ASCILITE 2026

The Future is Connection:

Collaboration, Creativity and Compassion in a Digital Society

Making programming learning visible: Students' perceptions of an authentic, process-oriented assessment design

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Generative artificial intelligence (GenAI) has increased questions about whether a final code artefact alone can constitute sufficient evidence of student learning in programming education. This poster presents a practice-based evaluation of a redesigned second-year programming unit that incorporated multiple forms of evidence of learning. The assessment design is informed by authentic assessment (Boud & Molloy, 2013), feedback for learning (Carless & Boud, 2018) and self-explanation theory (Chi et al., 1989). It responded to current calls for assessment reform in the age of AI by shifting attention from the final artefact to the processes through which students design, explain, test and improve code (Lodge et al., 2023).

Across three progressively sequenced assessments, students produced working Python programs, submitted WakaTime development records, recorded video explanations of design decisions, declared and justified GenAI use where permitted, and revisited prior code to improve exception handling and pytest testing. GenAI was allowed under accountable-use conditions, during which students were required to identify GenAI-assisted code, ensure that their submissions used concepts taught in the unit, and demonstrate that they understood and could explain the code they submitted. Assessment 1 established foundational object-oriented programming practices. Assessment 2 asked students to build a weather-data bot using CSV data, web scraping, datetime, logging, collections and pandas analysis. Assessment 3 required students to return to their Assessment 2 codebase and use feedback from Assessment 2 to strengthen its robustness through built-in exceptions, custom exceptions and tests. The design operationalised process-oriented assessment at task level. Code provided product evidence; WakaTime provided process evidence; video explanation provided conceptual evidence; and feedback with staged task design supported iterative development. Together, these tasks created an evidentiary architecture that made programming processes, conceptual reasoning and judgement more visible than final code alone.

The evaluation drew on 68 anonymous unit feedback responses. Open-ended feedback was examined using thematic analysis (Clarke & Braun, 2017). Three student-perception themes were emergent. First, *authentic tasks positioned programming as professional practice*: students valued project-based tasks such as CSV analysis, web scraping and data-processing bots because they resembled meaningful programming work. Second, *explanation and process evidence made computational thinking visible*: students described shifts from writing code to thinking in terms of modularity, validation, debugging and engineering practice. Third, *feedback supported iterative improvement and confidence*: students reported that feedback helped them identify errors, revise code and progress more independently.

The poster argues that process-oriented programming assessment should not rely only on restricting AI use. Instead, assessment can require multiple forms of evidence to validate student learning (Dawson et al., 2024) such as working code, development traces, self-explanatory video, feedback uptake, accountable AI-use declarations and testing artefacts. Video explanation is especially important because it prompts students to justify programing structures, methods, strategies and data-analysis approaches (Lai & Niblock, 2024). The study is limited by its reliance on one unit, one teaching period and self-reported student feedback. Further analysis of WakaTime data, video explanations, code revisions and pytest artefacts will examine how process evidence relates to conceptual understanding, reasoning and feedback uptake.

Keywords: authentic assessment, programming education, self-explanation, generative AI, feedback for learning, process-oriented assessment

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Hendry, A., & Lai, P. K. (2026, Nov 29 – Dec 2). Making programming learning visible: Students' perceptions of an authentic, process-oriented assessment design [Poster]. In Cochrane, T., Narayan, V., Poole, T., Lai, P., Lake, P., Moore, O., & Li, L. (Eds.), *The Future is Connection: Collaboration, Creativity and Compassion in a Digital Society*. Proceedings ASCILITE 2026. Brisbane (pp. 27–28). https://doi.org/10.65106/apubs.2026.3303

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