

Exploring English Teachers' Technology-Based Assessment Literacy and Practices in Indonesian Secondary Education

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ABSTRACT

Objective: This study explores how English teachers engage with technology-based assessment in Indonesian secondary education, with particular attention to their perceptions, practices, and evaluative approaches. **Method:** Using an exploratory mixed-method design with a qualitative-dominant orientation, data were collected from ten Senior High School English teachers through a questionnaire consisting of closed-ended and open-ended items. **Results:** The findings reveal that teachers have widely integrated digital tools, such as Google Forms, ChatGPT, and Grammarly, into their assessment practices, primarily to improve efficiency, automate grading, and provide feedback. However, their engagement with technology is largely operational, with limited conceptual differentiation between AI-driven and non-AI tools. Teachers frequently categorize diverse technologies under a broad notion of "AI," indicating a functional rather than conceptual understanding. Despite this ambiguity, teachers maintain a strong reliance on human judgment, using technology-generated outputs as references rather than final decisions. The study also identifies an emerging but incomplete critical awareness, as teachers recognize concerns related to accuracy and bias while continuing to use these tools in practice. These findings suggest that teachers' technology-based assessment literacy is unevenly developed, with strong operational competence but evolving conceptual and critical dimensions. **Novelty:** The study highlights the need for professional development that moves beyond technical training toward fostering informed, reflective, and ethically grounded engagement with technology in assessment.

INTRODUCTION

The integration of digital technologies into educational assessment has reshaped how teachers design, implement, and interpret evaluation practices, particularly in English Language Teaching (ELT), where assessment often involves complex and interpretive judgments [1], [2], [3], [4]. Technology-based assessment, encompassing platforms such as online quiz systems, automated feedback tools, and digital writing evaluators, has enabled more efficient grading processes, faster feedback cycles, and increased flexibility in monitoring student learning. These developments align with broader shifts toward digitally mediated education, where responsiveness and scalability are increasingly prioritized. At the same time, the growing reliance on technological tools raises important questions about how assessment decisions are made and how teachers maintain control over evaluative processes [5], [6], [7], [8].

Central to these developments is the notion of assessment literacy, which refers to teachers' knowledge, skills, and principles in designing and conducting valid, reliable, and ethical assessments [9]. In technology-rich environments, this literacy extends beyond traditional assessment competence to include the ability to engage meaningfully with digital tools, interpret system-generated outputs, and align technological

affordances with pedagogical goals. Technology-based assessment literacy, therefore, involves not only operational familiarity with tools but also evaluative judgment and critical awareness of how such tools shape assessment practices [10], [11], [12], [13]. This becomes particularly relevant as teachers increasingly interact with automated systems that can generate scores, feedback, and analytic insights, potentially influencing decision-making processes in subtle but significant ways.

Within this landscape, the rapid emergence of Artificial Intelligence (AI) has further complicated how technology is understood and utilized in assessment contexts [14], [15], [16]. While AI-powered tools, such as automated writing evaluators and generative feedback systems, are often highlighted for their advanced capabilities, in classroom practice, they are frequently used alongside, or even conflated with, more conventional digital tools that rely on simpler forms of automation. As a result, the boundaries between AI-driven and non-AI technologies are not always clearly defined in teachers' everyday practices. This lack of conceptual clarity can shape how technologies are selected, interpreted, and trusted, particularly when automated outputs are used to inform judgments about student performance.

In the Indonesian context, the adoption of technology in education has accelerated in recent years, supported by increased access to digital platforms and institutional encouragement to integrate technology into teaching and assessment. English teachers, in particular, have begun incorporating a range of tools, from online quiz platforms to feedback-generating applications, to support classroom assessment. These practices are often associated with perceived benefits such as reduced workload, faster grading, and more immediate feedback for students [17]. However, the growing dependence on technological tools also introduces potential challenges, including concerns about accuracy, fairness, and the extent to which automated systems can adequately capture complex language abilities [18], [19]. When technological outputs are accepted without sufficient scrutiny, there is a risk that assessment practices may become driven more by convenience than by pedagogical and evaluative soundness.

These dynamics suggest that teachers' engagement with technology-based assessment is not merely a matter of tool adoption, but reflects deeper issues related to literacy, judgment, and professional decision-making. Understanding how teachers perceive, use, and evaluate technological tools in assessment is, therefore, essential for capturing the realities of classroom practice and identifying how assessment literacy is evolving in digitally mediated environments [20], [21], [22]. Such understanding is particularly important in contexts where different types of technologies, ranging from basic automation to more advanced AI systems, are used interchangeably, potentially shaping teachers' conceptualizations and practices in ways that are not always explicit.

Based on these considerations, this study explores how Indonesian Senior High School English teachers engage with technology-based assessment in their professional practice. It focuses on teachers' perceptions, the tools and strategies they employ, and the ways they interpret and evaluate the role of automated and AI-related technologies in assessment. In doing so, the study aims to provide a more grounded account of how

technology-based assessment literacy is enacted in real classroom contexts. The study is guided by the following research questions:

1. How do English teachers perceive technology-based assessment in English language education?
2. What technologies and assessment practices do English teachers employ in their classrooms?
3. How do teachers interpret and evaluate the role of automated and AI-related tools in assessment?
4. What challenges and strategies do teachers identify in ensuring fairness and validity in technology-based assessment?

RESEARCH METHOD

Research Design

This study employed an exploratory mixed-method design with a qualitative-dominant orientation to investigate English teachers' engagement with technology-based assessment. Given the evolving and context-dependent nature of technology use in assessment, this design was considered appropriate for capturing both general patterns and in-depth perspectives [23], [24]. While quantitative data were used to identify trends in teachers' perceptions and reported practices, qualitative responses were prioritized to explore how teachers interpret, evaluate, and make decisions about technology use in assessment contexts. This approach allows for a more nuanced understanding of technology-based assessment literacy as it is enacted in practice, rather than treating it as a fixed or purely measurable construct.

Participants

The participants were ten Senior High School English teachers from public and private schools in Indonesia. They were selected using convenience sampling, based on accessibility and willingness to participate. The limited sample size reflects the exploratory purpose of the study, which aims to generate contextually grounded insights rather than statistical generalizations. The participants' teaching experience ranged from 5 to 34 years, representing a mix of early-career and experienced teachers. This variation provides a broader perspective on how technology-based assessment is understood and practiced across different levels of professional experience. In terms of professional development, most participants reported having attended some form of training related to educational technology, although the depth and focus of such training varied.

Instrument

Data were collected using a questionnaire designed to capture multiple dimensions of teachers' engagement with technology-based assessment. The instrument consisted of two main sections. The first section is closed-ended items (Likert-scale and multiple-choice), which examined teachers' perceptions of technology-based assessment, perceived benefits and challenges, frequency and types of tools used. The other section is open-ended questions, which elicited descriptions of assessment practices, ways of using automated or AI-related feedback strategies for ensuring fairness and validity, and

reflections on the role of technology in relation to teacher judgment. The development of the instrument was informed by existing frameworks of assessment literacy [9] and literature on technology integration in assessment, ensuring that the items addressed both operational and evaluative aspects of technology use. To enhance content validity, the questionnaire items were carefully aligned with the study's conceptualization of technology-based assessment literacy, particularly focusing on operational use, pedagogical alignment, evaluative judgment, and critical awareness. The instrument was designed to reflect authentic classroom practices and teacher experiences in the Indonesian context.

Data Collection

Data were collected through an online questionnaire distributed via Google Forms, a platform commonly used in educational research for its accessibility and ease of use. The survey was conducted over approximately one week. Participation was voluntary, and informed consent was obtained from all participants before completing the questionnaire. To encourage honest and reflective responses, anonymity was maintained, and no identifying personal information was collected. This was particularly important, given that some questions addressed teachers' uncertainties, challenges, and concerns regarding the use of technology in assessment.

Data Analysis

Data analysis was conducted in two stages, corresponding to the mixed-method design. First, quantitative data from closed-ended items were analyzed using descriptive statistics (frequencies and percentages) to identify general patterns in teachers' perceptions, tool usage, and reported experiences. Given the small sample size, the analysis was limited to descriptive interpretation rather than inferential statistics. Second, qualitative data from open-ended responses were analyzed using thematic analysis following the approach of Braun and Clarke [25]. The analysis involved familiarization with the data, initial coding of meaningful segments, grouping codes into broader categories, and refining themes to capture recurring patterns.

The thematic analysis focused on how teachers interpret and evaluate technology in assessment, including their understanding of automated and AI-related tools, their decision-making processes, and their strategies for maintaining fairness and validity. This analytic approach enabled the identification of underlying patterns that reflect different dimensions of technology-based assessment literacy. To enhance the credibility of the analysis, themes were reviewed iteratively to ensure consistency between data excerpts and interpretations, and representative responses were used to illustrate key findings.

RESULTS AND DISCUSSION

Results

The analysis of the questionnaire data reveals several patterns in how English teachers engage with technology-based assessment. These patterns reflect not only the

tools they use, but also how they interpret, evaluate, and position technology within their assessment practices. The findings are organized into five interrelated themes.

Widespread Adoption of Technology for Assessment Practices

The findings indicate that teachers have broadly integrated digital technologies into their assessment practices. Most participants reported using technology either “often” or “sometimes”, suggesting that technology-based assessment has become a routine component of classroom practice rather than an occasional innovation. A range of tools was identified, with Google Forms emerging as the most frequently used platform, particularly for administering quizzes and automating scoring. In addition, teachers reported using ChatGPT to provide feedback, Grammarly to evaluate writing, and platforms such as Quizizz and Nearpod to support interactive assessment activities.

These tools are primarily used for practical assessment purposes, such as delivering quizzes, generating feedback, and managing student responses. This pattern suggests that teachers are actively incorporating available technologies into their workflows, reflecting a pragmatic approach to assessment rather than a theoretically driven integration. To provide an overview of the range of technologies used by teachers, Figure 1 summarizes the frequency of digital tools reported by participants.

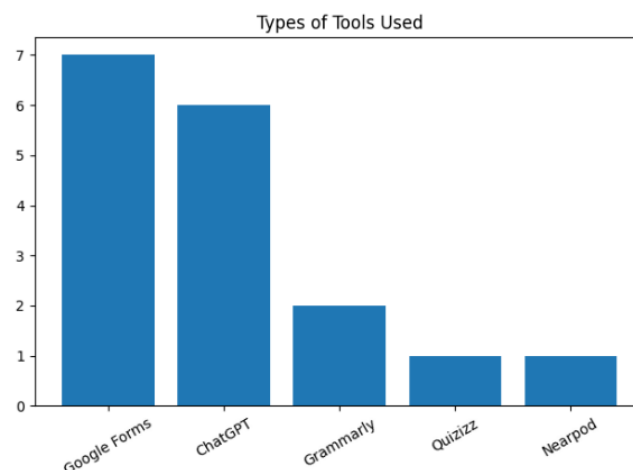


Figure 1. Digital tools used for assessment practices.

As shown in Figure 1, Google Forms is the most frequently used tool, followed by ChatGPT and Grammarly, while platforms such as Quizizz and Nearpod are used less frequently. This distribution indicates that teachers rely primarily on accessible and familiar platforms, with a combination of automated and AI-related tools supporting their assessment practices.

Efficiency as the Primary Driver of Technology Use

Across responses, efficiency emerged as the dominant reason for adopting technology-based assessment. Teachers consistently emphasized the ability of digital tools to reduce workload and speed up assessment processes. Most participants perceived technology as “*very helpful*” in managing assessment tasks. The most frequently cited advantage was the ability to “*assess quickly and automatically*”. Teachers

also highlighted the usefulness of technology in identifying patterns of student errors and supporting feedback provision.

One participant noted that technology “*really helps the teacher's role because it can save a lot of time in preparing assessments (diagnostic, formative, etc.).*” Similarly, another teacher emphasized, “*AI can help teachers by providing early feedback on grammar, spelling, and vocabulary... for time efficiency.*” These responses indicate that teachers primarily view technology as a tool for improving efficiency and managing workload, rather than as a means of fundamentally transforming assessment design or pedagogical approaches. The perceived benefits of technology-based assessment are illustrated in Figure 2.

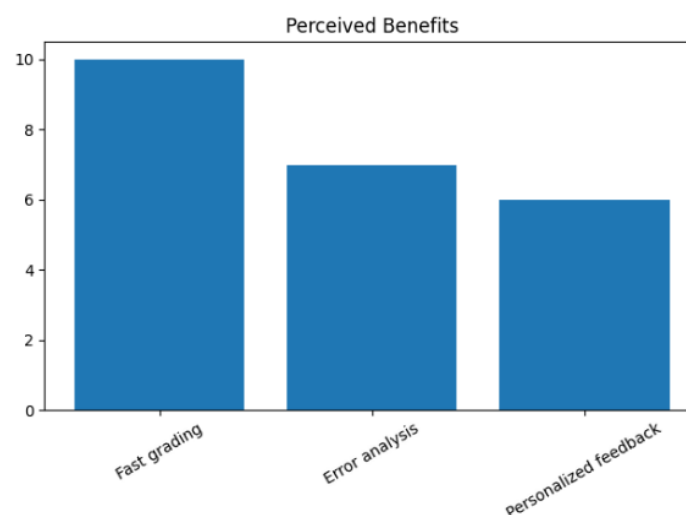


Figure 2. Perceived benefits of technology-based assessment.

Figure 2 shows that the most prominent advantage identified by teachers is the ability to grade quickly and automatically, followed by analyzing student errors and providing personalized feedback. This pattern reinforces the finding that efficiency and time-saving are the dominant considerations in teachers' adoption of technology.

Conceptual Ambiguity Between AI and Non-AI Technologies

A notable pattern in the data is the lack of a clear distinction between AI-driven tools and more conventional digital technologies. Teachers frequently grouped platforms such as Google Forms and Quizizz with tools like ChatGPT and Grammarly under the same category of “AI-based assessment.” This suggests that the term “AI” is used broadly to describe any technology that automates aspects of assessment. In practice, tools with relatively simple automation features are treated similarly to those involving more advanced algorithmic processes. This conceptual overlap reflects a functional understanding of technology, where emphasis is placed on what tools can do, such as generating feedback or automating grading, rather than how they operate. As a result, different types of technologies are integrated into practice without clear differentiation, indicating that teachers' engagement is primarily operational rather than conceptually grounded.

Continued Reliance on Human Judgment in Assessment

Despite their positive perceptions of technology, teachers consistently emphasized the importance of maintaining human judgment in assessment processes. Most participants reported using technology-generated feedback as a reference while retaining final control over evaluation decisions. A common strategy was to combine automated outputs with manual assessment. For example, one teacher stated to use the tools “...as a reference, but still give manual assessment.” Others emphasized the need to “manually double-check AI results” and “don’t rely entirely on AI for assessments.”

Teachers also articulated the limitations of technology in assessing more complex aspects of language. One participant explained, “assessing language style, nuance, and context still requires the direct involvement of teachers.” Another added, “assessing aspects such as creativity, cultural context, and communication still requires teacher intuition and experience.” These responses highlight a strong tendency toward a human-in-the-loop approach, where technology is positioned as a supportive tool rather than a replacement for teacher judgment. The extent to which teachers rely on technology versus their own judgment is presented in Figure 3.

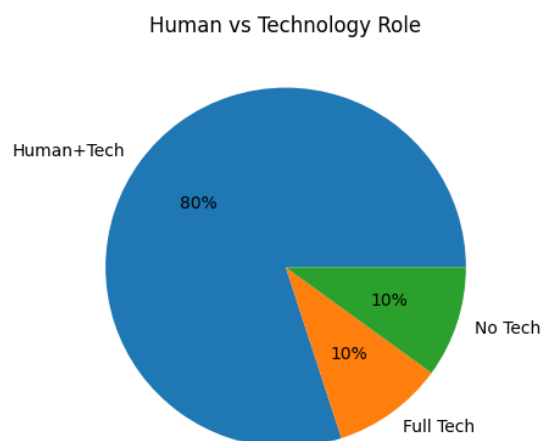


Figure 3. Reliance on human judgment in assessment.

Figure 3 clearly shows that the majority of teachers use technology-generated feedback as a reference while maintaining manual evaluation, with very few relying entirely on automated outputs. This pattern highlights the continued centrality of teacher judgment in technology-mediated assessment.

Emerging but Incomplete Critical Awareness of Technology Use

Teachers expressed several concerns regarding the use of technology in assessment, particularly in relation to accuracy, bias, and reliability. Many participants identified “concerns about accuracy and bias in assessments” as a key challenge. In addition, some teachers acknowledged their limited understanding of the technology itself: “teachers’ lack of understanding of AI technology.” Teachers’ perceived challenges in using technology-based assessment are summarized in Figure 4.

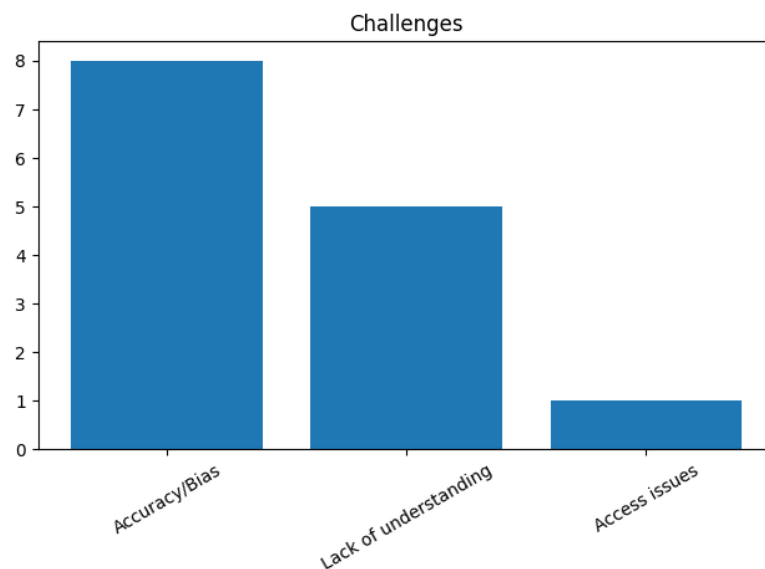


Figure 4. Challenges in using technology-based assessment.

As illustrated in Figure 4, concerns about accuracy and bias are the most frequently reported challenges, followed by limited understanding of the technology, while issues related to access appear less prominent. This suggests that teachers are more concerned with the reliability of assessment outcomes than with technical availability.

Despite these concerns, teachers continued to use technology in their assessment practices. Rather than rejecting these tools, they adopted strategies to mitigate potential risks, such as cross-checking results or “*using various AI tools to gain a broader perspective.*” This suggests that while teachers are aware of potential limitations, this awareness has not yet developed into systematic or critically informed practices. Instead, their engagement reflects a transitional stage, where practical use coexists with partial understanding and cautious adaptation.

Discussion

English Teachers' Perceptions of Technology-based Assessment

The findings indicate that English teachers generally hold positive perceptions of technology-based assessment, particularly regarding its efficiency and practicality. Teachers consistently described digital tools as helpful in reducing workload, accelerating grading processes, and facilitating faster feedback delivery. This finding supports previous studies emphasizing that technology-based assessment enhances responsiveness and efficiency in educational evaluation [4], [26]. It also aligns with Luthfiyyah et al. [17], who found that Indonesian teachers perceived digital assessment tools as beneficial for simplifying classroom assessment processes and improving feedback timeliness.

However, the findings further reveal that teachers' perceptions remain predominantly instrumental rather than pedagogical. Technology is mainly valued for its functional benefits, such as automation and convenience, rather than for its potential to transform assessment design or promote deeper learning engagement. This finding

resonates with Neumann et al. [5], who argued that teachers often adopt educational technologies primarily to optimize existing practices instead of rethinking assessment approaches more critically. Similarly, Su et al. [8] noted that technological integration in assessment frequently prioritizes efficiency and scalability over reflective pedagogical alignment.

From the perspective of assessment literacy, this pattern suggests that teachers demonstrate strong operational familiarity with digital tools, yet their engagement does not fully encompass the broader dimensions of evaluative judgment and critical awareness described by Fulcher [9] (2012). As discussed by Ayuningtryas and Emaliana [12] and Okafor [10], technology-based assessment literacy requires not only technical competence but also the ability to critically evaluate how technologies shape assessment decisions and learning processes. Importantly, teachers' positive perceptions coexist with concerns regarding accuracy and bias, indicating an emerging awareness of the limitations of technology-based assessment. This reflects the concerns raised by Dai [19] and Feyijimi et al. [18], who highlighted that reliance on automated systems may create risks related to fairness and validity when technological outputs are accepted uncritically. The coexistence of optimism and caution in the present study suggests that teachers are currently navigating a transitional stage in which they recognize both the opportunities and limitations of technology-based assessment, although these considerations have not yet developed into a fully coherent evaluative framework.

Technologies and Assessment Practices Employed by English Teachers

The findings show that teachers employ a diverse range of digital tools, including Google Forms, ChatGPT, Grammarly, Quizizz, and Nearpod, to support assessment practices. These tools are primarily used for quiz administration, automated scoring, and feedback generation, indicating that technology-based assessment has become embedded within routine classroom activities. This finding supports previous research emphasizing the increasing normalization of digital assessment practices in ELT contexts [1], [21].

A particularly significant finding is the conceptual ambiguity between AI and non-AI technologies. Teachers frequently categorized both simple automated platforms, such as Google Forms, and more advanced generative tools, such as ChatGPT, under the same label of "AI." This finding reflects the concern raised in the Introduction that the boundaries between AI-driven and non-AI technologies are often blurred in classroom practice [14], [15], [16]. Rather than distinguishing technologies based on their underlying mechanisms, teachers appear to interpret them primarily through their observable functions, especially automation and efficiency.

This pattern suggests that teachers' engagement with technology remains largely operational and function-oriented. In this sense, the findings support the argument proposed by Biagini [11] and Julia and Isrokatun [13] that teachers' technological literacy often develops unevenly, where practical usage may advance more rapidly than conceptual understanding. Similarly, Ijiwade and Alonzo [20] argued that teachers frequently adopt digital tools pragmatically without fully understanding the broader

implications of the technologies they employ. Therefore, the present study extends previous research by demonstrating that conceptual ambiguity is not merely a definitional issue, but also a practical dimension of technology-based assessment literacy. Teachers are able to integrate technologies effectively into classroom assessment, yet they may lack a differentiated conceptual framework for evaluating the nature and implications of those technologies.

Teachers' Interpretation and Evaluation of the Role of Automated and AI-related Tools in Assessment

The findings reveal that teachers adopt a critical but cautious approach in interpreting and using technology-generated outputs. Rather than relying entirely on automated systems, most teachers reported using such outputs as references while maintaining their own evaluative judgment through manual checking and verification. This finding reflects ongoing concerns regarding teacher control and evaluative authority in technology-mediated assessment environments [6], [7].

The findings further suggest the persistence of a human-in-the-loop approach, where technology supports rather than replaces teacher decision-making. This aligns with Sarigoz [22], who emphasized that teacher agency remains essential in digitally mediated learning environments, particularly when assessment involves interpretive and contextual dimensions. Teachers in the present study acknowledged that aspects such as creativity, contextual appropriateness, and communicative nuance still require human intuition and professional judgment.

At the same time, the need for manual verification indicates that teachers perceive limitations in the reliability and contextual sensitivity of technological outputs. This finding corresponds with the arguments of Neumann et al. and Su et al., who noted that automated systems may struggle to capture complex dimensions of student performance, particularly in language-related tasks that require interpretive evaluation [5], [8]. Although teachers demonstrate critical awareness by questioning and verifying technological outputs, their evaluative strategies remain largely experience-based and informal rather than systematically grounded in explicit assessment principles. This suggests that teachers are developing adaptive responses to technology-based assessment, yet their critical literacy remains emergent rather than fully established.

Challenges and Strategies for Ensuring Fairness and Validity

Teachers identified several challenges in technology-based assessment, particularly regarding accuracy, bias, and limited understanding of how digital technologies function. These findings support earlier concerns raised by Dai and Feyijimi et al., who argued that automated assessment systems may introduce issues of reliability, transparency, and fairness if used without sufficient critical oversight [18], [19]. To address these concerns, teachers employed several strategies, including manually verifying results, comparing outputs across multiple tools, and using technology selectively rather than exclusively. These practices demonstrate that teachers do not passively accept technological outputs, but actively negotiate and adapt their use in response to perceived limitations. This finding aligns with Ijiwade and Alonzo, who

emphasized that teachers often develop practical coping strategies when integrating unfamiliar technologies into classroom assessment [20].

Nevertheless, the findings indicate that these strategies remain largely informal and unsystematic. Teachers appear to rely heavily on personal judgment and practical experience rather than structured evaluative frameworks. This reinforces the argument proposed by Fulcher that assessment literacy involves not only technical ability, but also principled understanding of validity, fairness, and ethical evaluation [9]. Taken together, the findings suggest that teachers' engagement with technology-based assessment is characterized by strong operational use, instrumental perceptions centered on efficiency, conceptual ambiguity regarding technological categories, sustained reliance on human judgment, and emerging but incomplete critical awareness. This configuration reflects an uneven development of technology-based assessment literacy, where practical competence develops more rapidly than conceptual and evaluative understanding.

Implications for Teacher Development and Technology-based Assessment Practice

The findings of this study highlight the need to reconceptualize professional development in technology-mediated assessment contexts. While teachers demonstrate considerable operational familiarity with digital tools, their engagement remains largely functional and efficiency-oriented. This suggests that professional development initiatives should extend beyond technical training and focus more explicitly on fostering comprehensive technology-based assessment literacy, including conceptual understanding, evaluative judgment, and ethical awareness.

The study also underscores the importance of supporting teachers in developing more systematic approaches to evaluating technological outputs. Although participants demonstrated critical awareness by manually verifying results and selectively using automated feedback, these practices were primarily informal and experience-based. Strengthening teachers' capacity to critically assess issues related to validity, fairness, transparency, and bias is therefore essential for ensuring more responsible and pedagogically sound uses of technology in assessment.

In addition, the persistence of human-in-the-loop practices suggests that teachers continue to play a central role in maintaining evaluative quality and contextual sensitivity. Rather than positioning technology as a substitute for teacher judgment, educational policies and institutional practices should reinforce the role of teachers as active evaluators who interpret, adapt, and contextualize technological outputs within classroom realities. Finally, the conceptual ambiguity observed in teachers' understanding of AI and non-AI technologies points to the need for clearer conceptual frameworks and shared terminology in discussions of educational technology. Developing a more differentiated understanding of technological categories may help teachers engage with digital assessment tools more critically, enabling more informed decisions regarding their appropriate use and limitations.

CONCLUSION

Fundamental Finding : The findings demonstrate that teachers have actively adopted a range of digital tools and integrated them into their assessment practices, primarily to enhance efficiency and manage workload. However, this engagement is largely characterized by an operational orientation, where technology is valued for its functional benefits rather than its potential to transform assessment design or pedagogy. A key insight emerging from this study is the conceptual ambiguity surrounding different types of technologies. Teachers frequently use the term “AI” to refer to a broad range of tools, including both simple automated platforms and more advanced systems. This suggests that while teachers are proficient in using technology, their conceptual understanding of its underlying distinctions remains limited. At the same time, teachers consistently maintain control over assessment decisions through a human-in-the-loop approach, using technology-generated outputs as support rather than replacement. However, the coexistence of reliance on technology and concerns about its accuracy and fairness reveals an ongoing tension between efficiency and validity in assessment practices. Altogether, these findings suggest that technology-based assessment literacy is unevenly developed across its dimensions. While teachers demonstrate strong operational competence, their conceptual understanding and critical evaluation of technology are still evolving. **Implication :** This has important implications for professional development, which should move beyond tool-oriented training toward fostering deeper conceptual, evaluative, and ethical engagement with technology. **Limitation :** Such ambiguity reflects an early stage of technology-based assessment literacy, where practical use precedes deeper conceptual clarity. **Future Research :** Future research may build on this study by involving larger and more diverse samples, as well as incorporating classroom observations or interviews to further examine how technology-based assessment is enacted in practice. Such efforts can contribute to a more comprehensive understanding of how teachers navigate the complexities of assessment in increasingly technology-mediated educational environments.

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