Linking Early Warning to Supplemental Instructions in Organic Chemistry

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Project Abstract: Organic chemistry lecture courses are traditionally included among the high failure rate courses in collegiate curricula across the nation. In this project, we sought to address this trend by instituting in organic chemistry II lecture a competency exam during week one which encompasses material from organic chemistry I lecture. This is the second semester course of a two-semester sequence that was designed for the biological sciences major. Students performing poorly on this exam were strongly urged to seek advice from the college academic adviser and also enroll into supplemental instruction (SI) so that their deficiencies could be addressed. All students were followed throughout the semester and the passing rates of SI-enrolled and non-SI students were obtained at the end of the semester. This will allow us to examine the effectiveness of our approach towards enhancing the passing rate of these courses. This will be compared to an identical course in which no SI was available.

Motivating Problems: Organic chemistry is notorious among students majoring in the sciences for its difficulty and low passing rates. In our continuing search for a more effective way to address this problem, we sought to more directly target those students who could benefit most from SI sections through the early administration of the competency exam and advising of low-performing students by the college academic adviser.

Timeline: Administer the review/competency exam during the first week of the course to assess student preparedness. During the early part of week 2, poorly performing students are contacted by the college of natural sciences academic adviser and each student is advised on study habits, work schedule, other off-campus commitments, and also strongly encouraged to enroll into an SI session. After each midterm (week 5, 9 and 13), students performing poorly will be advised by the lecture instructor on study habits and strategies. The ACS standardized exam will be administered as the final exam and the data from that exam will be item analyzed for areas of strengths and weakness in student preparation. The performance of both the SI student group and non-SI student group will be analyzed for conclusion and summary.

Outcomes: We will very closely analyze the results of the competency exam, the three midterms, and the final exam to determine specific topics that students gained mastery during the semester. The data from all examinations for both the SI-enrolled students and the non-SI students will be also examined to determine any impact the SI participation has on the student performances and passing rate.

Broader Impact: Our study should be relevant to other courses which are comprised of two semester sequences. For example, the issue of how critical retention of the material from the first-semester course towards success in the second semester will be relevant to many other chemistry courses such as general chemistry, physical chemistry, and biochemistry, as well as many biology, math and physics courses. Another question addressed in this study is the level of student response to suggestions by the academic adviser to participate in additional instructional opportunities such as SI sessions. A third factor being probed in this study is the appropriate selection of undergraduates to become SI leaders. We carefully selected our SI leaders this semester for the three organic chemistry II lectures after interviewing each candidate by the instructors. We feel that these efforts should result in improved passing rates and an overall increase in student motivation to overcome the challenges encountered in these types of courses.
References:
