

Title: Formative Assessments Co-Created with Students (FACtS) for Large Classes

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What?

This paper reports lessons learned from designing and implementing Formative Assessments Co-Created with Students (FACtS) in a large-scale Data Literacy and Analytics module (CSC1015) delivered asynchronously to over 2,000 DCU students from 15 programs across five faculties annually since 2022 (Abgaz & Dunne, 2023). CSC1015 is designed using a microcurricula approach covering 14 Data Literacy and Analytics Topics (DLATs) —0.5 to 1 ECTS, each with independent Loop page—that can be composed into 5 ECTS module, and flexibly delivered in Sem I, II, and year-long setting. FACtS were introduced in response to student feedback indicating the need for additional supports that improve engagement, topic retention, and preparation for summative assessments in an online learning environment (Farrell et al., 2021; Hornsby, 2020). Grounded in active learning (Christersson et al., 2019; Stoerger & Krieger, 2016) and Universal Design for Learning principles (Emmers et al., 2022; Farrell, 2021; Flood & Banks, 2021), the approach leverages interactive digital platforms such as Loop and H5P (Magro, 2021) to implement FACtS. Students who had previously completed the module collaborated to summarise key topics and convert them into diverse formative assessment items—such as multiple-choice, true/false, drag-and-drop, matching, and fill-in-the-blank questions—using H5P's interactive features. FACtS, by design, embedded detailed immediate feedback for each question leading students to the content of the specific sub-topic covered in the questions (Broadbent et al., 2018).

So What?

350 FACtS distributed across seven DLATs were implemented as optional content for newly enrolled students. FACtS enabled the students who need extra scaffolding to exploit these formative assessment questions to better retain their knowledge and assess their understanding of the topics before they take the summative assessments (Bloom, 1968). Survey responses and comparative analytics of results indicated that students benefited from the FACtS in three core areas

- First, students who completed FACtS demonstrated improved summative assessment results, including statistically significant improvement in two DLATs. The analysis further demonstrated that overall engagement of students who completed the FACtS has shown improvement.
- Second, FACtS transformed the online learning environment into a more interactive and engaging experience through highly interactive question formats, aligning with Christersson et al.'s (2019) findings on diverse assessment elements' impact on learning. Students identified these functionalities as gamification elements, particularly the star ratings, which created an exciting "game-based" learning experience.

- Third, FACcTS facilitated metacognition by enabling students to pause and reflect on their learning strategies through peer-embedded experiences, allowing them to recognize strengths and weaknesses and adjust their approaches accordingly (Wafubwa & Csikos, 2022). Students developed sophisticated awareness of knowledge gaps and learning progress, enabling informed decisions about study strategies and summative assessment readiness. The immediate feedback loop boosted student confidence in knowledge retention, exemplifying transformative learning autonomy.

Peer-aligned design recognition, in which student experiences are systematically embedded within assessment questions; feedback-driven learning loops, facilitating iterative learning through timely and targeted feedback; and personalised learning adoption, which fosters the development of self-regulation strategies, constitute key underlying factors contributing to the observed positive impact of FACcTS.

Now What?

Although resource-intensive—requiring a combined 400 hours from students and a module coordinator—the approach has had a positive impact on students' learning experiences in subsequent semesters. Insights from the design and implementation phases provided a practical framework for creating interactive formative assessments and selecting appropriate technologies to embed student experience into module design. Overall, this research demonstrates that co-created assessments offer a scalable, evidence-based model for enhancing large asynchronous modules and advancing student-centred learning initiatives.

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