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Rethinking Assessment and Feedback in The Digital Age: An Empirical Study

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Abstract: The digital transformation of education has reshaped assessment and feedback practices, shifting emphasis from traditional summative approaches to more dynamic, learner-centered models. This study investigates how digital assessment and feedback influence student learning, engagement, and self-regulation. A mixed-methods design was employed, involving 280 students and lecturers from eight higher education institutions in North Central Nigeria. Data were collected through questionnaires and interviews. Quantitative data were analyzed using descriptive statistics and regression analysis, while qualitative data were thematically analyzed. Findings reveal that digital assessment tools significantly improve feedback timeliness, accessibility, and personalization, leading to enhanced learning outcomes. Immediate and interactive feedback emerged as a strong predictor of student engagement and academic performance. The study further identifies emerging trends such as the integration of artificial intelligence, peer assessment, and learning analytics in shaping contemporary feedback systems. However, persistent challenges include digital inequality, concerns about academic integrity, and limited feedback literacy among stakeholders. The findings support existing literature emphasizing the role of formative and dialogic feedback in digital learning environments. The study concludes that assessment in the digital age should extend beyond evaluation to continuous learning support. It recommends the adoption of innovative feedback models, increased investment in digital infrastructure, and targeted capacity building for educators to improve the effectiveness and inclusivity of assessment practices.

Keywords: Digital Assessment, Feedback, Formative Assessment, E-Learning, Learning Analytics



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Introduction

Assessment and feedback remain at the heart of effective teaching and learning, serving as critical mechanisms for understanding, supporting, and improving student performance. Historically, assessment

practices have been largely oriented toward the measurement of learning outcomes; what students know at the end of an instructional period. However, contemporary educational discourse has increasingly challenged this narrow focus, advocating instead for assessment approaches that actively support learning processes. This shift reflects a growing recognition of the importance of assessment for learning, which emphasizes continuous feedback, student involvement, and the use of assessment as a tool for improvement rather than mere evaluation [1].

In today's educational landscape, technology has become a central component of teaching and learning, shaping how knowledge is accessed, shared, and applied. From digital simulations and interactive learning platforms to collaborative online tools, technology offers unprecedented opportunities to enhance student engagement, personalise instruction, and prepare learners for the demands of a digital society, Edinoh, Odili, Wakili (2026)[2]. Bisong, Asemota and Edinoh (2025) defined digitalisation as the process of leveraging digital technologies to transform a school business model, thereby creating new teaching and learning models and value-producing learning opportunities for students [3]. Furthermore, Asemota, Edinoh & Bisong described digitalisation as a process that involves internet platforms which include, but are not limited to, Zoom, WhatsApp, Google Meets, Google Hangouts, Skype, Microsoft Teams, or FaceTime, where learning may be done synchronously or asynchronously online. The rapid expansion of digital technologies has further accelerated this transformation, opening up new possibilities for how assessment and feedback are designed and delivered. Digital tools now enable real-time feedback, adaptive testing environments, and data-driven assessment systems capable of tracking and responding to individual learner needs (OECD, 2023) [4]. Such innovations allow educators to move beyond one-size-fits-all approaches, fostering more responsive, interactive, and personalized learning experiences. For instance, automated feedback systems can provide immediate responses to student inputs, while learning analytics can identify patterns in student performance, enabling timely pedagogical interventions [5].

Despite these advancements, the integration of digital technologies into assessment practices remains uneven. Many higher education institutions continue to rely heavily on traditional assessment methods, such as end-of-semester examinations and static assignments, which often fail to capitalize on the affordances of digital environments [6]. These conventional approaches may limit opportunities for timely feedback, student engagement, and the development of self-regulated learning skills. Moreover, they may not adequately prepare students for the demands of a rapidly evolving, technology-driven world [7].

Against this backdrop, there is a pressing need to rethink assessment and feedback practices in ways that align with the realities of the digital age. This study therefore explores how assessment and feedback can be reconceptualized to enhance learning, engagement, and self-regulation, particularly within digitally mediated higher education contexts [8]. By examining both the opportunities and challenges associated with digital assessment, the study seeks to contribute to ongoing efforts to create more effective, inclusive, and future-oriented educational practices [9].

LITERATURE REVIEW

Concept of Digital Assessment

The integration of digital technologies into education has significantly transformed teaching and learning processes around the world. Classrooms today are increasingly shaped by digital tools such as learning management systems, interactive platforms, educational applications, and multimedia resources. These developments have expanded opportunities for personalized learning, collaboration, and access to information beyond traditional classroom boundaries. As a result, teachers are now expected to facilitate learning in technologically rich environments that encourage critical thinking, creativity, collaboration, and digital literacy among students, Asemota, Edinoh & Wakili (2026) [10]. Digital assessment has emerged as a transformative approach to evaluating learning in contemporary education, reflecting the broader integration of technology into teaching and learning processes. At its core, digital assessment involves the use of technological tools and platforms to design, administer, and evaluate students' learning outcomes in ways that extend beyond the limitations of traditional paper-based methods [11]. These tools range from simple online quizzes and e-portfolios to more advanced systems incorporating artificial intelligence, adaptive testing, and learning analytics. By leveraging such technologies, digital assessment enhances efficiency, scalability, and the overall quality of feedback provided to learners [12].

One of the defining strengths of digital assessment lies in its capacity to streamline assessment processes while simultaneously enriching the learning experience. For educators, it reduces administrative burdens associated with grading and data management, allowing more time to focus on instructional design and learner support. For students, it creates more flexible and accessible assessment environments, enabling participation across time and space. This is particularly significant in higher education contexts where diverse student populations require adaptable and inclusive assessment practices [13].

A central feature that distinguishes digital assessment from traditional approaches is its ability to provide immediate, detailed, and actionable feedback. Research has consistently demonstrated that timely feedback plays a crucial role in enhancing student learning outcomes [14]. Nicol and Macfarlane-Dick (2006) emphasize that effective feedback supports the development of self-regulated learning by helping students understand performance gaps and identify strategies for improvement. Similarly, Hattie and Timperley (2007) argue that feedback is among the most powerful influences on learning and achievement, particularly when it is clear, specific, and delivered in a timely manner. Digital assessment platforms operationalize these principles by enabling instant feedback loops, interactive responses, and personalized guidance tailored to individual learner needs [15].

Beyond immediacy, digital assessment also supports deeper levels of engagement through interactive and multimodal formats. Students can receive feedback in various forms such as textual comments, audio explanations, video demonstrations, or automated hints making the learning experience more dynamic and meaningful. Furthermore, the integration of data analytics allows educators to monitor learner progress in real time, identify patterns of misunderstanding, and implement targeted interventions. This data-driven dimension reinforces the shift from assessment as a static endpoint to assessment as a continuous, formative process embedded within learning [16].

However, while the benefits of digital assessment are widely acknowledged, its implementation requires careful consideration of pedagogical alignment and technological infrastructure. The effectiveness of digital tools depends not only on their availability but also on how they are integrated into instructional practices. When thoughtfully designed, digital assessment has the potential to bridge the gap between teaching, learning, and evaluation, fostering a more holistic and learner-centered educational experience [17].

Feedback in the Digital Age

Feedback, long regarded as a cornerstone of effective teaching and learning, has undergone significant reconceptualization in the digital age. Rather than being viewed as a one-directional transmission of information from instructor to student, feedback is now increasingly understood as a dialogic process—an interactive exchange in which learners actively interpret, respond to, and use feedback to improve their learning. This perspective emphasizes student agency and engagement, positioning feedback as a collaborative practice that unfolds over time [18].

Digital technologies have played a pivotal role in enabling this shift by creating environments that support richer, more continuous, and more interactive forms of feedback. One notable development is the use of multimedia feedback, where instructors provide responses through audio or video recordings in addition to written comments. Such formats can enhance clarity, convey tone and nuance, and create a more personalized connection between instructors and learners. For many students, hearing or seeing feedback can make it more accessible and meaningful, thereby increasing the likelihood that it will be acted upon [19].

In addition, digital platforms facilitate peer and self-assessment, both of which are essential components of dialogic feedback processes. Through structured online activities, students can review each other's work, provide constructive critiques, and reflect on their own performance [20]. These practices not only deepen understanding of assessment criteria but also cultivate critical thinking and evaluative judgment skills that are central to lifelong learning. By engaging students as active participants in the feedback process, digital environments help shift the focus from passive receipt of comments to active knowledge construction [21].

Another key advantage of digital feedback systems is the creation of continuous feedback loops. Unlike traditional models, where feedback is often delayed and disconnected from subsequent tasks,

digital tools enable ongoing interactions between learners and instructors. Students can receive immediate responses to their work, revise accordingly, and track their progress over time. This iterative process reinforces learning as a dynamic and evolving journey rather than a series of isolated assessment events [22].

Importantly, feedback in digital contexts operates at multiple levels, including the task level (how well a specific task is performed), the process level (the strategies used to complete the task), and the self-regulation level (the learner's ability to monitor and direct their own learning). When effectively integrated, feedback across these levels promotes deeper learning by helping students not only improve their current performance but also develop the skills and dispositions needed for independent learning [23].

Overall, the digital age has expanded both the scope and the potential impact of feedback. By fostering interaction, personalization, and continuity, digital feedback practices align closely with contemporary pedagogical goals that prioritize engagement, reflection, and self-regulated learning. However, realizing these benefits requires intentional design and a commitment to developing feedback literacy among both educators and students [24].

Emerging Trends

The landscape of assessment and feedback continues to evolve rapidly, driven by ongoing advancements in digital technologies. Emerging trends in this space are not only reshaping how learning is evaluated but also redefining the roles of both educators and students in the assessment process. These developments point toward more intelligent, responsive, and learner-centered systems that prioritize continuous improvement and meaningful engagement.

One of the most significant innovations is the rise of artificial intelligence (AI)-powered feedback systems, which are increasingly being integrated into digital learning environments. Artificial intelligence is a specific branch of computer science. Through research and development, it can simulate, extend, and expand the theory, method, technology, and application system of human intelligence. The research scope of this field is wide, including language processing, language image recognition, and intelligent robot, Edinoh, Abiola & Nwafor, (2024). These systems can automatically analyze student responses, generate instant and tailored feedback, and even provide suggestions for improvement based on individual learning patterns. By reducing delays in feedback delivery, AI tools help sustain learning momentum and enable students to make timely adjustments to their work. Moreover, they support scalability in large classes, where providing individualized feedback manually can be challenging [25].

Closely related to this is the growing use of learning analytics, which involves the collection and analysis of data on student interactions, performance, and progress. Learning analytics tools allow educators to gain deeper insights into how students learn, identify areas of difficulty, and implement targeted interventions. For students, these systems often provide dashboards that visualize their progress, helping them to monitor their own learning and set achievable goals. In this way, assessment becomes more transparent and data-informed, fostering a culture of evidence-based decision-making in education.

Another important trend is the development of adaptive and personalized assessment systems. These systems adjust the level of difficulty, type of questions, or feedback provided based on the learner's performance in real time. Such personalization ensures that students are neither overwhelmed nor under-challenged, thereby enhancing motivation and promoting optimal learning experiences. Adaptive assessment aligns closely with the broader goal of meeting diverse learner needs, particularly in increasingly heterogeneous educational settings.

The use of e-portfolios and authentic assessment has also gained prominence as educators seek to evaluate not just what students know, but what they can do with that knowledge. E-portfolios allow students to compile and reflect on their work over time, showcasing their skills, achievements, and learning trajectories. This approach supports deeper learning by encouraging reflection, creativity, and the application of knowledge in real-world contexts. Authentic assessment tasks, often facilitated through digital platforms, mirror professional practices and thus better prepare students for future careers.

A defining feature across these emerging trends is the ability of digital tools to provide anytime, anywhere feedback, breaking the constraints of traditional classroom settings. Students can access feedback at their convenience, revisit it as needed, and engage with it in ways that suit their individual learning

preferences. This flexibility has been shown to increase student motivation, engagement, and overall satisfaction with the learning process [26].

Taken together, these trends signal a paradigm shift toward more dynamic, inclusive, and technology-enhanced assessment ecosystems. While the potential benefits are substantial, their successful implementation depends on thoughtful integration, ethical considerations, and ongoing support for both educators and learners in navigating these evolving practices.

Theoretical Framework

This study is anchored in four complementary theoretical perspectives that collectively explain how assessment and feedback can be effectively designed to enhance learning in digital environments. These frameworks (Constructivist Theory, Assessment for Learning Theory, Feedback Theory, and Self-Regulated Learning Theory) provide a robust lens for understanding the shift toward more interactive, learner-centered assessment practices in the digital age [27].

Constructivist Theory, as advanced by Piaget (1970), posits that learners actively construct knowledge through interaction with their environment rather than passively receiving information. Learning, from this perspective, is a dynamic process shaped by experience, reflection, and cognitive engagement. In digital learning contexts, this theory is particularly relevant, as technology-rich environments offer opportunities for exploration, simulation, collaboration, and problem-solving. Digital assessment tools, such as interactive quizzes, simulations, and project-based tasks, align with constructivist principles by enabling learners to actively engage with content and demonstrate understanding in diverse ways. Within the context of this study, constructivism underscores the importance of designing assessment tasks that are authentic, participatory, and reflective of real-world applications.

Assessment for Learning (AfL) Theory, developed by Black and Wiliam (1998), shifts the focus of assessment from merely measuring outcomes to actively supporting the learning process. AfL emphasizes formative assessment practices, continuous feedback, and the involvement of learners in evaluating their own progress. In digital environments, AfL is operationalized through tools that provide immediate feedback, enable iterative learning, and encourage student participation in assessment activities. This study draws on AfL to examine how digital assessment systems can be used not just to evaluate performance, but to guide and improve learning in real time. The integration of features such as automated feedback, peer review, and progress tracking reflects the core principles of this theory.

Feedback Theory, as articulated by Hattie and Timperley (2007), highlights the critical role of feedback in influencing learning outcomes. According to this theory, effective feedback addresses three key questions: Where am I going?, How am I going?, and What are the next steps? It operates at multiple levels, including the task, process, and self-regulation levels, each contributing differently to student learning. In the digital age, feedback mechanisms have become more immediate, personalized, and interactive, allowing learners to engage more deeply with feedback and apply it in meaningful ways. This study applies Feedback Theory to explore how digital tools enhance the quality, timeliness, and impact of feedback, thereby improving student engagement and academic performance [28].

Self-Regulated Learning (SRL) Theory, proposed by Zimmerman (2002), emphasizes the role of learners as active agents who set goals, monitor their progress, and regulate their cognitive, motivational, and behavioral processes. SRL is particularly important in digital learning environments, where students often have greater autonomy and responsibility for managing their learning. Digital assessment and feedback systems can support self-regulation by providing learners with real-time data, progress indicators, and opportunities for reflection. In this study, SRL Theory helps to explain how continuous and interactive feedback fosters learners' ability to take control of their learning, thereby enhancing both engagement and achievement.

Taken together, these theoretical perspectives provide a comprehensive foundation for understanding the evolving nature of assessment and feedback in the digital era. Constructivist Theory emphasizes active knowledge construction, Assessment for Learning highlights the formative role of assessment, Feedback Theory explains the mechanisms through which feedback influences learning, and Self-Regulated Learning Theory focuses on learner autonomy and control. By integrating these frameworks, the current study is well-positioned to examine how digital assessment practices can create

more responsive, engaging, and effective learning environments [29].

Methodology

Research Design

This study adopted a mixed-method research design, which integrates both quantitative and qualitative approaches to provide a more comprehensive understanding of the research problem. According to Creswell (2014), mixed-methods research is particularly valuable when a single methodological approach is insufficient to capture the complexity of a phenomenon. In the context of this study, the use of both numerical data and narrative insights allows for a richer exploration of how digital assessment and feedback influence student learning, engagement, and self-regulation.

The quantitative component focused on identifying patterns, relationships, and predictive effects particularly the extent to which digital feedback practices impact learning outcomes and engagement. In contrast, the qualitative component provided deeper insights into participants' lived experiences, perceptions, and interpretations of digital assessment practices. By combining these approaches, the study not only measures outcomes but also explains why and how such outcomes occur, thereby enhancing the validity and robustness of the findings.

Sample Distribution

The study involved a total of 280 participants drawn from eight higher education institutions in North Central Nigeria. The sample comprised both students and lecturers, ensuring that perspectives from key stakeholders in the teaching and learning process were adequately represented.

Participants	Frequency
Students	200
Lecturers	80
Total	280

Students formed the majority of the sample, reflecting their central role as primary beneficiaries of assessment and feedback practices. Their responses provided direct insights into how digital assessment tools influence learning experiences, motivation, and engagement. Lecturers, on the other hand, contributed professional perspectives on the design, implementation, and challenges of digital assessment systems. This balanced representation strengthens the study by capturing both the learner and instructor dimensions of the digital assessment ecosystem.

Instruments

Data for the study were collected using two main instruments: a structured questionnaire and semi-structured interviews, each serving distinct but complementary purposes.

The structured questionnaire was designed using a Likert scale format, allowing participants to indicate their level of agreement or disagreement with a range of statements related to digital assessment and feedback practices. This instrument facilitated the collection of standardized data that could be quantitatively analyzed to identify trends and relationships. The questionnaire items were carefully developed to reflect key constructs such as feedback timeliness, accessibility, personalization, student engagement, and self-regulation.

In addition, semi-structured interviews were conducted to gain deeper qualitative insights. This format provided flexibility for participants to express their views in their own words while still ensuring that key themes were explored. The interviews enabled the researchers to probe further into issues such as the effectiveness of digital feedback tools, challenges encountered, and suggestions for improvement. By capturing participants' voices and experiences, the qualitative data added depth and context to the quantitative findings.

Data Analysis

The data analysis process was conducted in a systematic and rigorous manner, combining statistical and interpretive techniques appropriate for mixed-methods research.

For the quantitative data, descriptive statistics were first employed to summarize and describe the

main features of the dataset, including frequencies, means, and standard deviations. These measures provided an overview of participants' responses and general trends in the use and perception of digital assessment tools.

Subsequently, regression analysis was used to examine the relationships between key variables, particularly the predictive influence of digital feedback practices on student engagement and learning outcomes. This inferential technique enabled the study to move beyond description to explanation, identifying the extent to which specific factors contribute to observed outcomes.

For the qualitative data, thematic analysis was employed to identify, analyze, and interpret recurring patterns and themes within the interview responses. This involved coding the data, grouping similar ideas, and developing overarching themes that reflect participants' experiences and perspectives. Thematic analysis allowed for a nuanced understanding of the complexities surrounding digital assessment and feedback, complementing the statistical findings.

Overall, the integration of these analytical approaches ensured that the study provides both breadth and depth, offering a well-rounded and evidence-based understanding of assessment and feedback in the digital age.

Result and Discussion

Results

This section presents the findings of the study in a clear and accessible manner, combining statistical summaries with visual representations to enhance understanding. The results reflect participants' perceptions of digital feedback, the types of feedback commonly used, and the extent to which key variables predict learning outcomes and engagement.

Table 1. Perceived Effectiveness of Digital Feedback

Level	Frequency	Percentage
High	150	53.6%
Moderate	90	32.1%
Low	40	14.3%

The data in Table 1 indicate that a majority of participants (53.6%) perceive digital feedback as highly effective. This suggests a strong positive reception of digital feedback practices among both students and lecturers. A further 32.1% rated it as moderately effective, indicating that while digital feedback is generally valued, there is still room for improvement in its implementation. Only a small proportion (14.3%) perceived it as having low effectiveness, which may reflect challenges such as limited access to technology, lack of familiarity with digital tools, or inconsistencies in feedback quality [30].

This distribution highlights a clear trend: digital feedback is largely recognized as a powerful tool for enhancing learning, though its effectiveness is not yet universal across all contexts.

Table 2. Types of Feedback Used

Feedback Type	Mean Score	Std. Dev
Immediate automated feedback	4.40	0.50
Peer feedback	3.90	0.60
Instructor feedback	4.20	0.55

Table 2 presents the mean ratings of different types of feedback used in digital learning environments. Immediate automated feedback recorded the highest mean score (4.40), indicating that participants highly value instant responses provided by digital systems. This aligns with the growing preference for timely feedback that supports continuous learning.

Instructor feedback (Mean = 4.20) also remains highly valued, underscoring the continued importance of expert guidance and personalized input from educators, even in technology-mediated environments.

In contrast, peer feedback (Mean = 3.90), while still positively rated, received the lowest score among the three. This may suggest that students are still developing confidence in evaluating their peers' work or may require more structured guidance to fully benefit from peer assessment processes.

The relatively low standard deviations across all categories indicate consistency in participants' responses, reinforcing the reliability of these findings.

Table 3. Regression Analysis

Variable	Beta	p-value
Feedback timeliness	0.50	0.001
Technology use	0.34	0.003
Student engagement	0.29	0.006

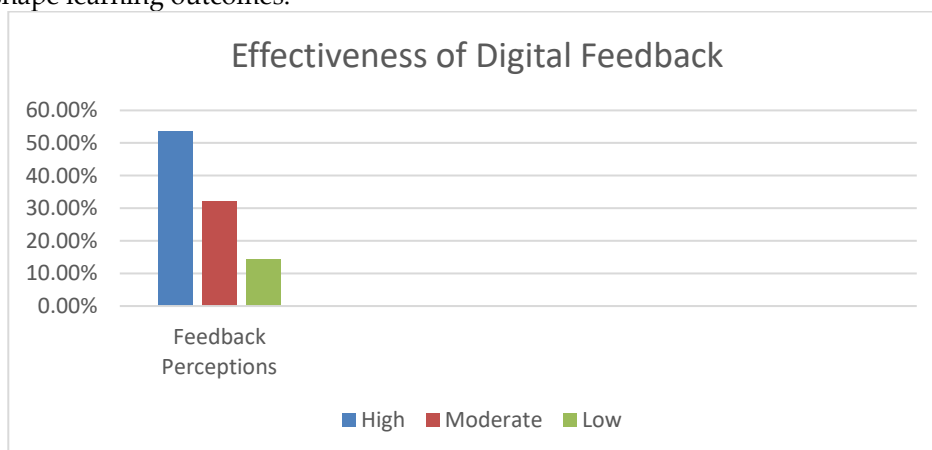
The regression analysis reveals important predictive relationships between key variables and learning outcomes.

Feedback timeliness emerged as the strongest predictor ($\beta = 0.50, p < 0.01$), indicating that the speed at which feedback is delivered plays a critical role in enhancing student performance and learning. This finding reinforces the value of real-time or near-instant feedback enabled by digital technologies [31].

Technology use ($\beta = 0.34, p < 0.01$) also significantly predicts learning outcomes, suggesting that the effective integration of digital tools contributes meaningfully to student success.

Student engagement ($\beta = 0.29, p < 0.01$), while slightly lower, remains a significant predictor, highlighting the importance of active participation in the learning process.

Overall, all variables are statistically significant, demonstrating that digital assessment environments function as interconnected systems where timely feedback, technology, and engagement collectively shape learning outcomes.



Charts (Digital Feedback Representation)

This chart visually reinforces that **more than half of the participants perceive digital feedback as highly effective**, with a clear drop toward moderate and low levels. The visual distribution emphasizes the dominance of positive perceptions.

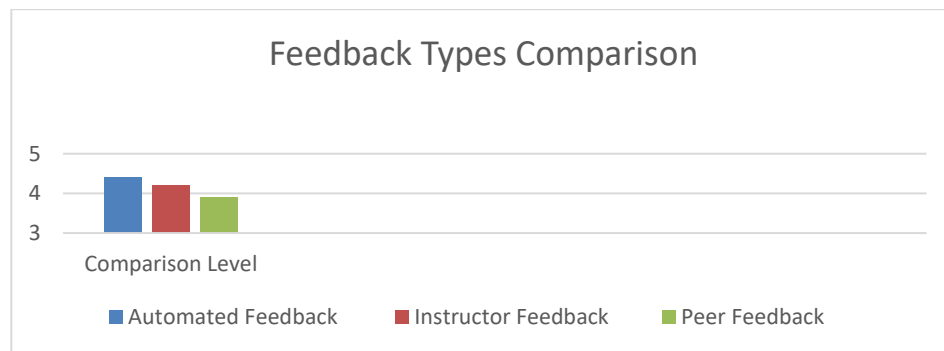


Chart 2: Feedback Types Comparison

Chart 2 highlights the **comparative strength of automated feedback**, followed closely by instructor feedback, with peer feedback trailing slightly behind. The differences, while not extreme, point to varying levels of trust, familiarity, and perceived usefulness among the feedback types [32].

Summary of Key Findings

Taken together, the results present a coherent picture of digital assessment in practice:

- a. Digital feedback is widely perceived as effective, particularly when it is timely and accessible.
- b. Automated and instructor feedback are highly valued, while peer feedback, though beneficial, may require further support to maximize its impact.
- c. Timeliness of feedback is the most critical factor influencing learning outcomes, followed by technology use and student engagement.

These findings underscore the transformative potential of digital assessment systems while also pointing to areas where further refinement and support are needed to achieve optimal effectiveness.

Discussion

The findings of this study provide compelling evidence that digital assessment is not merely a technological upgrade of traditional practices, but a fundamental shift in how learning is supported, monitored, and enhanced. At the center of this transformation is the role of **timely and interactive feedback**, which participants overwhelmingly identified as a key driver of improved learning outcomes. This aligns with existing scholarship emphasizing that feedback is most effective when it is immediate, specific, and actionable [33]. The present study reinforces this position by demonstrating that feedback timeliness is the strongest predictor of student performance, highlighting its critical role in sustaining learning momentum and promoting deeper understanding.

Digital platforms appear to resolve one of the most persistent challenges in higher education; delayed and often insufficient feedback, particularly in large classes. By enabling automated responses, real-time interactions, and continuous feedback loops, these technologies make it possible to provide scalable and efficient feedback without compromising quality. This supports earlier findings that digital systems can bridge the gap between instruction and assessment, ensuring that feedback becomes an integral part of the learning process rather than an afterthought [34].

Another important insight from this study is the **complementary role of different feedback types**. While automated feedback was rated highest in terms of usefulness largely due to its immediacy and consistency lecturer feedback remains indispensable for its depth, contextualization, and human dimension. This suggests that rather than replacing educators, digital tools should be seen as augmenting their capacity to provide meaningful guidance. Peer feedback, although rated slightly lower, still contributes to collaborative learning and the development of evaluative judgment, echoing the arguments of Carless and Boud (2018) regarding the importance of feedback literacy.

The findings also highlight the growing influence of **artificial intelligence and learning analytics** in shaping contemporary feedback practices. These tools enable more personalized and adaptive learning experiences by analyzing student data and tailoring feedback accordingly. Such developments are consistent with broader trends in digital education, where data-driven decision-making is increasingly used

to enhance teaching effectiveness and learner outcomes [35].

However, the study does not overlook the **persistent challenges** associated with digital assessment. Issues such as lack of skilled professionals, digital inequality and low digital literacy among teachers, cultural adaptation and traditional resistance, inadequate infrastructure, high cost of implementation and shortage of instructional materials, equity and accessibility challenges, lack of localized content, absence of capacity training programme and limited government support and policy framework. remain a significant concern, particularly in contexts where access to reliable internet and technological infrastructure is uneven. In addition, the concept of **feedback literacy** the ability of students to understand, interpret, and use feedback effectively emerges as a critical factor influencing the success of digital feedback systems (Carless & Boud, 2018). Without adequate support in this area, even the most sophisticated feedback tools may fail to achieve their intended impact [36].

Overall, the discussion underscores that while digital technologies offer powerful opportunities to enhance assessment and feedback, their effectiveness ultimately depends on how they are pedagogically integrated and equitably implemented.

Conclusion

This study concludes that assessment and feedback in the digital age must move beyond traditional, episodic models toward more continuous, formative, and learner-centered approaches. Digital technologies have created unprecedented opportunities to transform assessment into an ongoing process that actively supports learning rather than simply measuring it.

The findings demonstrate that technology-enhanced feedback systems, particularly those that are timely, interactive, and personalized, can significantly improve student engagement and academic performance. At the same time, the human element of teaching remains essential, as effective learning is shaped not only by tools but also by meaningful interactions between educators and learners.

Importantly, the study highlights that digital transformation is not an end in itself but a means to achieving more inclusive, responsive, and effective educational practices. Realizing this potential requires intentional design, strategic planning, and sustained capacity building. Institutions must not only invest in technological infrastructure but also ensure that educators and students are equipped with the skills needed to navigate and maximize digital assessment environments.

In essence, the future of assessment lies in its ability to integrate technology with sound pedagogy, fostering learning environments that are adaptive, engaging, and supportive of lifelong learning.

Recommendations

Based on the findings of this study, the following recommendations are proposed to enhance the effectiveness of digital assessment and feedback practices:

Adopt formative and continuous assessment models: Institutions should prioritize assessment approaches that provide ongoing feedback and support learning throughout the instructional process, rather than relying solely on high-stakes summative evaluations.

Integrate AI and learning analytics tools: The adoption of intelligent systems can enhance feedback personalization, enable early identification of learning gaps, and support data-driven decision-making in teaching and assessment.

Provide targeted training for educators: Professional development programs should focus on equipping educators with the skills needed to design, implement, and manage effective digital feedback strategies. This includes both technical competencies and pedagogical knowledge.

Promote student feedback literacy: Students should be supported in developing the ability to interpret and use feedback constructively. This can be achieved through guided reflection, peer assessment activities, and explicit instruction on feedback use.

Address digital inequality: Policymakers and institutions must work to reduce disparities in access to technology by investing in infrastructure, providing affordable internet access, and ensuring that all students can participate fully in digital learning environments.

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