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Editorial: Artificial intelligence and educational assessment – Opportunities and threats

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Artificial intelligence (AI) presents significant opportunities, yet critical challenges for educational assessment, with potential to reshape how learning is supported, determined, and enhanced. This special issue of Learning Letters explores these dynamics, offering timely insights into AI's potential for personalised instruction, authentic assessment design, and innovative educational practices. Each featured article helps us explore these dynamics, focusing on redefining academic integrity through effect-tracking assessments, promoting synthesis-based assignments resistant to AI optimisation, leveraging machine learning for personalised STEM learning, and proposing practical, technology-agnostic assessment frameworks. The editorial advocates for ongoing empirical research, comprehensive professional development for educators, and robust policy frameworks as essential for realising AI's promises and avoiding its more harmful risks. Collectively, this special issue addresses the necessity of balancing AI's powerful capabilities with our ethical and pedagogical vigilance as educators and researchers.

Keywords: academic integrity, artificial intelligence (AI), assessment, genAI, learning design

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Personal engagement with AI in education

Ever since I was a social studies teacher many (many!) years ago in Florida, I've been interested in the intersection of learning, assessment, and technology. Over the years, my professional identity, focus, and locations have changed, but my interest in and passion for exploring intersections in learning, assessment and technology remain.

My current role as an Enterprise Research Fellow with University of South Australia allows me to explore this dynamic space by conducting original research. Being at the front line of research comes with the pleasure and duty of advancing the conscientious work of others. It is in that spirit that the editors at Learning Letters and I present this special issue, *Artificial Intelligence and Educational Assessment: Opportunities and Threats*.

Framing the urgency of AI in education

The integration of AI into education is rapidly transforming education at all levels. AI has demonstrated significant potential in enhancing learning outcomes by providing personalised instruction and real-time feedback. AI-powered tools can, for example optimise skill development among higher education students, facilitating the acquisition of 21st-century competencies essential for navigating complex professional landscapes (Benvenuti et al., 2024). AI's role in profiling and predicting student performance carries transformative potential, enabling educators facing significant workload constraints to tailor interventions

addressing individual learning needs, thereby improving academic success rates (Deneen et al, 2024; Zawacki-Richter et al., 2019).

The adoption of AI in educational settings is not without challenges, though. Ethical considerations, such as data privacy and algorithmic bias, necessitate that we adopt cautious, informed approaches to implementation. The potential for AI to inadvertently perpetuate existing inequalities underscores the need for frameworks that ensure equitable access and use of AI technologies in education (Rizvi, 2023). Additionally, the dynamic nature of AI requires continuous professional development for educators to effectively integrate these tools into their teaching practices, and to keep up with what AI can, should, and should not be doing.

Overview of contributions

The four articles in this special issue provide an assessment-focused exploration of AI's role in education, spanning assessment authenticity, innovative assignment design, personalised learning, and assessment frameworks. Collectively, these articles underscore the critical need for thoughtful integration of AI into educational assessment, emphasising both opportunities and essential cautions.

The first article, "If cheating is optimisation then assessment must not be pure: Effect tracking and assessment", reframes the conversation on academic integrity by likening cheating to optimisation in programming. Billingsley argues for assessments designed explicitly with observable effects – such as direct student interaction, observation, and process tracking – to maintain integrity. This proposed approach challenges educators to design assessments that are more open to seeing the students' relationship to the assessment and resistant to the optimisation strategies offered by generative AI tools.

In this same vein, "Sociological assessment practices for college students in the age of generative AI: A shift towards synthesis-based assignments" challenges educators to move away from assessment design that is easily subverted by AI and, instead, move towards "synthesis-oriented assessments". These require critical synthesis, collaboration, and the application of theory to real-world contexts. By advocating for assignments that AI cannot easily replicate, Dguidegue provides a practical strategy for educators to preserve academic rigour and authenticity while promoting deeper learning outcomes.

"Development of a machine-learning-driven digital teaching assistant that utilises student engagement data to improve access to and success in K-12 STEM education" adopts a different perspective. Shreeve et al. explore the potential of AI to personalise learning through detailed analysis of student engagement data. Rather than positioning AI as a hazardous student tool that may subvert assessment of and for learning, the authors describe the creation of a digital assistant that uses AI-generated insights to help educators adapt instruction dynamically, enhancing educational equity and effectiveness in STEM learning environments.

Finally, "A technology-agnostic framework for designing assessments in the era of artificial intelligence addresses the pragmatic, big picture question: Where is the guidance for educators and students on how assessment and learning can function effectively in the age of AI? Curwood et al. point out that the current *Australian Framework for Generative Artificial Intelligence in Schools* (2023) lacks practical examples and tools. The authors address this by introducing a framework for integrating AI into assessment design through intentional dialogue between students and AI, combined with critical reflection on the composition process. This framework encourages students to actively engage with AI tools, supporting the development of critical thinking skills and ensuring that educators can effectively evaluate students' genuine understanding and skills.

Conclusion

Standing at the intersection of technological innovation and educational practice, we encounter both unprecedented possibilities and significant risks posed by AI. Balancing these opportunities with the need to minimise hazards requires a multifaceted approach that includes research, policy development, and professional capacity-building. This special issue, alongside broader frontline research in the intersectional spaces of AI and education, offers actionable insights that help chart a course for achieving this balance and advancing our collective understanding and application of AI in education.

First, there is a pressing need for ongoing empirical research that explores the long-term impact of AI on learning outcomes, academic integrity, and student engagement (Benvenuti et al., 2024; Rizvi, 2023). Such research should examine both the affordances and limitations of AI, ensuring that its use aligns with pedagogical goals rather than merely technological trends. The articles in this special issue, for example, contribute to this growing body of knowledge by offering insights into both theoretical and applied dimensions of AI in education.

Second, professional development initiatives must be prioritised to ensure that educators are equipped with the skills to integrate AI effectively. This includes training on how to critically evaluate AI-generated content, design assessments that either insulate against or account for AI use, and address ethical concerns such as data privacy and bias. Collaborative efforts between institutions, policymakers, and technology developers can help create frameworks that support ethical AI use while enhancing educational outcomes (Zawacki-Richter et al., 2019).

Lastly, institutions and nations must establish clear policies that guide the ethical use of AI in education. These policies should address issues such as transparency in AI decision-making, student data protection, and the responsible use of AI-generated content (Lodge et al. 2023). By fostering a culture of ethical AI adoption, educational institutions can mitigate risks while maximising the benefits of AI for teaching and learning.

This special issue of *Learning Letters* invites readers to engage with cutting-edge research that illuminates the potential of AI to transform education. By critically examining both the opportunities and challenges presented by AI, we can work towards implementing the actionable insights that assure assessment and learning experiences are valid, equitable, effective, and responsive to the needs of all learners.

About the author

Associate Professor Chris Deneen is an Enterprise Research Fellow with Education Futures at the University of South Australia and holds an honorary principal research fellowship at The University of Melbourne's Centre for the Study of Higher Education. He also serves as co-lead editor of the *Australasian Journal of Educational Technology*. Chris's work focuses on future-oriented understandings of assessment and feedback in higher education. Drawing on theoretical and empirical models, his research explores how technology – particularly artificial intelligence – shapes assessment and feedback practices. He has secured over AUD 2.7 million in competitive external research funding and has authored over seventy publications on these topics. Most recently, Chris and his team, The Assessment Experts Forum, won the 2024 Tracey Bretag Prize for Academic Integrity for their national policy advice paper, *Assessment Reform for the Age of Artificial Intelligence*.

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