

Technology-Enabled Assessment: Enhancing Formative Assessment in British Curriculum Schools in the UAE

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ABSTRACT

Assessment is vital as it support student learning and informing instructional practice. The increasing integration of digital technologies and artificial intelligence (AI) in education has created new opportunities to strengthen formative assessment in contemporary educational settings. This conceptual literature review examines the potential of technology-enabled assessment to enhance formative assessment practices in British curriculum schools situated in the United Arab Emirates (UAE). Guided by the Technological Pedagogical Content Knowledge (TPACK) framework, the study synthesizes contemporary research on learning analytics, AI-supported feedback, and digital assessment to assess their contributions to personalized learning, data-driven instructional decisions, and the enhancement of teacher effectiveness. The review also considers significant challenges, including ethical concerns, academic integrity, teacher autonomy, data privacy, and equitable access to technology. The findings suggest that the successful implementation of technology-enabled assessment necessitates a balance between technological advancements and sound pedagogical practices, human oversight, and continuous professional development. The paper concludes with practical recommendations for educators and school leaders seeking to integrate AI-enabled assessment in a manner that fosters meaningful learning while maintaining ethical and educational standards in British curriculum schools in the UAE.

Keywords: Technology-Enabled Assessment, Formative Assessment, Artificial Intelligence in Education, TPACK framework, British curriculum UAE

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1. Introduction

The rapid advancement of digital technologies has transformed how teaching, learning, and assessment practices worldwide. To enhance educational quality and improve learning outcomes, schools are increasingly integrating digital platforms, learning management systems, and artificial intelligence (AI) technology into classroom settings. Artificial intelligence (AI) is reshaping education by complementing traditional teaching methods with more innovative, personalized, and efficient approaches. Recent studies suggest that generative artificial intelligence could significantly improve teaching, learning, assessment, and educational administration.

Nonetheless, its deployment should be coupled with suitable ethical protections and human supervision (UNESCO, 2023). Because AI has the potential to foster personalized learning, replace repetitive tasks, and give data-informed insights into student performance, its increasing usage in education attracted significant attention from educators, researchers, and policymakers (Yerbabuena Torres et al., 2024). Recent studies suggest that large language models possess the capability to enhance personalized learning, formative feedback, assessment development, and teacher efficiency. However, challenges concerning accuracy,

bias, privacy, and over-reliance highlight the necessity of teacher expertise, critical evaluation, and human oversight to ensure their effective and ethical use in educational contexts (Kasneci et al., 2023).

Assessment is a fundamental component of the teaching and learning process, providing valuable information on students' development and guides instructional decision-making. Formative assessment, which seeks to foster learning by providing ongoing feedback rather than simply evaluating results, has received increasing attention in recent years. According to Black and Wiliam (1998), formative assessment is the technique of collecting and using evidence of student learning in order to tailor teaching and learning activities to fulfill the expectations of learners.

Their study demonstrated that formative assessment may greatly enhance student performance in a variety of age groups, subject areas, and learning environments. When formative assessment is used appropriately, teachers are able to identify learning gaps, give timely feedback, and alter lessons to promote students' development. Additionally, formative assessment has a strong relationship with effective teaching since its successful implementation includes adjustments in teacher perceptions and instructional practices. Formative assessment remains a key strategy for promoting meaningful learning and assisting with ongoing development as educational settings grow more and more technology-enabled (Black & Wiliam, 1998; Black & Wiliam, 2010).

Recent research has highlighted the close relationship between feedback literacy and self-assessment in higher education. Feedback literacy allows students to seek, understand, and apply feedback efficiently, thus supporting meaningful self-assessment practices. Through active engagement with feedback, both approaches support self-regulated and co-regulated learning. The authors proposed several pedagogical principles and feedback practices to strengthen feedback literacy and self-assessment. They emphasize the importance of external feedback, internal feedback development, and nurturing learning situations (Yan & Carless, 2021).

The advancement of feedback literacy is important for supporting students in making appropriate use of feedback to enhance their learning, since technology-enabled assessment rapidly offers possibilities for instant and personalized feedback. Technology-enabled assessment refers to the use of digital technologies, such as online tests, e-learning assessments, automated grading, and digital feedback systems, to design, deliver, manage, and evaluate assessment activities. Technology-enabled assessment encompasses the entire digital assessment process, including task delivery, result documentation, and supporting feedback, even if it tends to focus on operational efficiencies and administrative improvements (such as quicker grading or plagiarism detection). However, unless it is purposefully created to take use of technology's innovative benefits, its implementation often replicates traditional assessment practices without fundamentally transforming assessment design or pedagogy (Bearman et al., 2022).

One of the principal advantages of technology-enabled assessments is their ability to provide immediate, tailored, and practical feedback that enables educators to monitor student progress and make informed instructional decisions. Digital assessment tools facilitate instant feedback, enabling students to identify learning gaps and improve their understanding of the educational process. Additionally, learning analytics systems offer detailed insights into students' learning behaviors, allowing educators to identify those who may require additional support and intervention. Technology-driven assessments also promote peer and self-assessment, encouraging reflection, self-regulation, and the development of critical thinking skills. Furthermore, the integration of digital assessment tools with formative assessment principles

facilitates the delivery of scalable and personalized feedback tailored to the individual learning needs of students. Collectively, these features enhance the effectiveness of formative assessments and contribute to improved teaching and learning (Banihashem et al., 2025).

Artificial intelligence has further expanded the range of technology-enabled assessments, particularly in the enhancement of formative assessment methods. AI-driven applications facilitate the creation of automated, customized feedback, adaptive questioning, and scaffolding of student comprehension, while also supporting collaborative learning through peer interactions. Large Language Models (LLMs), such as ChatGPT, assist educators in developing student-friendly learning objectives, formulating diagnostic assessment queries, summarizing student responses, and providing adaptive feedback. Furthermore, LLMs specifically designed for educational purposes enhance the relevance, precision, and quality of assessment-related outputs, thereby promoting more effective and learner-centered formative assessment practices (Prompiengchai et al., 2025).

Despite the increasing adoption of AI-driven formative assessment, several challenges remain. Research has identified concerns regarding the accuracy and quality of feedback generated by AI, the ethical management of student data, the transparency of decision-making processes, and the potential for algorithmic bias (Prompiengchai et al., 2025). Furthermore, AI systems lack contextual awareness, professional judgment, and the pedagogical expertise required to effectively support complex educational decision-making. Consequently, human oversight and teachers' professional judgement remain essential to ensure that AI generated feedback is relevant, precise, and responsive to students' learning needs (Hopfenbeck et al., 2023).

The United Arab Emirates (UAE) has prioritized artificial intelligence and digital transformation within its national development objectives. The nation aims to prepare students for engagement in a knowledge-based and technology-driven economy through initiatives such as the UAE Artificial Intelligence Strategy 2031 and comprehensive educational innovation policies. As a result, schools are encouraged to incorporate digital technology into their instructional, learning, and evaluation processes. These advancements have enabled British curriculum schools to explore technology-enabled assessment tools, which enhance student learning, provide prompt feedback, and inform instructional decision-making. Consequently, understanding the role of technology-enabled assessment in the UAE educational context is increasingly significant (United Arab Emirates Government, 2023). In British curriculum schools, formative assessment is integral to the teaching and learning process, employing strategies such as learning objectives, success criteria, questioning, feedback, and continuous assessment for learning (Black & Wiliam, 1998; Black & Wiliam, 2010). AI-enabled assessment technologies have the potential to strengthen these established practices by providing timely feedback, learning analytics, and personalized instructional support (Banihashem et al., 2025).

While recent research has highlighted AI's potential to enhance feedback, learning analytics, and the efficiency of assessments, there has been relatively less focus on its meaningful integration into formative assessment practices from a pedagogical perspective. Although digital technologies have introduced new opportunities to enhance teaching and learning, their educational impact has remained inconsistent and largely depends on effective pedagogical implementation. While digital technologies have introduced new opportunities for advancing teaching and learning, their impact has been inconsistent, largely contingent on successful implementation. Generative artificial intelligence (GenAI) holds the potential to support formative assessment by providing personalized feedback, developing adaptive learning pathways, and increasing student engagement. However, the effectiveness of these technologies relies on educators' professional judgment, teaching expertise, and their capacity

to responsibly incorporate AI into classroom activities. Therefore, teacher preparedness, AI literacy, and ethical considerations are critical factors in the successful adoption of AI-enhanced formative assessment (Prompiengchai et al., 2025; Webb & Galamba, 2026).

Although there have been substantial advancements in technology-enabled assessment, research on the pedagogical integration of artificial intelligence to enhance formative assessment in British curriculum schools in the United Arab Emirates remains limited. Existing literature predominantly addresses the technological capabilities, opportunities, and ethical challenges associated with AI, while comparatively less emphasis is placed on its application in supporting formative assessment practices through established pedagogical frameworks such as TPACK. Additionally, there is a scarcity of conceptual guidance for educators and school leaders on implementing AI-enabled assessment in a manner that harmonizes technological innovation with effective pedagogy, ethical considerations, and teacher professional judgement within the UAE educational context.

This research applies the Technological Pedagogical Content Knowledge (TPACK) framework, established by Mishra and Koehler (2006), to investigate the incorporation of technology-enabled assessment in educational practice. The framework explains how educators effectively integrate technology into teaching by combining content knowledge, pedagogical expertise, and technological knowledge (Koehler & Mishra, 2009). This research utilizes TPACK as a framework to explain how educators may effectively incorporate AI and digital assessment technologies to improve formative assessment while upholding strong pedagogical practices.

This study aims to examine the impact of technology-enabled assessment, with a focus on artificial intelligence, on enhancing formative assessment practices in British curriculum schools in the United Arab Emirates. Drawing on existing literature and the TPACK framework, the research explores the opportunities, challenges, and educational implications associated with the use of digital technologies in assessments. The findings contribute to the ongoing discourse on the effective and ethical integration of AI in education, providing guidance for educators and school administrators.

2. Materials and Methods

2.1 Research Design

This paper adopts a conceptual literature review methodology to investigate how technology-enabled assessment, integrating artificial intelligence (AI), can enhance formative assessment practices in British curriculum schools in the United Arab Emirates (UAE). Conceptual papers facilitate the development of robust and innovative theories by providing structured frameworks that integrate and extend existing knowledge. These papers enhance academic rigor and enable significant theoretical advancements beyond the constraints of empirical research. Furthermore, they offer guidance to authors, reviewers, and supervisors in the effective organization and evaluation of non-empirical research (Jaakkola, 2020).

This methodology is particularly appropriate for exploring emerging educational topics, such as technology-enabled assessment, where continuous technological advancements are influencing teaching, learning, and assessment practices. The review draws upon peer-reviewed journal articles, policy documents, and scholarly reports related to formative assessment, feedback literacy, technology-enabled assessment, artificial intelligence in education, learning analytics, and the Technological Pedagogical Content Knowledge (TPACK) framework. By critically analyzing and synthesizing literature, the study identifies

the opportunities, challenges, and educational implications associated with integrating digital technologies and AI into assessment practices. Furthermore, the conceptual review provides a foundation for understanding how technology-enabled assessment can enhance meaningful learning, strengthen feedback processes, and inform instructional decision-making within British curriculum schools in the UAE.

2.2 Literature Search Strategy

Google Scholar served as the primary tool for identifying relevant literature, supplemented by ProQuest for additional peer-reviewed journal articles and academic publications. The literature search was undertaken using specific keywords, including technology-enabled assessment, formative assessment, artificial intelligence in education, learning analytics, feedback literacy, and TPACK. These keywords were strategically combined with Boolean operators such as AND and OR to refine the search and compile studies examining various aspects of technology-enabled assessment. The review concentrated on peer-reviewed journal articles published in English from 2020 to 2026, as well as key publications and pertinent policy documents that provided theoretical and contextual insights for the study. Publications unrelated to educational assessment, duplicate entries, non-English articles, and studies focusing solely on the technical development of artificial intelligence without its educational application were excluded from the review.

Initially, the titles and abstracts were assessed to ascertain their alignment with the study's objectives. Subsequently, a comprehensive review of the full texts of potentially relevant publications was conducted. The selected literature was subjected to critical analysis and synthesis to identify common themes, opportunities, challenges, and implications associated with technology-enabled assessment. The application of predefined inclusion and exclusion criteria, in conjunction with searches conducted on Google Scholar and ProQuest, enhanced the review's comprehensiveness and mitigated the risk of selection bias.

2.3 Conceptual Framework (TPACK)

This study is guided by the Technological Pedagogical Content Knowledge (TPACK) framework created by Mishra and Koehler (2006). The framework explains the knowledge required for the effective integration of technology in educational settings. It emphasizes that successful technology-enabled teaching and learning results from the interaction among technological, pedagogical, and content knowledge, rather than from any single domain independently. This framework provides a valuable lens for evaluating teachers' readiness to integrate technology in ways that enhance learning and align with curricular objectives (Koehler et al., 2013).

The TPACK framework is particularly relevant to technology-enabled assessment, as the effective application of artificial intelligence in this domain requires the integration of technology with pedagogical strategies and curriculum goals. AI can facilitate formative assessment by improving feedback processes, tracking student progress, and guiding instructional decisions. Nonetheless, the successful deployment of AI-supported assessment relies not only on technological proficiency but also on educators' capacity to apply pedagogical and content knowledge, ensuring that technology is utilized meaningfully and effectively within educational settings.

Recent research has highlighted the growing importance of integrating artificial intelligence into educational practice. ElSayary et al. (2026) argue that the effective adoption of AI technologies requires teachers to develop additional competencies, including AI literacy,

ethical awareness, and the ability to critically evaluate AI-generated outputs. These competencies complement the principles of the TPACK framework by emphasizing the role of teacher expertise in ensuring that technology supports meaningful learning experiences (ElSayary et al., 2026).

The TPACK framework offers an appropriate conceptual perspective for analyzing the enhancement of formative assessment practices through technology-enabled assessment. By highlighting the interplay among technological, pedagogical, and content knowledge, the framework provides a valuable perception for understanding how educators can integrate AI-powered assessment tools to strengthen pedagogy and improve student learning within British curriculum schools in the UAE.

Accordingly, the TPACK framework provides a valuable lens through which the opportunities, challenges, and educational implications of technology-enabled assessment discussed in the following sections are analyzed.

2.4 Data Sources

This study utilizes secondary data obtained from peer-reviewed journal articles, scholarly books, policy documents, educational reports, and seminal publications relevant to formative assessment, technology-enabled assessment, artificial intelligence in education, learning analytics, and the TPACK framework. The focus was directed towards studies published between 2020 and 2026 to include the most recent developments in educational technology and artificial intelligence. Foundational works were also integrated to establish theoretical foundations. The selected literature was subjected to a critical review and synthesis to identify key themes related to the opportunities, challenges, and implications of technology-enabled assessments in educational settings. Collectively, these sources provided the conceptual and empirical foundation for analyzing the opportunities, challenges, and educational implications of technology-enabled assessment within British curriculum schools in the UAE.

3. Results and Discussion

3.1 Technology-Enabled Assessment and Formative Learning

Learning analytics has emerged as an essential component of technology-enabled assessment, concentrating on the collection and analysis of students' data to enhance educational processes. By providing insights into student engagement, performance, and behavior within learning environments, learning analytics supports formative assessment through the continuous monitoring of student progress and the identification of learning needs. These data-driven insights enable educators to make informed instructional decisions and implement timely interventions to improve educational outcomes.

Furthermore, learning analytics enhances formative assessment by providing personalized and actionable feedback that promotes student reflection and self-regulated learning. Recent research also suggests that AI-powered educational tools can support personalized learning pathways and timely feedback, enabling more responsive and learner-centered assessment practices (UNESCO, 2023). By integrating analytics into assessment practices, educators can track learning trajectories, identify students requiring additional support, and modify teaching methods to address diverse learning needs. Consequently, learning analytics strengthens technology-enabled assessment by enhancing feedback, monitoring student progress, and supporting data-informed instructional decision-making (Banihashem et al., 2025).

Formative assessment plays a vital role in facilitating student learning by enabling learners to identify their current level of understanding, establish learning objectives, and develop strategies for improvement. It emphasizes active student engagement and the provision of timely feedback to guide learning and inform instructional decisions. Effective formative assessment involves the clarification of learning goals, identification of learning gaps, and provision of constructive feedback that promotes continuous improvement and academic progress. Recent advancements in artificial intelligence have expanded the potential of formative assessment by offering immediate and personalized feedback. Large Language Models (LLMs), such as ChatGPT, can assist in formulating learning objectives, designing adaptive assessment tasks, and providing tailored feedback that addresses individual learner needs. Tlili et al. (2023) argued that generative artificial intelligence has considerable potential to transform education by supporting personalized learning, adaptive teaching, and timely feedback (Tlili et al., 2023). These capabilities can enhance assessment for learning by promoting self-regulated learning, increasing student engagement, and supporting more adaptive teaching methods. However, the effectiveness of AI-enhanced formative assessment depends on its alignment with educational principles and curriculum objectives (Prompiengchai et al., 2025).

These advancements demonstrate how technology-enabled assessment expands traditional formative assessment methods through the integration of learning analytics and artificial intelligence. By enabling continuous feedback, monitoring student progress, and informing teaching strategies, technology-enabled assessment has the potential to create educational experiences that are more personalized, adaptive, and learner-centered (Banihashem et al., 2025; Prompiengchai et al., 2025).

3.2 Opportunities of Technology-Enabled Assessment

Technology-enabled assessments offer significant advantages, particularly in enhancing feedback mechanisms. Artificial intelligence enables feedback that is timely, scalable, personalized, and context-sensitive, thereby providing learners with guidance precisely when required. Such feedback aids students in identifying misunderstandings, improving comprehension, and making corrections more effectively than traditional assessment methods. Additionally, automated feedback systems reduce teachers' workload, allowing them to devote more time to instructional planning and targeted learner support. Beyond feedback enhancement, technology-enabled assessments support data-driven instructional decisions through learning analytics. By collecting and analyzing learner data, learning analytics enables educators to monitor student progress, identify learning gaps, and gain insights into student engagement and performance. Furthermore, predictive analytics can identify students at risk of underperformance, allowing teachers to implement timely and specific interventions to enhance student outcomes. These evidence-based insights enable educators to adapt instructional strategies to meet diverse learning needs and strengthen formative assessment practices (Banihashem et al., 2025).

Technology-enabled assessment offers significant potential for personalizing learning and tailoring instruction. Artificial intelligence can adjust learning pathways, evaluation tasks, and instructional support to meet the specific needs of each student, thereby facilitating more flexible and inclusive educational experiences. By delivering adaptive feedback, personalized content, and real-time evaluation of student performance, AI-driven assessment tools enable educators to address diverse levels of preparedness, interests, and learning styles. These technologies also foster learner autonomy by encouraging self-directed learning, reflection, and active engagement in the educational process. Consequently, technology-enabled assessment

supports differentiated instruction while fostering more adaptive, learner-centered, and inclusive educational environments (Prompiengchai et al., 2025; ElSayary et al., 2026).

Technology-enabled assessment holds significant promise for improving teacher productivity and reducing their workload. Tasks such as feedback generation, assessment planning, grading, and learning analytics can be automated using artificial intelligence, thereby allowing educators to allocate more time to lesson planning and student support. AI-driven tools also assist in lesson preparation, rubric development, and the creation of formative assessment activities, thus rendering assessment processes more manageable and scalable. Rather than replacing educators, these technologies enhance professional capabilities by supporting evidence-based decision-making and enabling teachers to focus on more complex pedagogical tasks. As a result, AI-assisted assessment can facilitate more efficient and sustainable teaching methods while maintaining the crucial role of teacher expertise (Prompiengchai et al., 2025; ElSayary et al., 2026).

These opportunities collectively illustrate the potential of technology-enabled assessment to enhance formative assessment by providing improved feedback, facilitating data-informed decision-making, enabling personalized learning, and increasing teacher efficiency. The integration of artificial intelligence with learning analytics allows educators to develop more adaptive, learner-centered educational environments that foster student engagement and achievement. However, to fully realize these benefits, it is necessary to address various pedagogical, ethical, and practical challenges, which are examined in the subsequent section.

3.3 Challenges and Ethical Considerations

Although AI-supported assessment offers significant opportunities, it also presents challenges related to the quality and reliability of feedback. AI-generated responses may occasionally be inaccurate, lack sufficient diagnostic depth, or provide overly generic feedback that fails to address individual learning needs. Furthermore, there is a risk that students may accept AI-generated feedback uncritically, potentially leading to an over-reliance on technology and diminishing opportunities for deeper reflection and independent judgment. Consequently, AI should be regarded as a tool that complements, rather than replaces, the expertise of educators. Teachers play a crucial role in interpreting feedback, exercising professional judgment, and ensuring that assessment practices remain pedagogically sound (Webb & Galamba, 2026).

Beyond concerns regarding the quality and reliability of AI-generated feedback, questions have also been raised about the role of artificial intelligence in educational decision-making. Although artificial intelligence can assist in assessment processes, it is incapable of replicating the contextual insight, ethical accountability, and professional judgment necessary for making informed educational decisions. Therefore, to effectively integrate AI into formative assessment, it is essential to maintain teacher autonomy and ensure that educators remain responsible for interpreting assessment data and making instructional decisions (Webb & Galamba, 2026).

Ethical and pedagogical concerns further complicate the implementation of AI-supported assessment. Tlili et al. (2023) identified issues concerning academic integrity, privacy, the precision of AI-generated content, and the possible abuse of generative AI. They stressed the necessity for responsible application and suitable protective measures within educational environments. Ethical concerns related to AI-supported assessments encompass issues of academic integrity and the potential over-reliance on AI-generated content. The growing utilization of AI tools may facilitate plagiarism and raise questions about the authenticity of students' work. Additionally, an excessive dependence on AI-generated responses can diminish students' engagement in critical thinking, reflection, and deeper learning. Such passive reliance

on AI may compromise the fundamental objectives of formative assessment, which include the development of self-regulation, metacognitive skills, and learner agency. Therefore, educators should design AI-aware assessment activities that encourage students to critically evaluate and enhance AI-generated outputs, thereby promoting meaningful engagement and responsible use of artificial intelligence in learning (Prompiengchai et al., 2025).

The successful implementation of technology-enabled assessment depends not only on the availability of AI tools but also on teachers' preparedness to use them effectively. Educators must possess a comprehensive understanding of AI, engage in ongoing professional development, and receive institutional support to critically assess AI-generated outcomes, make informed pedagogical decisions, and ethically integrate AI into assessment practices. Research suggests that teachers' willingness to adopt AI is influenced by their perceived preparedness, confidence, and perspectives on the educational advantages of AI. Therefore, professional development should extend beyond mere technical training to include ethical considerations, critical evaluation of AI tools, and their application in specific teaching contexts. Furthermore, opportunities for collaborative learning, peer support, and engagement in communities of practice can improve teachers' readiness and facilitate the responsible integration of AI into assessment practices (ElSayary et al., 2026).

The literature reviewed suggests that the success of technology-enabled assessment is contingent upon both the technological capabilities and the quality of implementation, as well as human oversight. Concerns about the dependability of feedback, teacher agency, ethical issues, and understanding of AI highlight the necessity for thorough planning and continuous assistance when incorporating artificial intelligence into assessment methods (Webb & Galamba, 2026; Prompiengchai et al., 2025; ElSayary et al., 2026).

3.4 Implications for British Curriculum Schools in the UAE

To successfully implement technology-enabled assessment in British curriculum schools in the UAE, it is crucial to engage in continuous professional development and capacity-building for educators. Teachers require ongoing training that extends beyond technical skills to include AI literacy, ethical considerations, and the pedagogical application of new technologies. Such professional development initiatives should equip educators with the ability to critically evaluate AI-generated feedback, analyze assessment data, and make informed instructional decisions. Furthermore, aligning these initiatives with the principles of the TPACK framework can assist teachers in effectively integrating technology, pedagogy, and content knowledge to enhance teaching, learning, and assessment practices (ElSayary et al., 2026; Koehler et al., 2013; Mishra & Koehler, 2006).

In addition, schools adhering to the British curriculum in the UAE must formulate explicit policies and guidelines to promote the ethical and responsible use of artificial intelligence in assessment methods. These policies should address key issues, including the maintenance of academic integrity, assurance of data privacy, promotion of transparency, encouragement of equity, and the appropriate use of AI-generated content. Schools must ensure that AI functions as a tool to support, rather than replace, the professional judgment and decision-making of teachers. By establishing ethical frameworks and governance structures, schools can safeguard learner autonomy, uphold the integrity of assessments, and encourage the responsible integration of AI in educational settings (Webb & Galamba, 2026; ElSayary et al., 2026).

Effective school leadership and institutional support are essential for the successful implementation of technology-enabled assessments in British curriculum schools in the UAE. The UAE's Artificial Intelligence Strategy underscores the nation's commitment to advancing digital transformation, fostering innovation, and integrating AI into the educational sector. To

achieve these objectives, schools must ensure the availability of adequate technological resources, develop clear implementation plans, and cultivate collaborative professional environments that facilitate the exchange of knowledge and innovation. Additionally, school leaders play a crucial role in aligning AI projects with broader educational goals, ensuring that technology enhances teaching, assessment, and student learning while adhering to ethical and pedagogical standards (United Arab Emirates Government, 2023; ElSayary et al., 2026).

Furthermore, the TPACK framework suggests that the successful integration of technology-enabled assessment requires the alignment of technological tools with curriculum objectives and pedagogical practices. According to the TPACK framework, educators should combine technological, pedagogical, and content knowledge to ensure that AI-supported assessment enhances learning rather than dictates instructional decisions. AI tools must be chosen based on specific learning objectives and employed in ways that facilitate meaningful assessment, student engagement, and curriculum alignment. In accordance with international guidelines, human oversight is crucial to ensure the responsible use of AI, uphold assessment integrity, and protect learner autonomy. Therefore, technology-enabled assessment should serve as a supplement to effective teaching rather than a substitute for professional expertise (UNESCO, 2023; Koehler et al., 2013; Koehler & Mishra, 2009; ElSayary et al., 2026).

Overall, the implications indicate that the effective integration of technology-enabled assessment in British curriculum schools in the UAE requires a comprehensive approach. This approach should integrate professional development, ethical oversight, institutional support, and technology integration guided by pedagogical principles. Based on these implications and the literature reviewed, a practical implementation framework is proposed. This framework, aligned with the Technological Pedagogical Content Knowledge (TPACK) model, is intended to support educators and school leaders in the systematic adoption of technology-enabled assessment. It delineates a structured sequence of implementation phases to ensure the responsible, ethical, and pedagogically sound incorporation of artificial intelligence into formative assessment practices.

Table 1. Proposed TPACK-Aligned Framework for Implementing Technology-Enabled Assessment in British Curriculum Schools in the UAE

Stage	Key Action	TPACK Dimension
Leadership and Vision	Develop a school-wide AI strategy aligned with assessment policies and ethical guidelines.	TK
Teacher Capacity Building	Provide continuous professional development in AI literacy, formative assessment, and responsible AI use.	TPK
Classroom Integration	Incorporate AI tools to enhance feedback, facilitate questioning, support differentiation, and conduct learning analytics, all while ensuring teacher oversight is maintained.	TPACK
Ethical Governance	Formulate policies that address privacy, bias, academic integrity, and the responsible use of artificial intelligence.	TPK
Continuous Evaluation	Monitor implementation through teacher feedback, student outcomes, and learning analytics to continuously improve practice.	TPACK

Note. TK - Technological Knowledge; TPK - Technological Pedagogical Knowledge; TPACK - Technological Pedagogical Content Knowledge.

The suggested framework aims to assist school leaders and educators in applying the principles of technology-enabled assessment in practical settings. Instead of offering a rigid implementation sequence, it delivers adaptable guidance that schools can modify based on their technological capabilities, institutional goals, and student requirements. This approach ensures

alignment with the TPACK framework and adheres to ethical standards for using artificial intelligence in education.

4. Conclusions

This study is a conceptual literature review that primarily draws on existing peer-reviewed literature and policy documents rather than primary empirical data from educational settings. Consequently, the conclusions are presented as a synthesis of current evidence, providing theoretical insights and evidence-informed implications for technology-enabled assessment. It is important to note that these insights have not been validated through direct classroom research. Future empirical investigations in British curriculum schools in the UAE should examine teachers' readiness to implement AI-enabled assessment, its impact on student learning outcomes, and challenges associated with equitable access across diverse educational contexts.

The integration of learning analytics and artificial intelligence into technology-enabled assessment offers considerable potential for enhancing formative assessment methods. The literature reviewed in this study indicates that these technologies can deliver timely and tailored feedback. Furthermore, tools powered by learning analytics and AI assist educators in monitoring student progress, identifying learning needs, and improving assessment efficiency through the automation of routine tasks. By enabling personalized learning and evidence-based teaching strategies, technology-enabled assessment can increase student engagement and improve learning outcomes. The literature collectively underscores the increasing importance of digital technologies in enhancing formative assessment and facilitating more adaptive teaching and learning practices (Banihashem et al., 2025; Prompiengchai et al., 2025).

Incorporating artificial intelligence into assessment methods presents promising opportunities; however, it also introduces several challenges that require careful consideration. Key issues include the reliability of AI-generated feedback, the preservation of teacher autonomy, the maintenance of academic integrity, and the ethical use of AI, all of which highlight the need for responsible implementation. Furthermore, the effective integration of AI in education depends on promoting AI literacy among educators and students, enabling them to critically evaluate AI-generated outcomes and make informed decisions. These considerations underscore the essential role of human oversight and professional judgment in ensuring that AI serves to enhance, rather than replace, effective teaching and learning practices (Webb & Galamba, 2026; ElSayary et al., 2026).

In British curriculum schools within the UAE, the successful implementation of technology-enabled assessment requires a comprehensive approach that incorporates professional development, AI literacy, institutional support, and ethical governance. Educators should apply the principles of the TPACK framework to integrate technology in a manner consistent with pedagogical practices and curriculum objectives, while ensuring the preservation of human oversight and professional judgment. Furthermore, continuous investment in teacher capacity-building and the responsible implementation of AI is crucial for the effective use of technology-enabled assessment in rapidly changing educational environments. Future research must investigate the long-term effects of AI-supported formative assessment on student learning outcomes, teacher practices, and assessment quality, with a specific focus on British curriculum schools in the UAE and similar educational settings (Mishra & Koehler, 2006; UNESCO, 2023; ElSayary et al., 2026).

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