Learning to Learn: Enhancing Student Success in General Education Math Courses Through Metacognition, Social Learning, and Resource Awareness

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Students entering college face an educational landscape that is vastly different from their high school experience. Many first-year college students encounter challenging mathematics courses that demand new forms of self-regulation and require adaptation of existing and developing new productive learning strategies. To aid students with these challenges in mathematics classes, we have integrated three dimensions of learning: metacognition, resource awareness, and social learning. Research shows that students who engage in metacognition and self-regulated learning (e.g., Zimmerman, 2002)—systematically analyzing and refining their learning approaches—perform better academically. However, learning is not an isolated process, so social learning plays a crucial role in shaping students' understanding. These dimensions encompass three key ideas of one's own learning: helping students learn about different learning strategies and discover their own learning strategies in the process.

The objective of this project is twofold. First, we aimed to design adaptable instructional materials that provide a systematic approach to integrating three mutually reinforcing dimensions of learning: (1) developing metacognitive skills, (2) increasing awareness and use of university learning resources, and (3) fostering social learning. Examples of such activities include weekly reflective journals, a scavenger hunt for locating campus learning resources, and a variety of out-of-class collaborative assignments. Second, we aimed to assess the effectiveness of these instructional materials, in particular, in terms of students' abilities to develop and articulate productive learning strategies. As such, our central research questions are: 1) What is the effectiveness of the proposed activities in developing metacognitive skills, fostering social learning, and increasing awareness of resources? 2) What learning strategies do students develop as a result of their experiences with the proposed activities?

To answer these research questions, we implemented the designed instructional materials in one section of general education Calculus 1 taught by the third author. Using a mixed-method approach (Johnson & Onwuegbuzie, 2004), we collected data through surveys and semi-structured clinical interviews (Clement, 2000). The survey items were adapted from existing inventories (e.g., Brown et al., 1996; Schraw & Dennison, 1994) and supplemented with our own items targeting various aspects of social learning. Clinical interviews provided richer, open-ended insights into students' perceptions of the activities and learning strategies they developed.

The data analysis is ongoing. During the poster presentation, we will share our instructional materials, preliminary findings on their effectiveness, and students' professed learning strategies.

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