

Investigating the Alignment of Instructors' and Students' Perceived Self-Efficacy Levels and Sources in an Introduction-to-Proofs Course

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This study investigates whether there is alignment between an instructor's and students' perspectives on students' self-efficacy levels and sources for using proving techniques in an Introduction-to-Proofs (ITP) course. It uses Bandura's self-efficacy theory (1977) and its four sources of self-efficacy (performance accomplishments, vicarious experience, verbal persuasion, and emotional arousal) as a basis for understanding where students' self-efficacy levels may originate. This builds on an established interest in understanding Bandura's four sources with respect to mathematics self-efficacy levels (Gainor & Lent, 1998; Gao, 2020; Parsons et al., 2011; Regier & Savic, 2020; Usher & Pajares, 2009; Watkins & Middleton, 2021).

Klassen and Lynch (2007) investigated the perspectives of Grade 8 and 9 students with learning disabilities and their teachers regarding the students' self-efficacy levels and sources. They concluded that the students' and teachers' perspectives of the students' self-efficacy levels and sources were misaligned. My study investigates if there is a similar case of misalignment between student and instructor perspectives in an ITP course, as "the differences in teacher and student perceptions and understandings of self-efficacy may result in teachers' providing interventions that are not valued by students, and possibly even counterproductive to their academic performance" (Klassen & Lynch, 2007, p. 504). This study is therefore guided by the following research question: Do teachers' and students' perspectives regarding students' self-efficacy levels for using proving techniques and the classroom experiences that influence students' self-efficacy levels for proving techniques align?

Data collection is ongoing from an ITP course that is running during the Fall 2025 semester by observing and recording each class session and conducting interviews with six students and the course's instructor. There will be, in total, three rounds of student interviews (SI) and two rounds of instructor interviews (II) that take place in the following order: SI1, II1, SI2, II2, SI3. Each interview consists of three phases. The first phase focuses on each participant's recent experiences in the course. The second phase's questions focus on two proof-based problems that I give each participant. Note that SI1 and II1 have the same problems, as does SI2 and II2. In the third phase, I show participants four classroom recordings and ask them questions about their recollection of each moment and each moment's possible impact on students' self-efficacy levels. This phase is being conducted similarly to Lew et al.'s methods (2016) that showed a real analysis course's students and instructor the same classroom recording to investigate alignment between what the instructor intended to convey during the lecture and students' understandings of the lecture's material.

This poster will focus on the study's preliminary results. The preliminary findings suggest there is some alignment between the instructor's and students' perspectives on students' self-efficacy levels and sources for using proving techniques. For example, the perspectives of the instructor and several students agreed that students were more confident in their ability to prove a statement directly than in their ability to prove a statement by contradiction. Additionally, the instructor and most of the students said that the in-class example of proving $\sqrt{2}$ is irrational by contradiction did not positively impact the students' self-efficacy levels for using contradiction.

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