

The Department of Mechanical Engineering presents:

The Ph.D. Dissertation Defense of Kevin Rawson

**Wednesday, December 19, 2018,
11AM in Winston Chung Hall 205/206**

**Using Smartpens to Examine the Relationship between Homework
Habits and Academic Achievement, and Influence Positive
Behaviors in Introductory Engineering Courses**

Doctor of Philosophy, Graduate Program in Mechanical Engineering
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Dr. Thomas Stahovich, Chairperson

This dissertation examines students' homework behaviors and the relationship to course achievement in introductory engineering courses. Much of the prior research on student behaviors relied upon self-reporting, which this work shows can be problematic, and which we avoid by employing smartpens to objectively measure students' natural work in an unobtrusive manner, with a high level of fidelity. This dissertation examines how much, how frequently, and when students work on their homework assignments, and whether we can influence students to change their behaviors on future homeworks by detailing their current behaviors.

This work makes four major contributions. First, we detail quantitative measures of student behavior that are related to course achievement. Second, we illustrate why self-reported quantitative measures of student behavior are problematic. Third, we investigate student behaviors over an entire course, and find that predictions of course grade from measures of student behavior at the beginning of the course are nearly as predictive as measures from over the entire course. This result also suggests student behavior does not change significantly over the course. Finally, we show influencing student behaviors by detailing their current behaviors with suggestions for improvement through a weekly report is an insufficient motivator to change their behaviors on future assignments. However, we observe that students that read more of the weekly reports in a timely fashion also tended to display more of the positive homework behaviors.

This work makes both applied and methodological contributions to educational research. The findings illustrate the relationship between students' contentiousness and course outcomes. Additionally, this work shows students' homework behaviors remain fairly consistent throughout the entire course.

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