

Case Study: Implementing Active Self-Feedback in Teaching

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Course information

In their first semester of the undergraduate Mathematics BSc., students take the unit Mathematical Problem Solving. During this unit, six sessions are dedicated to the 'How to Study Maths' programme, which aims to improve first year students' mathematical study skills to ease their transition into studying maths at university.

Active self-feedback was implemented in these sessions by Louise Walker, a Professor of Pure Mathematics, in several different activities, each focussing on a different mathematical study skill. Each activity was fairly short, consisting of a short task, a peer feedback task, and a final reflective task, and was worth a small number of summative marks to incentivise participation.

The task

Students had four assignments to complete on the following topics:

- How to write maths
- How you will be assessed
- How to make the most of feedback
- How to understand proofs

For each assignment the students submitted their work on the online platform Peer Scholar. They provided feedback on two pieces of work by other students (anonymous) and self-feedback. They then saw their feedback from peers and reflected on this.

At the end of the semester, students had a session on active self-feedback and completed a survey.

Comparators

For each task, students compared their work to two submissions by their peers.

Reflections by teaching staff

The proportion of students completing the assignments varied between 35% and 53%. This is likely a reflection of the small, but non-zero, number of marks available for each assignment.

One limitation was noted to be the occasional difficulty using the online platform, Peer Scholar. Although it allows a large number of students to anonymously give feedback on a few of their peers' submissions, it is not explicitly designed for self-feedback.

Reflections by students

Feedback from students was gathered using a final week survey, which 129 of 250 students responded to. When students were asked to indicate their agreement with the statement "The How to Study Maths sessions have helped me to develop my study skills", with a scale from Strongly Agree (5) to 1-Strongly Disagree (1) the responses had a mean of 3.74, indicating a generally positive feeling towards the sessions.

Some students specifically commented on the active self-feedback aspects of the sessions:

"This process also helped me reflect on my own work, identifying areas where I could improve, like ensuring logical consistency and presenting my solutions more clearly. Additionally, analysing diverse approaches in other students' solutions introduced me to new problem-solving techniques and broadened my perspective."

"I found that giving feedback on someone else's proof was the most helpful because it helped me to think about how I could critically analyse my own work to improve it. That is obviously an important thing to be able to do throughout university when there might be fewer opportunities to get feedback directly from lecturers. "

Appendix: Instructions

Peer feedback instructions

- **Positive feedback** can have a strong and positive impact. Please highlight something specific you liked in your peer's work. Let them know what was done really well and why they might want to continue doing that in their future work.
- Now it's time to give **constructive feedback**. If your peer was going to change just one thing about their work, what change would improve it the most? And what are some ways they might go about making that change? Please remember everything you have learned about giving constructive feedback when you write this and try your best to deliver your suggestions in a helpful tone that will minimize the triggering of a fight/flight reflex.

Self-feedback instructions and reflection

- Now that you have seen how your work compares to the work of your peers, please highlight one thing that you would have done differently. Is there something that you've now seen done well that you think could help your own work going forward?
- Compared to the work of your peers, how would you rank your own composition? (Scale 1 Poor – 5 Excellent)
- As we've discussed, sometimes reading feedback causes negative emotions in us, emotions like frustration, annoyance, anger and embarrassment. On the 1 to

7 scale below, how many negative emotions did you feel while reading this feedback?

- Putting the emotions aside, what was the core piece of advice that this peer was trying to express? Can you restate in your own words what they thought you should change and how you might change it?
- Please rate the quality of this feedback in relation to the six qualities of effective constructive feedback that you learned about in the Assess Phase (note you can return to the Assess Instructions and re-watch that video if you like by clicking on Instructions and then choosing the Assess Phase)
- How likely is it that you will follow this peer's advice and will follow their suggestion (note, not all peers give good advice and thus it is not necessary that you follow every peers' advice, only that you think about it and make a reasoned decision)

Final week survey questions

- Write down which of the assignment tasks for How to Study Maths was **most useful** and say why.
- Write down which of the assignment tasks for How to Study Maths was **least useful** and say why.
- Write down the **three** most important things you learned from comparing your work with other students' work.
- The How to Study Maths sessions have helped me to develop my study skills. (Scale: Strongly Agree – Strongly Disagree)
- Write down the techniques you have learned in the How to Study Maths sessions that you will use in your studying.
- Write down one study skill that you have developed this semester that you feel confident about.
- Write down a study skill that you would like to improve.
- Write down any other topics you would like to have seen covered in these sessions.