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LEVERAGING GENERATIVE AI FOR PERSONALIZING FORMATIVE
ASSESSMENT IN HIGHER EDUCATION

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Annotation: This article explores the role of generative artificial intelligence (GenAI) in personalizing formative assessment in higher education. It examines how AI can provide individualized tasks, immediate feedback, and learning recommendations based on students' needs. The study also highlights challenges such as academic integrity, data privacy, AI accuracy, and the importance of teacher supervision. The findings indicate that responsible use of GenAI can improve the effectiveness and flexibility of formative assessment.

Keywords: generative AI, formative assessment, personalized learning, higher education, feedback, artificial intelligence.

The rapid development of artificial intelligence (AI), particularly generative artificial intelligence (GenAI), is transforming teaching, learning, and assessment practices in higher education. Generative AI tools such as large language models can generate explanations, questions, examples, feedback, and learning materials in response to individual learners' needs. As a result, these technologies offer new opportunities for moving beyond standardized assessment toward more flexible, personalized, and continuous approaches to evaluating student learning. Recent research highlights the potential of large language models to support automated and personalized formative feedback, self-assessment, peer review, and instructor decision-making in higher education.

Formative assessment plays a particularly important role in the learning process because its primary purpose is not simply to measure achievement but to identify students' strengths, learning gaps, and difficulties and provide feedback that can guide subsequent learning. However, in traditional higher education settings, providing timely and individualized feedback to large numbers of students can be difficult because of teachers' workload, limited time, and resource constraints. Generative AI has the potential to address some of these challenges by producing immediate, adaptive feedback and assessment tasks that can be adjusted according to students' demonstrated knowledge and performance.

Personalization represents one of the most promising dimensions of GenAI-supported formative assessment. Instead of providing identical questions and feedback to all learners, AI-based systems can analyze students' responses, identify areas of difficulty, and generate differentiated tasks or explanations. Recent empirical research on generative-AI-based personalized assessment has demonstrated the potential of combining learner profiles, knowledge representation, automated assessment generation, and feedback



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optimization to support individualized learning at scale. Such an approach can help students understand not only what they have learned, but also what they need to improve and which learning strategies may be most appropriate for their individual needs. At the same time, the integration of GenAI into assessment raises important pedagogical, ethical, and academic integrity concerns. AI-generated feedback may not always be accurate, sufficiently contextualized, or aligned with course learning outcomes. Recent research also indicates that human-generated feedback can remain more accurate and actionable than algorithmic feedback in some educational contexts. Therefore, generative AI should not be viewed as a replacement for teachers' professional judgment. Rather, its effectiveness depends on meaningful human oversight, appropriate assessment design, transparent AI-use policies, and continuous evaluation of the quality of generated feedback. UNESCO similarly emphasizes that the use of generative AI in education should follow a human-centred approach that protects privacy, promotes equity, supports human agency, and ensures safe and meaningful educational use. The emergence of GenAI also requires institutions to reconsider what should be assessed, particularly by placing greater emphasis on critical thinking, problem-solving, creativity, and the ability to critically evaluate AI-generated information.

Against this background, leveraging generative AI for personalizing formative assessment in higher education represents an important area of contemporary educational research. The effective integration of GenAI can potentially make formative assessment more responsive, timely, individualized, and scalable while strengthening students' opportunities for reflection and continuous improvement. However, achieving these benefits requires a careful balance between technological innovation and established pedagogical principles. Therefore, examining how generative AI can be strategically integrated into personalized formative assessment is essential for developing effective, ethical, and learner-centred assessment practices in higher education.

In conclusion, generative artificial intelligence has significant potential to transform formative assessment in higher education by making assessment processes more personalized, flexible, timely, and learner-centred. Through the analysis of students' responses and learning needs, GenAI can generate individualized questions, explanations, recommendations, and immediate feedback. Such opportunities can help students identify their strengths and weaknesses, monitor their learning progress, and develop greater responsibility for their own learning.

The integration of GenAI into formative assessment can also reduce some of the routine workload of teachers and enable them to focus more on pedagogical decision-making, student support, and the development of higher-order thinking skills. However, effective implementation requires careful consideration of accuracy, academic integrity, data privacy, ethical issues, and the potential dependence of students on AI-generated content. Therefore, GenAI should function as a supportive educational tool rather than a substitute for teachers or students' independent thinking.



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Ultimately, the successful use of generative AI for personalized formative assessment depends on a balanced combination of technological capabilities and human pedagogical expertise. When appropriately designed and monitored, AI-supported formative assessment can contribute to more responsive learning environments, improve the quality of feedback, strengthen student engagement, and support continuous academic development. Consequently, the responsible integration of GenAI represents a promising direction for enhancing the effectiveness and personalization of assessment practices in higher education.

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