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Redesigning Asynchronous Discussions in an Online Graduate Engineering Course: A SoTL Study Plan

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Abstract

Student engagement remains a persistent challenge in asynchronous online learning environments, particularly in STEM disciplines where meaningful peer interaction can be difficult to sustain. In a graduate-level engineering course undergoing redesign, course evaluation data indicated that students perceived peer interaction as contributing less to their learning than other course components. This planned Scholarship of Teaching and Learning (SoTL) study examines whether structured discussion prompts designed to elicit self-explanation can support meaningful peer interaction and learning outcomes in an asynchronous online course. Grounded in generative learning, self-explanation, and cognitive load theory, the study focuses on self-explanation as a cognitive mechanism that may contribute to meaningful peer interaction and learning outcomes. A mixed-methods, quasi-experimental design will compare two consecutive course offerings: a prior section using unstructured, ungraded discussion forums and a redesigned section using structured, graded prompts. Posts and replies from both offerings will be coded and scored with a five-level self-explanation rubric to identify inference, reasoning, and conceptual integration. Qualitative analysis will examine how self-explanation appears in discussion contributions and how it is associated with meaningful peer interaction. Learning management system participation metrics, rubric-based self-explanation scores, assignment scores, exam scores, and final course grades will be compared across discussion conditions. By examining patterns of self-explanation, peer interaction, participation, and academic performance, this study aims to inform evidence-based discussion design in online graduate engineering education.

Keywords: Asynchronous Online Discussion; Graduate Engineering Education; Sotl; Self-Explanation; Student Engagement