E²Coach in Physics: who takes advantage of personalized feedback, encouragement, and advice?

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Who does better-than-expected?

In 2008, we began a learning analytics project aimed at understanding student performance in large introductory physics courses. The “Better-Than-Expected” (BTE) project gathered information describing the progress of 48,579 UM students through these courses over a period of 14 years. In this dataset, we combined detailed information about the student on arrival in the class (including standardized test scores, high school and prior UM GPA, socioeconomic status, gender, etc.) with a full portrait of their progress through the course (including homework grades, classroom participation, exam scores, and final grade).

These data allowed us to quantify the correlation between student preparation, background, and initial performance on course outcomes - to construct predictive models of student success. We find that final grades can be predicted from information about an entering student quite well, with a dispersion of half a letter grade. The simplest predictor is incoming UM GPA.

Example results from the UM “Better than Expected” project for Physics 140, the first semester course for engineering and physical science students.

What does E²Coach offer?

E²Coach is a learning analytics driven intervention engine, designed and built to support all students. At its core is the power of computer tailored communication; the ability to design unique content for an individual based on data known about them. E²Coach is built on the Michigan Tailoring System (MTS), a mature open-source software package developed and supported by the UM Center for Health Communications Research. It allows us to give every student a website containing complex feedback, encouragement, and advice which is aware of their background, current standing, and concerns, sensitive to their ambitions and identity, and responsive to their progress as the term goes on. Because these messages, designed by a team of experts, are computer generated, they are as easily delivered to a class of 700 as they would be to a class of 20.

E²Coach Status

E²Coach Enrollment: by Engineering, by Gender, by Course

More females students have chosen to enroll in E²Coach

E²Coach Enrollment: by UM Cumulative GPA

Students with weaker GPAs have enrolled in E²Coach

Next Steps

In this initial implementation we required students to opt-in to the system. The data above show that many of the students we most want to reach have not taken advantage of what E²Coach has to offer. We have come to realize that while developing message content is important, so is building a system that engages the students with the material.

We are planning on requiring E²Coach participation for the Fall ’12 semester and planning to engage other campus resources. We envision that E²Coach will deliver messages to academic support units such as CSP, WISE, MEPO, MSTEM Advisors, in an effort to provide students with personal support when it is most required.