Perceptions of Effective Formative Feedback: A comparative Analysis Between Undergraduate Students and Mathematics Lecturers

Samah Taha, George Kinnear and Paola Iannone

University of Edinburgh, School of Mathematics;

Samah.taha@ed.ac.uk ; G.kinnear@ed.ac.uk and Paola.innone@ed.ac.uk

Keywords: Formative Feedback, Feedback Framework, Comparative Judgement

In the context of formative e-assessment in mathematics, students often demonstrate misconceptions, which underlie their mistakes. This prompts an exploration of the role of feedback as cornerstone of formative e-assessment. Given the increasing reliance on technology in education and the need for adaptable assessment methods to meet the evolving needs of learners in the digital age, focusing on e-assessment becomes imperative (Evans, 2013). What feedback should mathematics lecturers provide within e-assessment to effectively support student learning? This poster presents the perspective of both undergraduate students and mathematics lecturers to the feedback provided by fourteen mathematics lecturers in response to a fictional student response to a formative e-assessment task.

High-quality feedback may influence student achievement (Mulliner & Tucker, 2017). However, despite substantial time and effort invested in generating feedback, there is a noticeable lack of research in higher education regarding its effectiveness (Price et al., 2010). Despite evidence of students' desire for feedback from their lecturers, the National Students Survey in the UK has documented student dissatisfaction since 2005, with students expressing discontent over the nature and timing of feedback (Price et al., 2010). In contrast, academics often believe their students are receiving timely, extensive, and informative feedback (Mulliner & Tucker, 2017).

Assessment feedback includes all feedback exchanges generated within assessment design, occurring within and beyond the immediate learning context, being overt or covert (actively and/or passively sought and/or received), and importantly, drawing from a range of sources (Evans, 2013). A comprehensive review by Lipnevich and Panadero (2021) presents fourteen models, complete with accompanying diagrams, explaining how feedback operates and identifying variables that may contribute to student engagement with it. Within this complex landscape of factors and interactions, our study draws a narrow focus on the content of the feedback message that mathematics lecturers provide to undergraduate students on formative e-assessment tasks. In this poster, we address two questions:

RQ1: Do mathematics lecturers generally agree on the characteristics of the effectiveness of formative feedback?

RQ2: Do the lecturers' perceptions of effective feedback align with those of their students?

Building upon the research conducted by Evans et al. (2022), which highlights the efficacy of comparative judgment in studying the quality of mathematical explanations, we adopt this approach to analyse the quality of feedback given on e-tasks. Comparative judgment is a widely utilised method in educational research, employed to evaluate student's essays, laboratory reports, and abstract constructs such as conceptual understanding, problem-solving, and mathematicians' proof

conceptions (Evans et al., 2022). For our study, we collected feedback from mathematics lecturers in response to a prompt on a common error made by undergraduate students. The task is derived from a digital module in integral calculus, designed to support undergraduates in finding areas enclosed by functions, as highlighted by Kontorovich and Locke (2023). Using a comparative judgment approach, two groups of judges – lecturers and students – will assess pairs of feedback for effectiveness. This will generate two scores for each item of feedback: one from lecturers and one from students. To address RQ1, we will compute the split-halves reliability measure for the group of lecturers, using the method described by Evans et al. (2022). This gives a number between 0 and 1, with values above 0.7 indicating a good level of agreement between the lecturers. To address RQ2, we will compute the correlation between the scores produced by the lecturers and the scores produced by the students. A high correlation (close to 1) indicates strong agreement on feedback effectiveness, while a low correlation (close to 0) suggests limited agreement.

If undergraduate students and mathematics lecturers share a common understanding of high- and low-quality mathematical feedback, this agreement motivates further investigation in two directions: evaluating alignment with established frameworks for high-quality feedback, and exploring potential differences in the underlying mechanisms and considerations influencing students and lecturers' choices. Conversely, any conflict in feedback perceptions between students and lecturers prompts an exploration of the factors contributing to the disparity. Addressing these factors is crucial for enhancing students' engagement with feedback.

References

Evans, C. (2013). Making Sense of Assessment Feedback in Higher Education. *Review of Educational Research*, *83*(1), 70–120. https://doi.org/10.3102/0034654312474350

Evans, T., Mejía-Ramos, J. P., & Inglis, M. (2022). Do mathematicians and undergraduates agree about explanation quality? *Educational Studies in Mathematics*, *111*(3), 445–467. https://doi.org/10.1007/s10649-022-10164-2

Kontorovich, I., & Locke, K. (2023). The Area Enclosed by a Function Is Not Always the Definite Integral: Relearning Through Collaborative Transitioning Within a Learning-Support Module. *Digital Experiences in Mathematics Education*, *9*(2), 255–282. https://doi.org/10.1007/s40751-022-00116-z

Lipnevich, A., & Panadero, E. (2021). A Review of Feedback Models and Theories: Descriptions, Definitions, and Conclusions. *Frontiers in Education*, *6*. https://doi.org/10.3389/feduc.2021.720195

Mulliner, E., & Tucker, M. (2017). Feedback on feedback practice: Perceptions of students and academics. *Assessment & Evaluation in Higher Education*, *42*(2), 266–288. https://doi.org/10.1080/02602938.2015.1103365

Price, M., Handley, K., Millar, J., & O'Donovan, B. (2010). Feedback: All that effort, but what is the effect? *Assessment & Evaluation in Higher Education*, *35*(3), 277–289. https://doi.org/10.1080/02602930903541007