University of Michigan Provost's Teaching Innovation Prize

2012 WINNER

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Professor Millunchick is accepting this award with her collaborators: Tershia Pinder-Grover and Katie Green.

"The efficacy of screencasts to address the diverse academic needs of students in a large lecture course," *Advances in Engineering Education*, Winter 2011, Vol 2, No 3.

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High Return on Faculty Investment: Addressing Diverse Student Needs in Large Lectures Through Screencasting

Innovation Description

Screencasting has previously been featured in projects receiving the Provost's Teaching Innovation Prize. The innovativeness of this particular project lies in its integration of sound research on learning outcomes from the very outset.

Students from different engineering majors have comparable academic indicators upon entering MSE 220, a large introductory materials science and engineering course. However, their prior exposure to the course material varies widely. Whereas the core curricula for aerospace and chemical engineering majors include MSE-related topics, there is little such overlap in the industrial and operations engineering (IOE) curriculum.

Careful statistical analysis reveals that students perceive screencasts to be helpful and tend to use them as a study supplement. Overall, usage of screencasting in its various forms is positively and significantly correlated with course performance as indicated by the final grade. The most substantial gains were made by students with the least familiarity with course material. Specifically, IOE students enter with the least preparation in materials science, but they do not receive the lowest grades in the course, due to their comparatively heavy use of the screencasts.

Screencasts thus have the potential to "level the playing field" in courses which draw students with a wide range of background knowledge.

Student Comments

"I wish every class had screencasts."

"The different forms of information made available to the students really enhanced my ability to learn the material."

"Animations and photos really help illustrate key concepts."

"I don't think I've ever taken a class where the instructor does all they can to make sure the student doesn't have any lingering misconceptions."

"Essentially, the screencasts mimic the interaction that would occur if problems were discussed with [the professor] one on one."
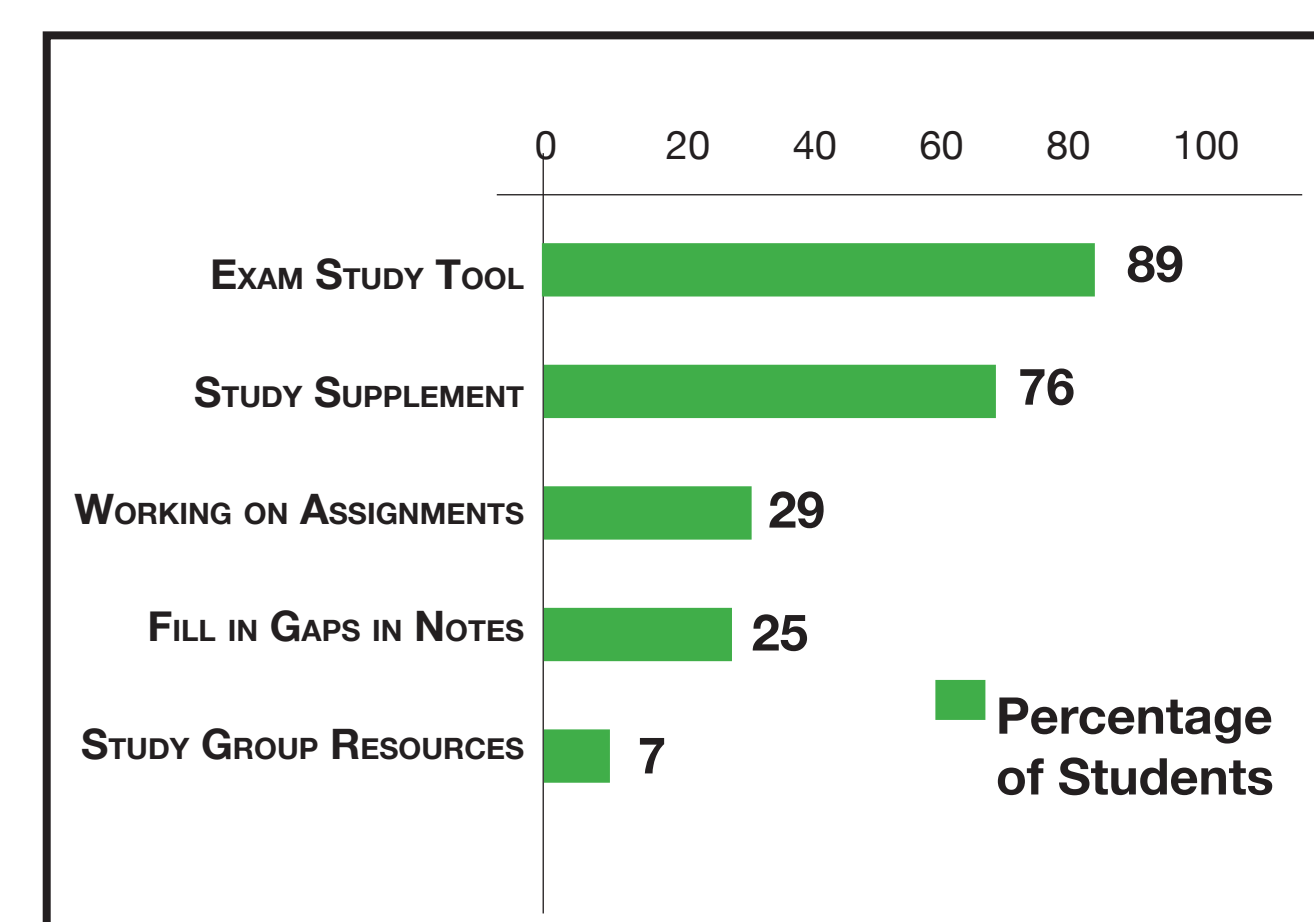
Screencasts "empower the diligent student to succeed."

The screencasts innovatively present "homework solutions, taking the student step-by-step through the mental processes taken in arriving to the final solution."
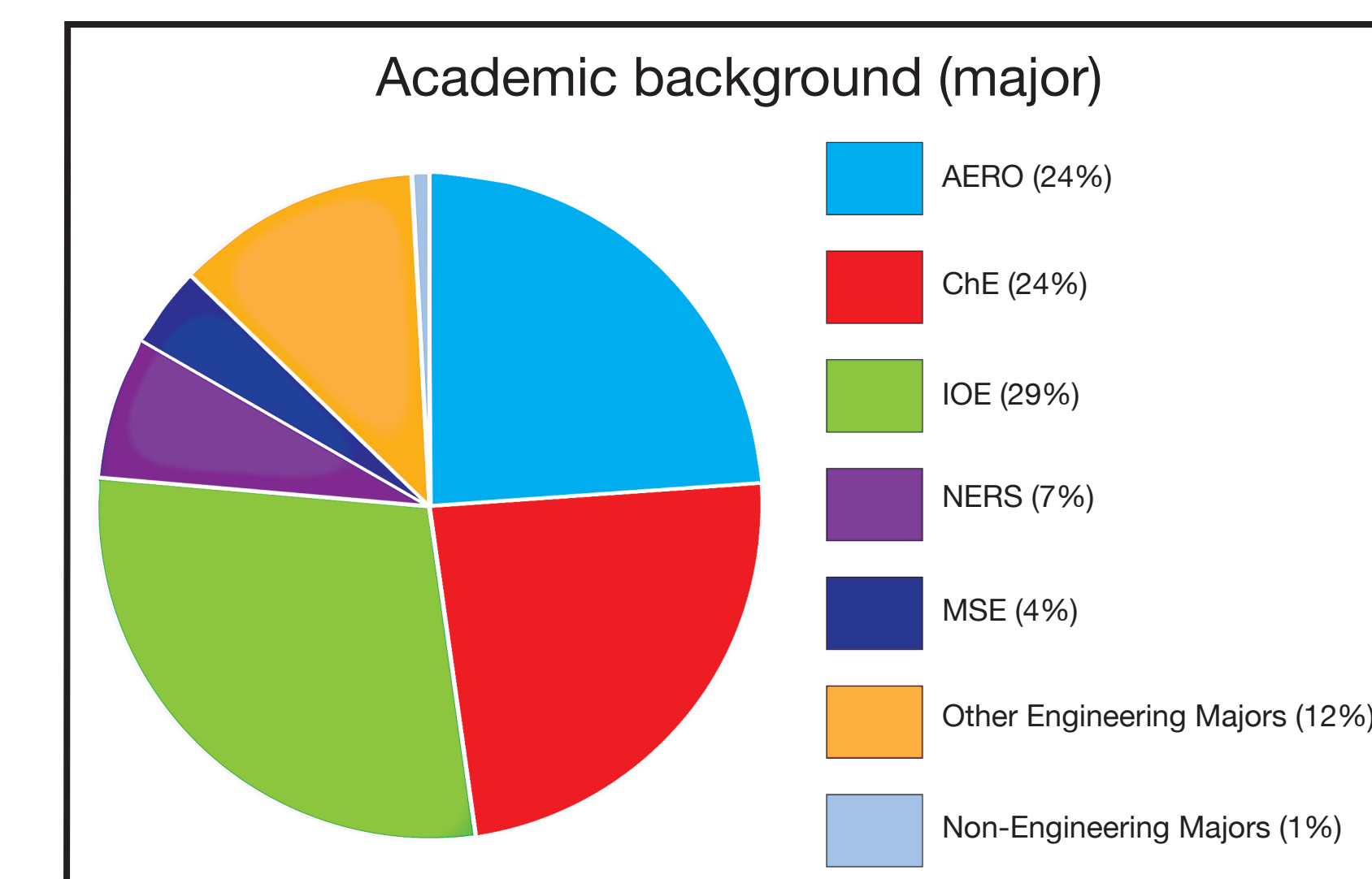
"I really like the recorded lectures so that I can go back and look at lectures that were unclear."

Examples of Teaching Innovation

I. CAPTURING LECTURES AS THEY OCCUR, ENABLING LATER REVIEW

II. CLARIFYING "MUDDIEST" LECTURE POINTS IDENTIFIED BY AT LEAST 30% OF STUDENTS

III. DISSEMINATING NOT JUST SOLUTIONS, BUT RATHER PROBLEM-SOLVING PROCESSES, AFTER HOMEWORK, QUIZZES, AND EXAMS HAVE BEEN TURNED IN

Functions fulfilled by different types of screencasts. Students love the informality and accessibility of basement recordings, even when the professor's dog is barking in the background.

	Percentage of Students
EXAM STUDY TOOL	89
STUDY SUPPLEMENT	76
WORKING ON ASSIGNMENTS	29
FILL IN GAPS IN NOTES	25
STUDY GROUP RESOURCES	7

This chart shows how students use screencasts. Data span two semesters of usage by MSE 220 students.

Academic background (major)

- AERO (24%)
- ChE (24%)
- IOE (29%)
- NERS (7%)
- MSE (4%)
- Other Engineering Majors (12%)
- Non-Engineering Majors (1%)

Number of website hits & polymer structure final exam question

Major	N	Correlation	Sig.
AERO	34	r=.350*	p=.042
ChE	45	r=.123	p=.421
IOE	60	r=.425**	p=.001

*$p<0.05$, **$p<0.01$

Screencast use and final exam performance correlate strongly for IOE majors, whose curriculum does not expose them to MSE content before they enter MSE 220.