

The Role of Online Quizzes in Students Preparedness for Flipped Classrooms and Improving Learning Outcomes in Gateway Chemistry Courses

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Abstract:

High-enrollment, low division gateway courses historically have a lower rate of student success. Redesigning gateway courses, in favor of evidence-based teaching practices improves student performance and pass rates. Two versions of General Chemistry I and two versions of General Chemistry II course taught by the same instructor were assessed based on the course final grades. The sample design included students enrolled in the blended high-structure courses without online prerequisite quizzes as part of pre-class learning, control sections in this research (spring 2023, fall 2023), with initial population 88 and 53 students respectfully; two blended high-structure courses with mandatory prerequisite quizzes included in pre-class learning, experiment sections in current research (spring 2024 and fall 2024) with initial populations 66 and 72 students respectfully. It was shown using the inferential analysis that the improved student learning outcomes in experiment sections vs. control sections are attributed to prerequisite online quizzes in pre-class learning phase due to improved students' preparedness for the active learning sessions in flipped classroom settings and useful feedback to students about their mastery of learning objectives.

Keywords:

Course Redesign, Flipped Classroom, Gateway Course, Pre-class Learning Modalities, Pre-class Online Quizzes.