

Students' Positive and Negative Experiences in Proof Courses

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Keywords: Proof Courses, Student experience, Undergraduate mathematics courses

Existing research on students' experiences in proof-based courses has often focused on examining insights students gain from lectures (Krupnick et al., 2018; Lew et al., 2016) and their beliefs about the processes of reading, writing, and interpreting proofs (Guajardo & Lew, 2024; Lew & Mejia-Ramos, 2019; Weber & Mejia-Ramos, 2014), with much of this work highlighting students' struggles with proof. In their transition to proof-based mathematics, students are often required to conform more deeply than they would have previously towards linguistic, logical, and authoritative standards that trickle up from and symbolize larger mathematical cultures (Lew K. & Mejia-Ramos, 2019). Such standards can be alienating, especially when they suggest that individuals have struggled or made mistakes, or when they receive unclear or confusing responses (Dawkins & Weber, 2017). Therefore, it is important to understand, from the students' perspective, what students have found supportive or unsupportive throughout their experiences with proof courses. This poster aims to address the research question: What do students perceive as helping or hindering their experiences in proof-based courses?

This poster will use data from interviews with five undergraduates who all had taken at least three proof-based courses. These students were recruited after they had taken a survey regarding their experience with proof courses and had responded "yes" to an interview invitation. The interviews took place over Zoom with the second author and an additional researcher. Students reflected on their experiences in proof-based courses and proof culture. They shared experiences that shaped their views on what is valued in the proof community. To answer our research question, we used a thematic analysis to identify themes related to what students noted as helpful or not in relation to their experience in their proof-based course.

From our initial analysis we saw a few things come up right away. Grading and expectations were huge issues for students. Some students couldn't figure out what their professors wanted. They lost points for writing too much, or for using shorthand. One student said, "I thought I did everything I needed to. But I didn't know what he wanted." Another said, "Proofs aren't supposed to be assignments... they're explanations for why something is true." Suggesting that disparities in grading expectations hindered their learning experience as it was unclear what was "right" and what was "wrong". This shows students wanted proving to feel more authentic and less rule-driven. The students also pushed back against the idea of blindly accepting answers just because they came from a textbook or a professor. "Most of the class would agree with a proof just because it came from the professor. But nobody's perfect. Anyone can have a small error." This suggests that providing a more authentic proving experience that allows mistakes and errors can help students' learning experience. Students also noted that they wanted more chances to work with classmates, more flexibility. In their eyes, proving did not have to be a solo job, it could feel more like a group puzzle or even a lab, suggesting collaborative work in their proof courses was helpful. This poster will share the themes that came out of these interviews. By identifying these themes, we will gain insight into small changes like better feedback or more chances for group work that can help students feel more supported in proof-based math.

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