on remote assessment. Table 1 outlines the selection and rejection criteria, while Table 2 lists the search terms utilised across databases.

Table 2 Search strings used in all four databases for article identification.

Search Strings				
online assessment	AND	(technology integration)	AND	higher education
online assessment	AND	(pedagogical impact)	AND	higher education
online assessment	AND	(students' acceptance)	AND	higher education
online assessment	AND	(readiness)	AND	higher education

2.2. Screening phase

In this phase, the articles shortlisted in Phase I were provided a second screening round based on titles. Titles were carefully read for adherence to the predefined keywords. In addition, a quick screening of each article's abstract was performed to evaluate its conformity with the predefined acceptance and exclusion guidelines. Studies that did not align with these standards were removed. To achieve maximum validity for the selection process, duplicate records present in the four databases were methodically removed.

2.3. Eligibility Phase

In phase three, a detailed screening was conducted to assess the eligibility of the articles retrieved for further screening. Only studies that met all predefined selection and rejection criteria were retained for the last screening process. This process was crucial in ensuring that the publications selected were of immediate relevance to the research issues.

2.4. Exclusion phase

During this phase, publications that met the established eligibility criteria were selected for analysis, and those that did not were excluded. The exclusion process involved various scholarly sources, including published books, book excerpts, academic proceedings, and articles with restricted or unavailable full texts as well as publications outside the 2015–2025 timeframe. The article identification process is visually represented in Figure 1.

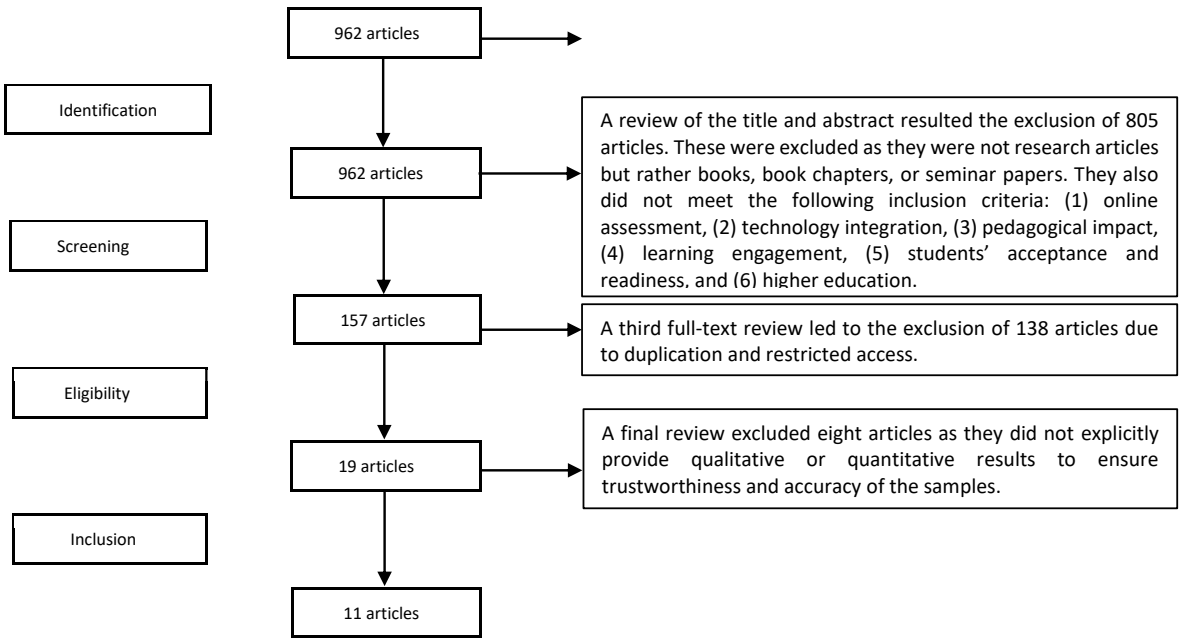

Figure 1 Research article screening and selection process (PRISMA method) flowchart.

A total of 11 articles were selected after the fourth-phase screening. These studies utilised qualitative, quantitative, and mixed methods approaches. As shown in Table 3, four studies adopted a quantitative approach, another four employed mixed methods, while the remaining three utilised qualitative methods.

Table 3 Number of articles by study approach.

Study Approach	Amount
Qualitative	3
Quantitative	4
Mixed Methods	4

3. Results and Discussion

A total of 11 articles were gathered, analysed, and documented for this study. All selected articles were published between 2015 and 2025 to ensure alignment with recent issues and trends, enhancing the study's relevance. This selection also provides a foundation for effectively responding to the research inquiries.

Table 4 offers a summary of the articles' country of origin, research methodology and participant details. Moreover, Table 5 lists the authors of each study and explores the function of online assessments in higher education, particularly in relation to technology integration, pedagogical impact, learning engagement, and students' acceptance and readiness.

Table 4 Research article details.

No.	Title and author(s)	Country	Research Method	Research Participant
1	Online Assessment Techniques Adopted by the University Teachers Amidst COVID-19 Pandemic: A Case Study.	India	Qualitative	31 participants
2	Experience of E-Learning and Online Assessment During the COVID-19 Pandemic at the College of Medicine, Qassim University.	Saudi Arabia	Quantitative	545 participants
3	The Effects of Privacy-Non-Invasive Interventions on Cheating Prevention and User Experience in Unproctored Online Assessments: An Empirical Study.	Luxembourg	Mixed	997 participants
4	Effects of Nonlinear Dynamic Online Assessment Model on Language Learners' Learning Outcomes and Cognitive Load.	China	Mixed	83 Participants
5	Auditing Students' Perceptions of Online Assessments and E-Proctoring Systems.	South Africa	Quantitative	238 Participants
6	Factors Affecting the Adoption and Use of Online Assessment for Learning at Polytechnics in Zimbabwe.	Zimbabwe	Qualitative	15 participants
7	Online Assessment in Turkish Universities: Challenges, Strategies, and Self-Efficacy Dynamics.	Turkey	Mixed	50 participants
8	Online Assessment and Artificial Intelligence: Beyond the False Dilemma of Heaven or Hell.	United Kingdom	Mixed	16 participants
9	Higher Education Student Responses to the Use of Online Assessments on Biology Material.	Indonesia	Quantitative	114 participants
10	Online Assessment in the Era of Digital Natives in Higher Education Institutions.	Tanzania	Qualitative	124 participants
11	An Integrated Approach to Preempt Cheating on Asynchronous, Objective Online Assessments in Graduate Business Classes.	USA	Quantitative	178 participants

Table 5 summarises the findings from several research publications, categorising them by their focus areas, which include technological integration, pedagogical influence, learner engagement, and student acceptance and preparation. Some studies explore technological integration in online assessments, such as Sullivan (2016), who studies ways to avoid cheating via the Canvas LMS, and Özyer (2024), who examines instructors' challenges in monitoring students' progress and alternative methods of evaluation.

Other studies addressing pedagogical influence include those of Mukherjee et al. (2023), who discover that an honour code reminder reduced cheating, and Liu (2024), who investigates the effects of several online language testing frameworks on cognitive load and learning outcomes. Terblanche et al. (2024) investigate crucial elements influencing views of online assessment, whereas Mahlangu and Makwasha (2023) identify problems in online assessment uptake at Zimbabwean polytechnics during the COVID-19 pandemic. Moreover, Ndibalema's (2021) research on learning engagement emphasises both the benefits and drawbacks of online assessment, such as the potential for divergent thinking and technology limitations.

Table 5 Summary of findings from the research articles.

No.	Author(s)	Focus Area	Findings
1	Gupta et al. (2023)	Technology integration and students' acceptance and readiness	The researchers discovered that university lectures employed a variety of online evaluation approaches, including blogs and peer tutorial videos. Readiness levels varied, with some teachers suspicious and others indifferent. During online teaching, challenges included technological obstacles as well as teachers' mental discomfort.
2	Elzainy et al. (2020)	Learning engagement and technology integration	The research found increased student satisfaction and improved problem-based learning (PBL) grades, particularly among female students. Faculty also showed enhanced technological skills, supporting the future integration of online medical courses.
3	Mukherjee et al. (2023)	Pedagogical impact	The study displayed an honour code reminder reduced cheating in online assessments without affecting user experience or self-efficacy.
4	Liu (2024)	Pedagogical impact	The study investigated the impact of several online language evaluation models on cognitive load and learning outcomes in EFL learners. The Nonlinear Dynamic Individual-Centred Language Assessment (NDICLA) model has been shown to lower cognitive load while improving learning results in computer-assisted language learning (CALL) environments.
5	Terblanche (2024)	Student acceptance and readiness	The study looked at how postgraduate auditing students perceived online examinations and e-proctoring at a South African institution that offered open distance and e-learning. Factor analysis identified five key components influencing perceptions: emotions, fairness, monetary aspects, IT challenges, academic integrity, and cheating. The findings provide insights for educators and future research.
6	Mahlangu and Makwasha (2023)	Student acceptance and readiness	The research identified key factors influencing online assessment adoption in Zimbabwean Polytechnics during COVID-19, using the TOE framework and TAM model. Findings highlight technological (internet connectivity, devices, ICT infrastructure), organisation (institutional support), environment (academic integrity), and individual (digital skills, user perception) factors. The research emphasises the e-testing has become mandatory in higher education, recommending training for instructors and learners enhancing efficiency and adoption.
7	Özyer (2024)	Technology integration and pedagogical impact	This study found that teachers struggled to monitor student progress and use alternate evaluation strategies. They favoured summative evaluations, such as assignments, projects, and quizzes, over conversations and e-portfolios. Strategies included improving question quality, employing a variety of assessment techniques, and introducing technological safeguards inside the Learning Management System (Canvas). The study used the TPACK paradigm, which emphasises the integration of technology, pedagogy, and subject knowledge. The findings show the need of professional development for improving assessment techniques in online education.
8	Amrane-Cooper et al. (2024)	Pedagogical impact and student acceptance and readiness	The research explored perceptions of online assessments and AI in higher education, revealing ambivalent views. Key themes include ethics, integrity, assessment redesign, diversity, inclusion, and AI dependencies. While AI offers opportunities for personalised assessment, concerns exist regarding academic integrity, fairness, and institutional credibility. The study emphasises the need for ethical, inclusive, and innovative assessment practices.
9	Pantiwati et al. (2023)	Student acceptance and readiness	The looked at how students responded to online assessment systems in a Biology Education program. Quizizz and Google Forms were the students' preferred platforms. The findings point to the need for a more effective and efficient online assessment platform that meets student demands while also addressing existing platforms' strengths and flaws.
10	Ndibalema (2021)	Learning engagement	The study discovered that online assessments provide possibilities for diverse thinking, self-reflection, and quick feedback. However, problems include unstable internet connectivity, a scarcity of technical gadgets, and students' unfavourable views. Capacity building for both teachers and students is required for successful implementation. The research recommends including online formative assessments into blended learning.
11	Sullivan (2016)	Technology integration	The study examined strategies to prevent cheating in asynchronous, objective online quizzes by integrating technological tools and social approaches. The results indicate

that the use of the Canvas LMS to generate randomised quizzes prevented cheating by making it both impracticable and unprofitable. The method influences nervousness about tests, pupil participation, educational effectiveness, and productivity during work.

In addition, study conducted by Elzainy et al. (2020) has show that learner engagement and technology integration lead to increased student satisfaction and technical literacy in OME. Similarly, Amrane-Cooper et al. (2024) investigate the link between pedagogical control and students' acceptance of AI-based evaluation, with a focus on ethical considerations and institutional reputation. Overall, the chart highlights the wide range of research interest in online assessment, as well as its benefits and limitations in higher education. In conclusion, the integration of technology in education, supported by effective pedagogical strategies and teacher preparation, significantly enhances learner engagement and student acceptance. Continuous professional development and addressing challenges such as technostress are essential for maximizing the benefits of technology in educational settings (Jackson & Rosenblatt, 2024; Slade et al., 2025; Nurhasanah et al., 2024; Liu et al., 2025).

Table 6 presents an organisational structure of research publications based on their areas of interest, with some overlap within groups. Table 6 also categorises the research into four major categories: technology integration, pedagogical impact, learning engagement, and student acceptance and readiness. Some articles fall into more than one category, demonstrating the linked nature of various difficulties in online examinations.

Table 6 Results of the studies' publications.

No.	Author(s)	Technology Integration	Pedagogical Impact	Learning Engagement	Students' Acceptance and Readiness
1	Gupta et al. (2023)	√			√
2	Elzainy et al. (2020)	√		√	
3	Mukherjee et al. (2023)		√		
4	Liu (2024)		√		
5	Terblanche et al. (2024)				√
6	Mahlangu and Makwasha (2023)				√
7	Özyer (2024)	√	√		
8	Amrane-Cooper et al. (2024)		√		√
9	Pantiwati et al. (2023)				√
10	Ndibalema (2021)			√	
11	Sullivan (2016)	√			

Research by Gupta et al. (2023), Elzainy et al. (2020), Özyer (2024), and Sullivan (2016) focus on using technology and digital platforms in online examinations. Mukherjee et al. (2023), Liu (2024), Özyer (2024), and Amrane-Cooper et al. (2024) analyse the pedagogical impact, including assessment design, academic integrity, and learning effectiveness. Elzainy et al. (2020) and Ndibalema (2021) study learner engagement and identify problems such as student satisfaction, problem-based learning, and technical impediments.

In contrast, the students' scceptance and readiness category includes research by Gupta et al. (2023), Terblanche et al. (2024), and Pantiwati et al. (2023), which address students' perceptions, readiness, and challenges with online examinations. Gupta et al. (2023) reporte a relationship between technology integration and student acceptance and readiness, Elzainy et al. (2020) reporte a link between technology integration and learning engagement, and Özyer (2024) identifies a link between technology integration and pedagogical impact. Similarly, Amrane-Cooper et al. (2024) contribute to pedagogical impact and student acceptance and readiness. In a nutshell, the research into online examinations spans multiple interconnected categories, each influencing the others (Mostafa, 2023; Allan, 2020; Forughi, 2024). Topuz and Kinshuk (2024), Ghanem and El-Shoafy (2024), and Sun et al. (2025) address that these challenges comprehensively can enhance the effectiveness and acceptance of online assessments.

Figure 2 displays the division of the research articles into four principal categories: technology integration, pedagogical impact, learning engagement, and students' acceptance and readiness. Of a total of 15 research articles (100%), the largest percentage (33.34%) belong to students' acceptance and readiness, suggesting a keen scholarly interest in students' attitudes, readiness, and adjustment to online examinations. Technology integration and pedagogical impact each account for 26.66% (4 articles each), suggesting an equal online learning context. The learning engagement theme, with 13.34% (2 articles), is the least discussed, indicating that although engagement is an important component of online learning, it has been less

prominently studied in the literature than other themes. This categorisation highlights the need for additional research focused on improving student engagement and pedagogical implications of online assessment practices.

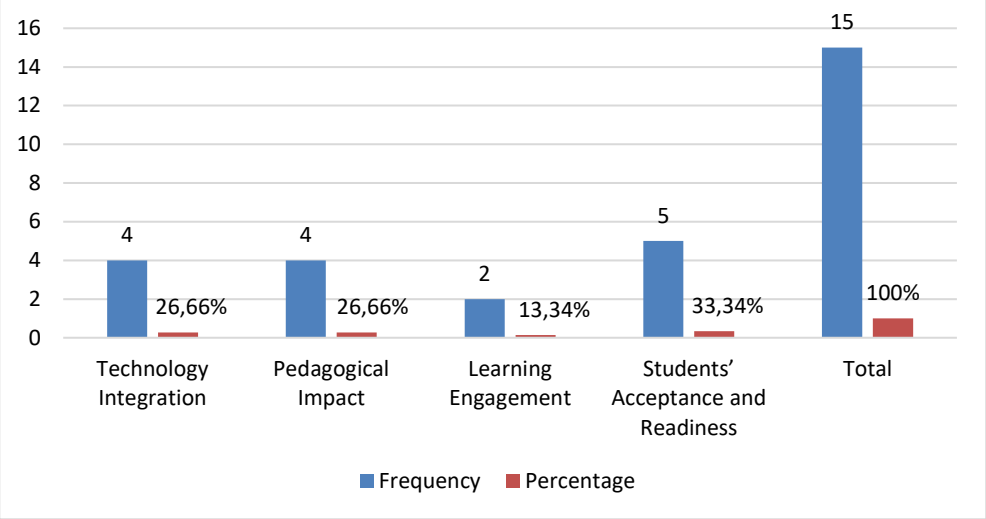

Figure 2 Research article distribution by category.

4. Conclusion

The systematic review of the 11 studies identifies key aspects of online assessment in higher education under four general themes: technology integration, pedagogical impact, learning engagement, and students' acceptance and readiness. The findings indicate that students' acceptance and readiness (33.34%) is the theme of most studies, indicating the necessity of examining students' attitudes, readiness, and challenges in accepting online assessment. Technology integration (26.66%) and pedagogical impact (26.66%) receive equal attention, suggesting an equilibrium of interest in digital tools, instructional approaches, and their impact on the effectiveness of evaluations. Conversely, learning engagement (13.34%) is given the least amount of attention, signalling a gap in research on the effects of online evaluations on learner motivation, interaction, and active involvement.

The overlap between categories further demonstrates the interconnectedness of these themes, as most studies address more than one aspect of online assessments. This suggests that effective implementation needs to be comprehensive and address technological, pedagogical, and student-centred dimensions. While online assessments have many benefits, such as flexibility, efficiency, and accessibility, challenges remain in terms of student engagement, assessment fairness, and technological barriers. Briefly, this review emphasises the need for future research to focus on advancing student engagement and assessment methodologies to further cater to effectiveness, inclusivity, and academic integrity. Such improvement will facilitate the continued evolution of online assessment practices to remain reliable, equitable, and pedagogically sound in evolving digital learning environments.

5. Recommendations for Future Studies

This study is limited by its use of secondary data, which restricts first-hand participant perspectives, and its focus on articles published between 2015 and 2025, which may exclude relevant research from other periods. Furthermore, the categorisation of research articles may not fully reflect the complex issues related to online assessments due to methodological and contextual differences. Additionally, the absence of a meta-analysis does not permit a more in-depth statistical examination of online assessment efficacy.

Future research must focus on ways to enhance student engagement in online assessments to address motivational and cognitive problems. As engagement is a primary driver of learning outcomes, studies should explore interactive assessment techniques, gamification, and personalised feedback systems to increase student engagement and motivation. Empirical studies must also be conducted to study the long-term influence of online examinations on students' academic achievement and skill acquisition. Although online assessments provide flexibility and accessibility, their role in facilitating critical thinking, problem-solving skills, and long-term knowledge retention. Additionally, more research is needed on how artificial intelligence and adaptive learning technologies can be used to improve the reliability and fairness of online examinations. AI-driven examinations have the potential to provide personalised learning experiences, detect academic dishonesty, and ensure equitable grading practices and therefore represent a fascinating area for future research.

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Ethical Considerations

The authors confirm that this study adheres to ethical standards.

Conflict of Interest

All the authors declare that they have no conflicts of interest.

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