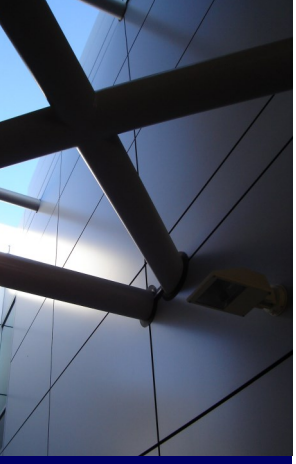

MECHANICAL ENGINEERING
DISSERTATION DEFENSE

The Department of Mechanical Engineering presents:

The Ph.D. Dissertation Defense of

Justin Gyllen

Wednesday, November 29, 2017, 12:00PM in Winston Chung Hall 203

Investigating Students' Course Material Use Through Novel Technology-Enhanced Data Collection

Doctor of Philosophy, Graduate Program in Mechanical Engineering
University of California, Riverside, November 2017
Dr. Thomas Stahovich, Chairperson

This dissertation examines students' use of written course materials in introductory engineering courses, begins to elucidate the relationships between students' study habits and their subsequent course performance, and evaluates the impact that carefully designed preparatory quizzes has on these relationships. Much of previous educational research into student study habits relies heavily on self-reports – measures which can be unreliable and problematic. This dissertation addresses the issue by employing a custom instrumented document viewing software designed to objectively measure students' actual use of the provided course materials with unprecedented objectivity and detail. The research inquiries investigated in this dissertation consider not only how much time is spent in study, but also what types of content are being used and when the study activities occur.

The findings suggest that engineering students use the textbook at surprisingly low rates throughout the quarter, and that spending a relatively larger portion of one's time on pages containing homework problems is positively related to performance. Further, students are largely inaccurate in their judgements of how much they actually use the provided course materials. The results suggest that students who are more accurate in their judgements of time spent in study will tend to perform better in the course, highlighting the importance of one's own awareness of study habits. Finally, the results of an experimental intervention suggest that when preparatory assignments are added to the course structure, students viewed a significantly larger percentage of pages that were explicitly assigned to be read and performed significantly better on in-class quizzes. Further, students visited the explanatory text pages of the textbook earlier and more often, with respect to homework assignment deadlines, and this behavior was found to moderate the relationship between preparatory assignment treatment and course performance.

This dissertation makes both applied and methodological contributions to educational research. The findings provide a quantitative analysis of students' actual study habits in engineering courses and begins to illuminate the relationships between study behaviors and course performance. Additionally, this work provides insight into the possible mechanisms that influence the relationships between study behaviors and learning outcomes when adding preparatory quizzes to the course structure.