Abstract

Screencasts, recordings that capture audio narration along with computer screen images, can be used to supplement lectures with content that addresses diverse student needs. This study documents the strategic use of screencasts in a large introductory Materials Science & Engineering (MSE) course, examining their impact on course performance. While screencast use is perceived as helpful and is positively and significantly correlated with course performance, the most substantial gains were found for students with the least amount of prior exposure to concepts in the course material.

Student Academic Background

Over 70% of students come from three departments: Aerospace Engineering (AERO), Chemical Engineering (ChE), and Industrial and Operations Engineering (IOE).

Academic Background (Major)

- AERO (24%)
- ChE (24%)
- IOE (20%)
- NERS (7%)
- MSE (4%)
- Other Engineering Majors (12%)

Prior Exposure to MSE 220 Concepts

While IOEs have academic indicators (e.g., GPA & SAT) comparable to their peers, they start MSE 220 at a disadvantage due to less prior experience with material.

Results

Self-reported Impact on Student Learning

Students typically used screencasts as study supplements and found them to be helpful.

- Over 86% of students who responded to the survey and viewed the screencasts in question felt the homework/quiz solutions and most difficult point screencasts were helpful.

Helpfulness of Screencasts

"...screencasts allowed me to clarify concepts I didn’t fully understand before the quiz, and helped me master them before the exam." ~ Fall 2008 Student

Implications & Future Work

- Regardless of course format, screencasts have the potential to:
  - Allow students the flexibility to work at their own pace and level of detail.
  - Synthesize resources into multimedia presentation of concepts that can reach a wider range of learners.
  - "Level the playing field" among students with comparable academic ability, but varying levels of academic preparation.

- Further exploration is needed to:
  - Understand the reasons for lower or higher screencast use among particular groups of students.
  - Test our conclusions across additional semesters and other courses that enroll students with diverse academic preparation.
  - Determine whether screencasting is similarly beneficial across other course formats (e.g., labs, computer design courses, etc.).

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