



Designing Authentic Assessments in the Age of AI: A Case Study in Genetics

Neil A. Cross

Sheffield Hallam University

Abstract

The rapid advancement of artificial intelligence (AI) and large language models (LLMs) presents significant challenges for traditional knowledge-based assessment in higher education. Within bioscience disciplines, AI systems can now readily generate responses to most content-driven questions, including those requiring advanced data interpretation. This study aimed to design an authentic assessment for a Level 4 Biochemistry and Genetics module (20 credits) that targets skills less amenable to automation by current AI tools. The assessment required students to design a diagnostic polymerase chain reaction (PCR) assay to detect a unique pathogenic mutation associated with an inherited metabolic disease, using the National Center for Biotechnology Information (NCBI) bioinformatics platform. The task was designed to mirror real-world research workflows and was supported by instructional screencasts. In its initial implementation (2024-25), AI tools provided only limited guidance and were unable to generate complete or satisfactory responses. However, by 2025–26, more advanced systems (e.g. institutional Copilot and GPT-5-class models) could produce plausible text-based outputs when prompted. Despite this, the assessment remained resistant to AI completion, as students were required to provide annotated screenshots demonstrating engagement with bioinformatics tools. These findings suggest that carefully designed, authentic assessments that require procedural, tool-based, and evidence-supported outputs can mitigate risks associated with AI use while supporting the development of discipline-relevant skills.

Keywords

artificial intelligence, curriculum design, authentic assessment, bioscience, genetics

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