An Examination of the Self-Regulation Strategies of Students in an Inquiry-Based Learning With ALEKS Support Course

Peter Sassman
Northern Illinois University

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Extensive research has shown that a vital component of student success in mathematics classes is the ability to self-regulate (e.g., Bol et al., 2016; Isaacson & Fujita, 2006; Kramarski & Gutman, 2006; Ley & Young, 1998; Mevarech & Fridkin, 2006; Throndsen, 2011). Self-regulated learning (SRL) is the ability of a student to take an active part in their learning, by setting goals and motivating themselves, using different strategies to complete their learning task, and by reflecting on their learning and strategy usage (Zimmerman, 2002). A prominent model of SRL and the one being used for this project is Zimmerman's (2002) model, which has three phases: the forethought phase, the performance phase, and the self-reflection phase (Zimmerman, 2002). In addition, there has been research into different classroom practices to combat the issues of low academic achievement, such as more active-learning style classes (e.g., Freeman et al., 2014) and the use of technology (Cosyn et al., 2021). A specific type of active-learning model is known as Inquiry-based learning (IBL), where students are given investigative tasks that allow them to be engaged in the creation of important mathematics (Laursen & Rasmussen, 2019), and has shown promising results in university courses (e.g. Kogan & Laursen, 2014; Laursen et al., 2014). The intelligent-tutoring software ALEKS has also been adopted in many classrooms (Cosyn et al., 2021), where research has seen positive results when the software was used as a supplement to a regular classroom (e.g., Boyce & O'Halloran 2020; S. Sun et al., 2021). My project focuses on how students self-regulate their learning in classrooms that utilize inquiry-based learning (IBL) and ALEKS software.

This project integrates student questionnaires and classroom observations to determine how students self-regulate their learning in this novel classroom environment. The surveys include a numerical measure of students' SRL skills using a subset of the Motivated Strategies for Learning Questionnaire (MSLQ; Pintrich & De Groot, 1990). The classroom observations use the Toolkit for Assessing Mathematics Instruction – Observation Protocol (TAMI-OP; Hayward et al., 2018), while the intensity of IBL is measured using the Inquiry-Oriented Instructional Measure (IOIM; Kuster et al., 2019). I examine the self-regulated learning scores of students and the intensity of inquiry-based learning to look for relationships. This poster will present some of the observational data collected, along with the numerical values of the SRL skills, to answer the questions: (1) Is there a relationship between the intensity of IBL and students' self-regulated learning skills? (2) Are there differences in the intensity of IBL across sections? By analyzing how classroom practices may relate to self-regulated learning skills, we can then begin adjusting these practices to focus on improving the SRL skills of students in future courses.

For five different sections of this coordinated class with all different instructors, interesting differences were observed through the TAMI-OP, as well as differences in the implementation and intensity of IBL via the IOIM. For example, some sections had higher scores on the TAMI-OP, reflecting a more active-based classroom, but lower IOIM scores. In addition, some sections had higher IOIM scores but had lower self-regulated learning skills in students.

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