



Rethinking Language Assessment In The Digital Age: From Measurement To Meaning Through Assessment Of, For, And As Learning

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Abstract

The rapid advancement of digital technologies has transformed language assessment through online testing, automated scoring, and AI-based feedback. However, existing literature overwhelmingly prioritizes technical efficiency and measurement accuracy, leaving a critical research gap regarding the underlying pedagogical and philosophical purposes of digital evaluation. To address this, this study focuses on re-evaluating the conceptual foundations of digital language assessment through the tripartite framework of Assessment of Learning (AoL), Assessment for Learning (AfL), and Assessment as Learning (AaL). The objective of this paper is to examine how digitalization reshapes the aims of assessment and address the central problem of whether digital environments privilege certain assessment functions over others. Grounded in contemporary assessment theory (AoL, AfL, AaL), this qualitative conceptual review argues that current digital practices heavily privilege AoL (focusing on standardization and accountability), while reducing AfL to procedural feedback and largely marginalizing AaL, which requires metacognitive reflection and learner agency. The study concludes that without a clear philosophical orientation, technology-driven evaluation risks reducing education to mere automated measurement. Crucially, this paper offers a theoretical contribution by bridging technological innovation with assessment philosophy, providing a framework to align digital language assessment with holistic learner development and educational equity.

Keywords: Digital Assessment; Language Assessment; Philosophical purpose of assessment.

Abstrak

Pesatnya perkembangan teknologi digital telah mentransformasi evaluasi bahasa melalui tes daring, penskoran otomatis, dan umpan balik berbasis kecerdasan buatan (Artificial Intelligence/AI). Namun, kajian yang ada masih didominasi oleh fokus pada efisiensi teknis dan akurasi pengukuran, sehingga menyisakan kesenjangan penelitian terkait tujuan pedagogis dan landasan filosofis yang mendasari evaluasi digital. Untuk mengatasi kesenjangan tersebut, penelitian ini berfokus pada peninjauan kembali landasan konseptual evaluasi bahasa digital melalui kerangka tripartit Assessment of Learning (AoL), Assessment for Learning (AfL), dan Assessment as Learning (AaL). Artikel ini bertujuan untuk mengkaji bagaimana digitalisasi mengubah tujuan evaluasi serta menjawab permasalahan utama mengenai apakah lingkungan digital lebih mengutamakan fungsi evaluasi tertentu dibandingkan fungsi lainnya. Berlandaskan teori evaluasi kontemporer (AoL, AfL, dan AaL), penelitian ini menggunakan pendekatan kajian konseptual kualitatif. Hasil kajian menunjukkan bahwa praktik evaluasi digital saat ini cenderung lebih mengutamakan Assessment of Learning (AoL) yang berorientasi pada standardisasi dan akuntabilitas, sementara

Assessment for Learning (AFL) direduksi menjadi sekadar mekanisme pemberian umpan balik, dan Assessment as Learning (AaL) yang menekankan refleksi metakognitif serta kemandirian belajar peserta didik masih terpinggirkan. Penelitian ini menyimpulkan bahwa tanpa orientasi filosofis yang jelas, evaluasi berbasis teknologi berisiko mereduksi proses pendidikan menjadi sekadar pengukuran otomatis. Kontribusi teoretis utama artikel ini adalah menjembatani inovasi teknologi dengan filsafat evaluasi melalui penyediaan kerangka konseptual yang dapat menyelaraskan evaluasi bahasa digital dengan pengembangan peserta didik secara holistik serta prinsip keadilan pendidikan.

Kata Kunci: Penilaian Digital; Penilaian Bahasa; Tujuan Filosofis Penilaian.

INTRODUCTION

The rapid advanced of digital technologies and artificial intelligence (AI) has significantly transformed contemporary language assessment practices. Digital assessment tools, including online testing platforms, automated scoring systems, learning analytics, and AI-assisted feedback applications, are increasingly integrated into language education to support assessment processes and enhance efficiency. Recent studies indicate that AI technologies are now widely employed for test administration, automated scoring, item generation, and feedback provision, reflecting the growing digitalization of language assessment practices.¹ This transformation has enabled assessment processes to be conducted more efficiently through rapid scoring, automated evaluation, and timely feedback mechanisms that support both instructors and learners.² The increasing adoption of digital assessment technologies reflects a broader shift toward data-driven and technology-mediated approaches to evaluating learner performance.³ Consequently, digitalization has become a defining characteristic of contemporary language assessment, influencing not only how assessment is conducted but also how evidence of learning is generated, analyzed, and interpreted.

¹ Stefan O'Grady, Nazlinur Gokturk, and Olena Rossi, "Artificial Intelligence in Language Assessment Research: A Scoping Review," *Research Synthesis in Applied Linguistics* 2, no. 1 (January 2026): 103–39, <https://doi.org/10.1080/29984475.2026.2633389>.

² Rujun Gao et al., "Automatic Assessment of Text-Based Responses in Post-Secondary Education: A Systematic Review," *Computers and Education: Artificial Intelligence* 6 (June 2024): 100206, <https://doi.org/10.1016/j.caeai.2024.100206>; Wei Dai et al., "Assessing the Proficiency of Large Language Models in Automatic Feedback Generation: An Evaluation Study," *Computers and Education: Artificial Intelligence* 7 (December 2024): 100299, <https://doi.org/10.1016/j.caeai.2024.100299>.

³ Emrah Emirtekin, "Large Language Model-Powered Automated Assessment: A Systematic Review," *Applied Sciences* 15, no. 10 (January 2025): 5683, <https://doi.org/10.3390/app15105683>.

Existing scholarship on digital language assessment has largely concentrated on the technical and operational dimensions of assessment systems. Recent studies have examined the use of artificial intelligence for automated scoring, item generation, feedback provision, and assessment administration, highlighting the potential of digital technologies to improve efficiency, scalability, and measurement processes.⁴ In addition, systematic reviews of automated assessment systems have emphasized issues such as system performance, assessment accuracy, grading automation, and the application of natural language processing techniques in evaluating learner responses.⁵ These studies have made important contributions to the development of digital assessment by demonstrating how technological innovations can streamline assessment procedures, reduce administrative burdens, and provide rapid feedback to learners. As a result, discussions of digital language assessment are frequently framed around questions of effectiveness, accuracy, and technological performance. Consequently, digital language assessment is often understood primarily as a tool for measurement and evaluation rather than as a pedagogical practice with broader educational purposes.

Despite these valuable contributions, relatively little attention has been paid to the educational and philosophical purposes underlying digital language assessment. Existing studies have primarily focused on improving assessment efficiency, scoring accuracy, automation, and technological performance, while offering limited discussion of how digitalization may reshape the fundamental aims of assessment itself.⁶ Assessment is not merely a mechanism for measuring learning outcomes; rather, it serves multiple purposes related to supporting learning, informing instruction, and fostering learner development.⁷ As Black and Wiliam argue, the significance of assessment lies not only in its capacity to evaluate

⁴ O'Grady, Gokturk, and Rossi, "Artificial Intelligence in Language Assessment Research."

⁵ Gao et al., "Automatic Assessment of Text-Based Responses in Post-Secondary Education."

⁶ O'Grady, Gokturk, and Rossi, "Artificial Intelligence in Language Assessment Research"; Gao et al., "Automatic Assessment of Text-Based Responses in Post-Secondary Education."

⁷ Dylan Wiliam and Paul Black, "The Formative Purpose: Assessment Must First Promote Learning - BLACK - 2004 - Yearbook of the National Society for the Study of Education - Wiley Online Library," accessed June 25, 2026, <https://onlinelibrary.wiley.com/doi/10.1111/j.1744-7984.2004.tb00047.x>.

achievement but also in its potential to promote learning through meaningful feedback and instructional adaptation.⁸ Consequently, an exclusive emphasis on technological effectiveness risks reducing assessment to a process of measurement, overlooking its broader pedagogical role in facilitating learning and learner engagement. This gap becomes increasingly important in the context of digital language assessment, where technological innovation continues to outpace discussions concerning the purposes and meanings of assessment practices.

Contemporary assessment theory recognizes that assessment serves multiple educational purposes beyond the measurement of learning outcomes. A widely accepted framework conceptualizes assessment through three interconnected perspectives: assessment of learning (AoL), assessment for learning (AfL), and assessment as learning (AaL).⁹ Assessment of learning primarily focuses on evaluating and certifying students' achievement for purposes such as grading, accountability, and reporting.¹⁰ In contrast, assessment for learning emphasizes the use of assessment evidence to support ongoing learning through feedback, instructional adjustment, and continuous monitoring of learner progress. Conversely, the conceptual framework of assessment for learning transcends conventional evaluative practices by prioritizing the continuous application of diagnostic and formative data as a dynamic mechanism to optimize educational trajectories. Within this pedagogical model, assessment evidence serves not as a final judgment, but as a critical catalyst for academic growth; it actively drives the instructional cycle through the delivery of high-impact, constructive feedback, enables educators to implement responsive modifications to their teaching methodologies, and establishes a system of continuous, methodical monitoring to accurately gauge and support each learner's developmental pathway.¹¹

⁸ Wiliam and Paul Black.

⁹ Lonneke H. Schellekens et al., "A Scoping Review on the Notions of Assessment as Learning (AaL), Assessment for Learning (AfL), and Assessment of Learning (AoL)," *Studies in Educational Evaluation* 71 (December 2021): 101094, <https://doi.org/10.1016/j.stueduc.2021.101094>.

¹⁰ Schellekens et al.

¹¹ Rebecca Morris, Thomas Perry, and Lindsey Wardle, "Formative Assessment and Feedback for Learning in Higher Education: A Systematic Review," *Review of Education* 9, no. 3 (2021): e3292, <https://doi.org/10.1002/rev3.3292>.

Furthermore, the discourse surrounding contemporary educational evaluation is significantly enriched by the paradigm of assessment as learning, which expands this established perspective by explicitly recalibrating the role of the learner into that of a central, active agent within the evaluative process. By embedding mechanisms for continuous self-assessment and deep critical reflection, this pedagogical approach actively facilitates the development of metacognitive regulation strategies among students, which ultimately allows them to internalize learning objectives, monitor their own intellectual progress, and autonomously drive their future educational trajectory.¹² When synthesized, these diverse theoretical perspectives collectively demonstrate that contemporary assessment frameworks must transcend the traditional, reductionist view of evaluation as a mere mechanism for measuring terminal outcomes. Instead, assessment ought to be re-conceptualized as a dynamic pedagogical practice that actively facilitates cognitive growth, fosters robust learner agency by empowering students to take ownership of their academic trajectories, and serves as a vital catalyst for systemic educational development and institutional progress.¹³

Although the concepts of assessment of learning, assessment for learning, and assessment as learning have been widely discussed in contemporary assessment literature, limited attention has been given to how these purposes are represented and negotiated within digital language assessment environments.¹⁴ Existing research on digital assessment has predominantly emphasized issues of efficiency, automation, validity, reliability, and technological performance, with comparatively less focus on the educational purposes that such technologies may reinforce or constrain.¹⁵ As digital technologies increasingly mediate assessment

¹² Schellekens et al., "A Scoping Review on the Notions of Assessment as Learning (AaL), Assessment for Learning (Afl), and Assessment of Learning (AoL)"; Stephen Rutherford, Connie Pritchard, and Nigel Francis, "Assessment IS Learning: Developing a Student-centred Approach for Assessment in Higher Education," *FEBS Open Bio* 15, no. 1 (November 2024): 21–34, <https://doi.org/10.1002/2211-5463.13921>.

¹³ Schellekens et al., "A Scoping Review on the Notions of Assessment as Learning (AaL), Assessment for Learning (Afl), and Assessment of Learning (AoL)"; Morris, Perry, and Wardle, "Formative Assessment and Feedback for Learning in Higher Education"; Rutherford, Pritchard, and Francis, "Assessment IS Learning."

¹⁴ Schellekens et al., "A Scoping Review on the Notions of Assessment as Learning (AaL), Assessment for Learning (Afl), and Assessment of Learning (AoL)."

¹⁵ O'Grady, Gokturk, and Rossi, "Artificial Intelligence in Language Assessment Research"; Gao et al., "Automatic Assessment of Text-Based Responses in Post-Secondary Education."

processes, important questions emerge regarding whether these systems equally support all assessment purposes or inadvertently privilege particular functions of assessment. For instance, digital assessment technologies may effectively facilitate assessment of learning through standardized testing, automated scoring, and large-scale measurement, while their capacity to promote learner reflection, self-regulation, and meaningful engagement remains less clearly understood.¹⁶ This imbalance highlights the need for a more critical examination of how digitalization reshapes the purposes of language assessment and the implications that arise from this transformation.

In response to these concerns, this paper critically examines how digitalization reshapes the purposes of language assessment through the framework of assessment of learning (AoL), assessment for learning (AfL), and assessment as learning (AaL). Specifically, this paper seeks to examine which assessment purposes are emphasized or marginalized in digital language assessment practices and to consider the philosophical implications arising from this shift. By addressing these issues, the study contributes to ongoing discussions on digital language assessment and highlights the importance of aligning technological innovation with broader educational purposes, learner development, and meaningful learning experiences.

RESEARCH METHOD

In terms of methodological framework, this study employed a qualitative, conceptual literature review specifically designed to critically examine and deconstruct the multifaceted ways in which accelerated digitalization reshapes and redefines the fundamental purposes of language assessment within contemporary educational contexts. Diverging from traditional empirical studies, a qualitative conceptual literature review prioritizes the rigorous analysis, systematic synthesis, and critical interpretation of existing bodies of knowledge; this approach is intentionally leveraged to cultivate a more profound, nuanced theoretical

¹⁶ O'Grady, Gokturk, and Rossi, "Artificial Intelligence in Language Assessment Research"; Schellekens et al., "A Scoping Review on the Notions of Assessment as Learning (AaL), Assessment for Learning (AfL), and Assessment of Learning (AoL)."

understanding of the phenomenon under investigation rather than focusing on the generation or quantification of novel empirical data.¹⁷ Accordingly, this investigation engaged in a comprehensive review and systematic integration of the relevant theoretical paradigms and empirical literature surrounding digital language assessment, explicitly intersecting these insights with the tripartite frameworks of assessment of learning (AoL), assessment for learning (AfL), and assessment as learning (AaL). This particular qualitative trajectory was deemed highly appropriate and epistemologically sound because the primary objective of this study was to critically explore the overarching philosophical foundations, underlying pedagogical assumptions, and broader educational implications inherent in digital assessment practices, rather than attempting to quantify specific localized outcomes or test definitive causal relationships.¹⁸

To establish a robust theoretical foundation, the primary data source for this study drew upon a diverse array of academic literature specializing in language testing, technological integration in assessment, artificial intelligence applications, and evolving educational evaluation theories. The dataset uniquely integrated peer-reviewed research papers, systematic literature reviews, conceptual treatises, and scholarly books detailing the socio-pedagogical objectives and ramifications of assessment practices. Adhering to the rigorous methodologies intrinsic to conceptual literature analysis, this study bypassed traditional, passive summarization techniques. Instead, the gathered literature served as a dynamic analytical tool to cross-examine and synthesize the nuanced dimensions of assessment of learning (AoL), assessment for learning (AfL), and assessment as learning (AaL), thereby offering an integrated conceptual blueprint of contemporary educational evaluation.¹⁹ To guarantee the contemporary relevance, topicality, and analytical rigor of the synthesized findings, a stringent temporal filter was applied,

¹⁷ Hannah Snyder, "Literature Review as a Research Methodology: An Overview and Guidelines," *Journal of Business Research* 104 (November 2019): 333–39, <https://doi.org/10.1016/j.jbusres.2019.07.039>; Snyder.

¹⁸ Elina Jaakkola, "Designing Conceptual Articles: Four Approaches," *AMS Review* 10, no. 1 (June 2020): 18–26, <https://doi.org/10.1007/s13162-020-00161-0>.

¹⁹ Felix Schreiber and Colin Cramer, "Towards a Conceptual Systematic Review: Proposing a Methodological Framework," *Educational Review* 76, no. 6 (September 2024): 1458–79, <https://doi.org/10.1080/00131911.2022.2116561>.

whereby explicit priority was accorded to scholarly literature published within the preceding decade. Concurrently, historically significant seminal works and foundational treatises were integrated into the dataset on a highly selective basis, a deliberate strategy deployed to establish a robust, well-anchored theoretical infrastructure and provide indispensable historical-conceptual context where necessary.

Identification of the relevant theoretical and empirical literature was systematically executed through comprehensive electronic searches across prominent, internationally recognized academic databases, specifically Scopus, the Education Resources Information Center (ERIC), and Google Scholar. This data retrieval architecture utilized a strategic combination of targeted keywords and Boolean strings, including but not limited to 'digital language assessment,' 'online assessment,' 'artificial intelligence in assessment,' 'assessment of learning (AoL),' 'assessment for learning (AfL),' and 'assessment as learning (AaL).' Following this initial retrieval phase, the compiled publications underwent a rigorous multi-stage screening process designed to carefully evaluate their thematic alignment with the study's core investigative focus on the evolving purposes and systemic implications of digitized language evaluation. In guaranteeing the overall quality and contemporary relevance of the analysis, explicit preference was accorded to high-impact, peer-reviewed publications disseminated within the preceding decade that offered substantive theoretical frameworks, innovative conceptual models, or robust empirical insights into assessment practices within digitized educational ecosystems. Upon the successful completion of this rigorous screening and selection protocol, a definitive corpus of 32 comprehensive publications was retained for subsequent in-depth qualitative synthesis and analysis.

The selected literature was analyzed using thematic analysis to identify recurring patterns and themes related to the purposes of language assessment in digital environments. The analysis began by reviewing and categorizing the selected studies according to the three assessment purposes: assessment of learning (AoL), assessment for learning (AfL), and assessment as learning (AaL).²⁰ Following the

²⁰ Aqil Othman, Kamisah Osman, and Norasmah Othman, "Assessment Value: A Systematic Literature Review on Assessment As, For and of Learning in School," *International Journal of*

initial compilation phase, the selected literature was rigorously examined to delineate the precise mechanisms through which emerging digital technologies shape, scaffold, or fundamentally challenge each core assessment purpose. Emerging themes and recurring conceptual patterns derived from this corpus were subsequently synthesized and critically interpreted, an analytical step undertaken to systematically explore the extent to which digitized language assessment practices either accentuate or systematically marginalize particular evaluative objectives. Through this iterative interpretive process, the investigation ultimately sought to uncover and articulate the broader philosophical and ontological implications that accelerated digitalization holds for the landscape of contemporary language assessment.²¹

RESULT AND DISCUSSION

The Purposes of Language Assessment in the Digital Age

In the digital age, language assessment has experienced a profound transformation driven by the rapid integration of artificial intelligence (AI) and digital technologies into educational practices. Traditional assessment models, which were largely paper-based and outcome-oriented, are increasingly being replaced or supplemented by digital assessment systems that enable more flexible, interactive, and continuous evaluation of learners' language abilities. This shift reflects not only a technological change but also a reconceptualization of assessment as an ongoing process embedded within learning activities rather than a separate, final measurement event. Recent studies highlight that AI-driven and technology-enhanced assessment tools, such as automated scoring systems and digital feedback platforms, have expanded the possibilities of language evaluation by providing real-time, scalable, and data-informed insights into learner performance.²² In addition,

Academic Research in Progressive Education and Development 13, no. 1 (February 2024), <https://ijarped.com/index.php/journal/article/view/627>.

²¹ Lorelli S. Nowell et al., "Thematic Analysis: Striving to Meet the Trustworthiness Criteria," *International Journal of Qualitative Methods* 16, no. 1 (December 2017): 1609406917733847, <https://doi.org/10.1177/1609406917733847>.

²² Ping-Lin Chuang and Xun Yan, "Language Assessment in the Era of Generative Artificial Intelligence: Opportunities, Challenges, and Future Directions," *System* 134 (November 2025): 103846, <https://doi.org/10.1016/j.system.2025.103846>.

AI-mediated formative assessment has been shown to enhance feedback immediacy and instructional decision-making, although challenges remain regarding validity, teacher interpretive skills, and ethical concerns such as bias and data privacy.²³ Moreover, generative AI and large language model (LLM)-based systems are increasingly being explored as tools to support feedback generation and formative assessment practices, offering scalable, adaptive, and personalized learning support while still requiring careful pedagogical integration to avoid over-reliance on automation.²⁴ Overall, these developments suggest that language assessment in the digital era is no longer limited to evaluating learning outcomes, but is increasingly becoming an integrated, technology-enhanced process that actively contributes to learning itself.

The purposes of language assessment in the digital age have shifted significantly from static measurement toward dynamic, data-driven, and continuous evaluation processes. In traditional assessment frameworks, the primary goal of testing was to measure learners' language proficiency at a specific point in time, often for summative purposes such as grading, certification, or accountability. However, with the integration of digital technologies, assessment is increasingly conceptualized as an ongoing process that generates continuous streams of learner data, enabling more responsive and adaptive educational decision-making. Digital assessment systems, particularly those supported by learning analytics and artificial intelligence, allow educators to track learner performance in real time and identify patterns that were previously difficult to capture in conventional testing environments.²⁵ This shift reflects a broader movement toward "datafication" in education, where learning processes are translated into quantifiable data that can be analyzed to inform instruction and assessment practices.²⁶ As a result, the

²³ Zeli Utari, Zulfani Sesmiarni, and Widya Syafitri, "AI-Mediated Digital Formative Assessment, EFL Writing: Validity, Teacher Digital Literacy, Ethical Implications.," *Journal of English Language and Education* 11, no. 1 (January 2026): 1–10, <https://doi.org/10.31004/jele.v11i1.1775>.

²⁴ Sapolnach Prompiengchai, Charith Narreddy, and Steve Joordens, "A Practical Guide for Supporting Formative Assessment and Feedback Using Generative AI," arXiv:2505.23405, preprint, arXiv, June 2, 2025, <https://doi.org/10.48550/arXiv.2505.23405>.

²⁵ Ben Williamson, Sian Bayne, and Suellen Shay, "The Datafication of Teaching in Higher Education: Critical Issues and Perspectives," *Teaching in Higher Education* 25, no. 4 (May 2020): 351–65, <https://doi.org/10.1080/13562517.2020.1748811>.

²⁶ Jeremy Knox, Ben Williamson, and Sian Bayne, "Machine Behaviourism: Future Visions of 'Learnification' and 'Datafication' across Humans and Digital Technologies," *Learning, Media and*

purpose of language assessment is no longer limited to evaluating what learners know at a single moment, but also extends to monitoring how learning develops over time and how instructional interventions can be adjusted accordingly.²⁷ Nevertheless, this transformation also raises critical questions about the extent to which assessment purposes are being reshaped by technological capabilities rather than pedagogical priorities.

Beyond its traditional role in measuring learning outcomes, language assessment in the digital age has expanded to encompass a broader range of pedagogical functions, particularly in supporting formative learning processes. Digital assessment environments increasingly integrate Assessment for Learning (AfL) principles through mechanisms such as immediate feedback, automated scoring, and continuous performance monitoring. These features allow learners to receive timely input on their language use, which can enhance awareness of strengths and weaknesses and guide subsequent learning actions. In addition, learning analytics and AI-powered systems enable more personalized assessment experiences by adapting task difficulty and feedback based on learner performance patterns.²⁸ Such adaptive assessment systems contribute to more individualized learning pathways, aligning assessment more closely with learner needs rather than standardized expectations. Furthermore, recent research highlights that AI-supported formative assessment can improve the quality and frequency of feedback provided to learners, while also assisting teachers in making more informed instructional decisions.²⁹ This indicates that assessment is increasingly functioning not only as a tool for evaluation but also as an active component of the learning process itself. However, despite these advancements, the extent to which such technologies truly empower learners remains dependent on how they are pedagogically implemented within educational contexts.³⁰

Technology 45, no. 1 (January 2020): 31–45, <https://doi.org/10.1080/17439884.2019.1623251>.

²⁷ Angxuan Chen et al., “A Systematic Review and Meta-Analysis of AI-Enabled Assessment in Language Learning: Design, Implementation, and Effectiveness,” *Journal of Computer Assisted Learning* 41, no. 1 (2025): e13064, <https://doi.org/10.1111/jcal.13064>.

²⁸ Angxuan Chen et al., “A Systematic Review and Meta-Analysis of AI-Enabled Assessment in Language Learning: Design, Implementation, and Effectiveness,” *Journal of Computer Assisted Learning* 41, no. 1 (2025): e13064, <https://doi.org/10.1111/jcal.13064>.

²⁹ Utari, Sesmiarni, and Syafitri, “AI-Mediated Digital Formative Assessment, EFL Writing.”

³⁰ Chai Dong and Fenyan Zhang, “Book Review: Machine Learning and Human Intelligence: The

Despite the numerous advancements brought by digital technologies in language assessment, several critical tensions emerge regarding its pedagogical implications. One major concern is the growing dominance of measurement-oriented approaches, where assessment is increasingly driven by the logic of efficiency, scalability, and data processing rather than deep pedagogical understanding. While AI-powered systems and learning analytics provide valuable insights into learner performance, they may also reduce complex language abilities into simplified numerical representations, potentially overlooking contextual and communicative dimensions of language use. This phenomenon reflects the broader issue of “datafication” in education, where learning is increasingly translated into quantifiable metrics that may not fully capture its richness and complexity.³¹ Furthermore, the increasing reliance on automated scoring and algorithmic feedback raises questions about the diminishing role of teacher judgment in assessment practices, as human interpretation is gradually supplemented—or in some cases replaced—by machine-generated evaluation.³² Although such technologies enhance efficiency and consistency, they also risk marginalizing the nuanced, contextualized understanding that human assessors bring to language evaluation. In addition, concerns regarding fairness, transparency, and algorithmic bias remain significant, particularly in AI-driven assessment systems that rely on large datasets for decision-making processes.³³ Therefore, while digital language assessment offers considerable pedagogical potential, its implementation must be critically examined to ensure that technological advancement does not override educational values and learner-centered principles.

Overall, the developments in digital language assessment indicate a significant reconfiguration of assessment purposes, where traditional boundaries between assessment of learning, for learning, and as learning become increasingly blurred. While digital technologies have expanded the possibilities for continuous evaluation, real-time feedback, and adaptive learning, these advancements do not

Future of Education for the 21st Century,” *Policy Futures in Education* 21, no. 2 (February 2023): 239–40, <https://doi.org/10.1177/14782103221117655>.

³¹ Williamson, Bayne, and Shay, “The Datafication of Teaching in Higher Education.”

³² Knox, Williamson, and Bayne, “Machine Behaviourism.”

³³ Wayne Holmes, Maya Bialik, and Charles Fadel, *Artificial Intelligence in Education: Promises and Implications for Teaching and Learning* (Boston, MA: Center for Curriculum Redesign, 2019).

affect all assessment purposes equally. Instead, they tend to emphasize efficiency, scalability, and measurement-oriented functions, while more reflective and learner-centered purposes may receive less systematic attention. This suggests that language assessment in the digital era is inherently multifunctional but unevenly realized in practice, depending on the technological tools and pedagogical orientations employed. Therefore, it becomes essential to critically examine which purposes are amplified and which are diminished within digital assessment ecosystems. This leads to the next discussion, which explores in greater detail the extent to which different assessment purposes are emphasized or marginalized in contemporary digital language assessment practices.

Assessment of Learning in Digital Environments

Assessment of Learning (AoL) continues to be the most prominent purpose of language assessment in digital environments. Traditionally, AoL refers to assessment practices designed to evaluate learners' achievement. Although digital technologies have introduced new forms of assessment, but the systems remain strongly aligned with these summative objectives. Research has shown that digital assessment platforms are widely used to measure learning outcomes, monitor academic performance, and provide evidence of achievement in educational institutions.³⁴ In language education, online tests, computer-based examinations, and digital proficiency assessments have become increasingly common, enabling educators and institutions to assess learners more efficiently while maintaining standardized evaluation procedures.³⁵ Consequently, rather than replacing traditional assessment purposes, digital technologies have largely strengthened the measurement-oriented functions of assessment, reinforcing the central role of AoL within contemporary language assessment practices.³⁶

³⁴ Dian Susyla and Sinarman Jaya, "Digital Assessment in English Language Teaching (ELT): A Systematic Literature Review," *Edu-Ling: Journal of English Education and Linguistics* 7, no. 1 (December 2023): 135–56, <https://doi.org/10.32663/edu-ling.v7i1.4246>.

³⁵ Liqaa Habeb Al-Obaydi, Marcel Pikhart, and Ragad M. Tawafak, "Online Assessment in Language Teaching Environment through Essays, Oral Discussion, and Multiple-Choice Questions," *Computer-Assisted Language Learning Electronic Journal* 24, no. 2 (October 2023), <https://callej.org/index.php/journal/article/view/7>.

³⁶ Suryanti Suryanti, Vann Sok, and Sokha Dara, "Innovative Approaches to Assessing Language Proficiency in Digital Learning Environments," *Journal International of Lingua and*

The dominance of Assessment of Learning in digital environments is further reinforced through the widespread adoption of online testing and computer-based assessment systems. Unlike traditional paper-based examinations, digital assessment platforms enable institutions to administer assessments on a larger scale while ensuring greater efficiency and consistency in scoring and test administration. This capability is particularly evident in language proficiency assessments, where computer-based tests facilitate the standardized measurement of learners' language skills across diverse educational contexts.³⁷ Furthermore, digital platforms allow assessment results to be collected, processed, and reported more rapidly, supporting institutional needs for accountability and performance monitoring.³⁸ The scalability and standardization offered by digital assessment systems make them especially suitable for summative assessment purposes, as they provide comparable measures of learner achievement while reducing administrative burdens on educators and institutions. As a result, digital assessment technologies have become powerful instruments for strengthening the evaluative and certification functions traditionally associated with Assessment of Learning.³⁹

The dominance of Assessment of Learning is further strengthened by the integration of artificial intelligence (AI), automated scoring systems, and learning analytics into digital assessment practices. These technologies enable the rapid evaluation of learners' language performance, particularly in writing and speaking assessments, where large volumes of responses can be processed with greater speed and consistency than traditional human scoring methods. Automated essay scoring and AI-assisted feedback systems have become increasingly common in language education, providing institutions with efficient tools for assessing learner achievement at scale.⁴⁰ In addition, learning analytics allows assessment platforms

Technology 3, no. 3 (2024): 527–42, <https://doi.org/10.55849/jiltech.v3i3.731>.

³⁷ Al-Obaydi, Pikhart, and Tawafak, "Online Assessment in Language Teaching Environment through Essays, Oral Discussion, and Multiple-Choice Questions."

³⁸ Christine Redecker and Øystein Johannessen, "Changing Assessment — Towards a New Assessment Paradigm Using ICT," *European Journal of Education* 48, no. 1 (2013): 79–96, <https://doi.org/10.1111/ejed.12018>.

³⁹ Anžela Jurāne-Brēmane, "Digital Assessment in Technology-Enriched Education: Thematic Review," *Education Sciences* 13, no. 5 (May 2023): 522, <https://doi.org/10.3390/educsci13050522>.

⁴⁰ Masaki Uto, "A Review of Deep-Neural Automated Essay Scoring Models," *Behaviormetrika* 48, no. 2 (July 2021): 459–84, <https://doi.org/10.1007/s41237-021-00142-y>.

to collect and analyze extensive performance data, generating detailed reports that support grading, certification, and institutional accountability.⁴¹ Such capabilities align closely with the objectives of Assessment of Learning, as they prioritize the measurement and documentation of learning outcomes through quantifiable indicators. Consequently, AI-driven assessment technologies not only enhance the efficiency of summative evaluation but also reinforce the growing emphasis on data-based decision-making in contemporary language assessment practices.⁴²

Despite the significant benefits that digital technologies offer for assessment efficiency and scalability, the strong emphasis on Assessment of Learning may also narrow the broader educational purposes of language assessment. The widespread use of automated scoring, learning analytics, and data-driven evaluation systems encourages a focus on measurable outcomes and performance indicators, often privileging what can be easily quantified over more complex dimensions of language learning.⁴³ Recent reviews of AI in language assessment reveal that research and practice remain heavily concentrated on the automated evaluation of productive skills, particularly speaking and writing, reflecting a persistent orientation toward measurement and score generation rather than learner development.⁴⁴ Consequently, important aspects of language learning, such as intercultural competence, critical reflection, learner agency, and contextual language use, may receive less attention within digitally mediated assessment environments. While digital technologies undoubtedly strengthen the effectiveness of summative assessment, their dominance may contribute to an imbalance among assessment purposes. Therefore, although Assessment of Learning remains the most strongly supported function in digital language assessment, it is essential to examine whether other purposes, particularly those that directly support learning processes, receive comparable attention in contemporary educational practice.

⁴¹ Lucas Paulsen and Euan Lindsay, "Learning Analytics Dashboards Are Increasingly Becoming about Learning and Not Just Analytics - A Systematic Review," *Education and Information Technologies* 29, no. 11 (August 2024): 14279–308, <https://doi.org/10.1007/s10639-023-12401-4>.

⁴² O'Grady, Gokturk, and Rossi, "Artificial Intelligence in Language Assessment Research."

⁴³ Lixiang Yan et al., "Practical and Ethical Challenges of Large Language Models in Education: A Systematic Scoping Review," arXiv.Org, March 17, 2023, <https://doi.org/10.1111/bjet.13370>.

⁴⁴ O'Grady, Gokturk, and Rossi, "Artificial Intelligence in Language Assessment Research."

Assessment for Learning in Digital Environments

While Assessment of Learning remains the most dominant purpose in digital assessment environments, digital technologies have also created significant opportunities for Assessment for Learning (AfL). Unlike AoL, which focuses on evaluating learning outcomes, AfL is primarily concerned with supporting and improving learning during the instructional process through ongoing feedback and instructional adjustments. Digital assessment tools have expanded the implementation of AfL by enabling continuous monitoring of learner progress and facilitating more timely responses to learners' needs.⁴⁵ Through online learning platforms, educators can access real-time information about learner performance, allowing them to identify learning difficulties and provide targeted support before formal assessments take place.⁴⁶ Consequently, assessment in digital environments is increasingly positioned not only as a mechanism for measuring achievement but also as a means of enhancing learning and informing instructional decisions. This development reflects a gradual shift toward more formative and learner-supportive assessment practices within technology-enhanced language learning contexts.⁴⁷

One of the most significant contributions of digital technologies to Assessment for Learning is the provision of immediate and continuous feedback. Unlike traditional assessment practices, where learners may wait days or even weeks to receive evaluation results, digital platforms can provide feedback instantly after task completion. Such immediacy allows learners to identify errors, monitor their progress, and make timely adjustments to their learning strategies.⁴⁸ In language learning contexts, automated feedback tools, online quizzes, and digital learning platforms enable students to receive ongoing information about their performance, thereby supporting self-regulated learning and continuous improvement.⁴⁹

⁴⁵ Zi Yan et al., "Effects of Self-Assessment and Peer-Assessment Interventions on Academic Performance: A Meta-Analysis," *Educational Research Review* 37 (November 2022): 100484, <https://doi.org/10.1016/j.edurev.2022.100484>.

⁴⁶ Paulsen and Lindsay, "Learning Analytics Dashboards Are Increasingly Becoming about Learning and Not Just Analytics - A Systematic Review."

⁴⁷ Jurāne-Brēmane, "Digital Assessment in Technology-Enriched Education."

⁴⁸ Benedikt Wisniewski, Klaus Zierer, and John Hattie, "The Power of Feedback Revisited: A Meta-Analysis of Educational Feedback Research," *Frontiers in Psychology* 10 (January 2020), <https://doi.org/10.3389/fpsyg.2019.03087>.

⁴⁹ Mohammed Bashraheel and Gheorghita Ghinea, "How Does Leveraging Artificial Intelligence in Assessments Impact Student Outcomes? A Systematic Review," *Computer Science*

Furthermore, feedback generated through digital assessment systems can help teachers identify learning gaps more efficiently and adapt instruction accordingly. These features align closely with the core principles of Assessment for Learning, which emphasize the use of assessment information to guide future learning rather than merely evaluate past performance.⁵⁰

The integration of artificial intelligence (AI) has further expanded the formative potential of digital assessment by enabling adaptive assessment and personalized learning experiences. Unlike traditional assessment approaches that provide uniform tasks and feedback to all learners, AI-powered systems can analyze learner performance patterns and adjust assessment tasks according to individual needs and proficiency levels. This adaptive capability allows learners to receive more targeted support, thereby promoting deeper engagement and more effective learning progression.⁵¹ Furthermore, AI-assisted assessment systems can generate personalized feedback and learning recommendations, helping learners identify areas for improvement and develop appropriate learning strategies.⁵² Such features align closely with the principles of Assessment for Learning, as assessment information is continuously used to support learning and guide future performance rather than merely evaluate completed work. In language learning contexts, adaptive assessment tools have also been shown to facilitate personalized feedback and accommodate diverse learner profiles, making assessment more responsive to individual learning trajectories.⁵³ As a direct consequence of these technological interventions, the formative function of assessment has been profoundly enhanced and epistemologically shifted toward a more democratic pedagogical paradigm. The resulting creation of dynamic, learner-centric, and adaptive assessment

Review 61 (August 2026): 100929, <https://doi.org/10.1016/j.cosrev.2026.100929>.

⁵⁰ Jurâne-Brêmane, "Digital Assessment in Technology-Enriched Education."

⁵¹ Constantinos Halkiopoulos and Evgenia Gkintoni, "Leveraging AI in E-Learning: Personalized Learning and Adaptive Assessment through Cognitive Neuropsychology—A Systematic Analysis," *Electronics* 13, no. 18 (January 2024): 3762, <https://doi.org/10.3390/electronics13183762>.

⁵² K. Bayly-Castaneda, M. S. Ramirez-Montoya, and A. Morita-Alexander, "Crafting Personalized Learning Paths with AI for Lifelong Learning: A Systematic Literature Review," *Frontiers in Education* 9 (August 2024), <https://doi.org/10.3389/educ.2024.1424386>.

⁵³ Sri Supiah Cahyati, Kiran Iqbal, and Fatima Malik, "Adaptive Assessment Tools for Language Learners: A Review of Current Technologies," *Journal International of Lingua and Technology* 3, no. 3 (2024): 645–58, <https://doi.org/10.55849/jiltech.v3i3.781>.

environments ensures that evaluative practices are no longer merely retrospective exercises in grading, but rather forward-looking, transformative tools designed to optimize student engagement and academic progression.

Despite the growing potential of digital technologies to support Assessment for Learning, their implementation does not always fully realize formative assessment principles. Many digital assessment systems emphasize performance tracking, progress monitoring, and automated feedback, yet these functions are often designed to improve efficiency rather than foster meaningful learner engagement with feedback.⁵⁴ As a result, feedback may become a one-way transmission of information rather than a dialogic process that encourages reflection and active learning. Furthermore, although AI-powered assessment tools can provide personalized recommendations, the quality of formative support ultimately depends on how learners and teachers interpret and use the feedback within instructional contexts.⁵⁵ Recent research also suggests that many digital assessment applications continue to prioritize measurable performance indicators, thereby maintaining a strong orientation toward accountability and achievement outcomes.⁵⁶ Consequently, while digital technologies have expanded opportunities for Assessment for Learning, their contribution often remains secondary to the dominant measurement-oriented functions associated with Assessment of Learning. This imbalance highlights the need to examine another assessment purpose that places learners themselves at the center of the assessment process, namely Assessment as Learning.

Assessment as Learning in Digital Environments

Assessment as Learning (AaL) represents a learner-centered approach in which assessment functions as a process of self-monitoring, reflection, and metacognitive development. Unlike Assessment of Learning, which focuses on measuring achievement, and Assessment for Learning, which emphasizes feedback

⁵⁴ Jurâne-Brêmane, "Digital Assessment in Technology-Enriched Education."

⁵⁵ Mohammed Bashraheel and Gheorghita Ghinea, "How Does Leveraging Artificial Intelligence in Assessments Impact Student Outcomes? A Systematic Review," *Computer Science Review* 61 (August 2026): 100929, <https://doi.org/10.1016/j.cosrev.2026.100929>.

⁵⁶ O'Grady, Gokturk, and Rossi, "Artificial Intelligence in Language Assessment Research."

to improve performance, AaL positions learners as active agents who evaluate their own learning progress and make informed decisions about future learning strategies. In digital learning environments, various technologies have the potential to support AaL through tools such as e-portfolios, reflective journals, self-assessment checklists, and learning dashboards that provide learners with access to their own performance data.⁵⁷ These tools can encourage learners to engage in self-reflection, monitor their progress, and develop greater awareness of their strengths and weaknesses. Consequently, digital technologies create opportunities for assessment to become an integral part of learners' self-regulated learning processes rather than merely a mechanism for external evaluation.⁵⁸

Assessment as Learning, however, appears to receive considerably less attention in digital language assessment practices than either Assessment of Learning or Assessment for Learning. Much of the current development in digital assessment focuses on automated scoring, performance monitoring, learning analytics, and feedback systems, which primarily support measurement and instructional improvement rather than learner self-reflection and metacognitive growth.⁵⁹ Although digital tools such as e-portfolios and self-assessment platforms can facilitate learner agency, these applications remain less prominent in both research and practice. As a result, learners often assume the role of data recipients rather than active participants in the assessment process. This suggests that while digital technologies offer opportunities for Assessment as Learning, its implementation remains relatively limited, making it the most marginalized assessment purpose within contemporary digital language assessment environments.⁶⁰

⁵⁷ Ernesto Panadero, Heidi Andrade, and Susan Brookhart, "Fusing Self-Regulated Learning and Formative Assessment: A Roadmap of Where We Are, How We Got Here, and Where We Are Going," *The Australian Educational Researcher* 45, no. 1 (March 2018): 13–31, <https://doi.org/10.1007/s13384-018-0258-y>.

⁵⁸ Olga Viberg et al., "The Current Landscape of Learning Analytics in Higher Education," *Computers in Human Behavior* 89 (December 2018): 98–110, <https://doi.org/10.1016/j.chb.2018.07.027>.

⁵⁹ O'Grady, Gokturk, and Rossi, "Artificial Intelligence in Language Assessment Research."

⁶⁰ Panadero, Andrade, and Brookhart, "Fusing Self-Regulated Learning and Formative Assessment."

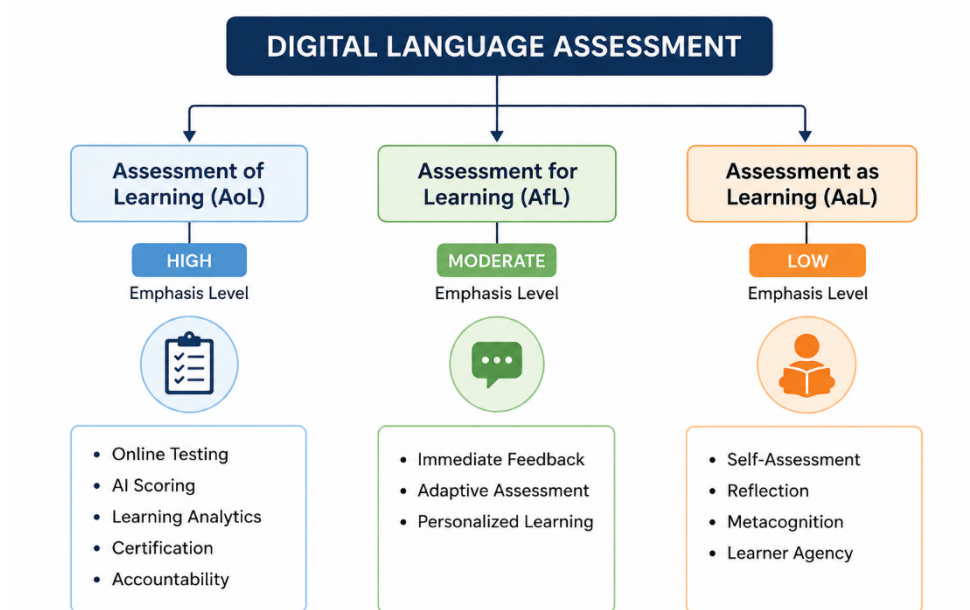


Figure 1. Conceptual Mapping of Assessment Purposes and Their Relative Emphasis in Digital Language Assessment

Philosophical Implications of Digital Language Assessment

The increasing integration of digital technologies into language assessment reflects not only a technological transformation but also a philosophical shift in how assessment is conceptualized and practiced. The findings of this review suggest that digital assessment environments tend to prioritize efficiency, standardization, and data-driven decision-making, resulting in a stronger emphasis on Assessment of Learning than on other assessment purposes. While such developments improve the scalability and accessibility of assessment, they also raise concerns about the growing dominance of measurement-oriented approaches. The widespread use of automated scoring systems, learning analytics, and AI-powered evaluation tools reflects a broader trend of datafication, in which complex learning processes are increasingly translated into quantifiable indicators.⁶¹ Consequently, language assessment risks becoming primarily a mechanism for generating performance data rather than a pedagogical process that supports meaningful learning and learner development.⁶²

⁶¹ Williamson, Bayne, and Shay, "The Datafication of Teaching in Higher Education."

⁶² O'Grady, Gokturk, and Rossi, "Artificial Intelligence in Language Assessment Research."

These findings highlight the importance of maintaining a balanced approach to language assessment in the digital age. Although digital technologies provide valuable opportunities for feedback, adaptive learning, and personalized assessment, their educational value ultimately depends on how they are integrated into pedagogical practices. Rather than viewing technology as a replacement for human judgment, educators should consider digital assessment tools as resources that complement and enhance teaching and learning processes. Greater attention should also be given to Assessment as Learning, which promotes learner agency, self-reflection, and metacognitive development but remains comparatively underrepresented in current digital assessment practices. Therefore, the future of digital language assessment should focus not only on improving technological efficiency but also on ensuring that assessment continues to serve broader educational goals that support meaningful learning, learner autonomy, and holistic language development.⁶³

CONCLUSION

This review has explored how the purposes of language assessment are being reshaped in the digital age through the integration of digital technologies and artificial intelligence. The analysis demonstrates that digital assessment has evolved beyond traditional paper-based practices into a technology-enhanced ecosystem that supports multiple assessment purposes. However, these purposes are not equally represented. Contemporary digital language assessment practices predominantly emphasize Assessment of Learning through online testing, automated scoring, and data-driven evaluation systems. Although digital technologies also provide valuable opportunities for Assessment for Learning through feedback mechanisms, adaptive assessment, and personalized learning support, these functions remain secondary to measurement-oriented objectives. Meanwhile, Assessment as Learning receives comparatively less attention, despite its potential to foster learner autonomy, self-reflection, and metacognitive development.

⁶³ Panadero, Andrade, and Brookhart, "Fusing Self-Regulated Learning and Formative Assessment."

This review is limited by its reliance on published literature and therefore may not fully capture emerging assessment practices that have yet to be extensively documented in academic research. In addition, the review primarily focuses on language assessment contexts and may not reflect developments in other educational disciplines. Future research should investigate how digital assessment can more effectively support learner agency and Assessment as Learning, particularly through the design of technologies that encourage reflection, self-regulation, and active learner participation. Ultimately, the future of digital language assessment should seek a balanced integration of Assessment of Learning, Assessment for Learning, and Assessment as Learning to ensure that technological innovation contributes not only to efficient evaluation but also to meaningful and holistic language learning.

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