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Tablet PC's, Active Learning, and Freshman Mathematics

Abstract

Too often freshman fail and fall behind early in our large-enrollment math courses, Calculus for Engineers or Liberal Arts Math, because they do not engage in the classroom and their questions remain unanswered. Bringing Tablet PCs and a projector, obtained through a 2006 Hewlett-Packard Teaching-for-Technology Grant, into multiple sections of these courses, allows each student or small group of students to use the pen/digital ink feature to submit problem solutions anonymously to the instructor via web-based classroom-interaction software, such as MessageGrid or Ubiquitous Presenter. The instructor projects, discusses, annotates, and saves individual submissions. Communication now occurs with a subset of students who would rarely participate in class, and active learning is achieved across the classroom because all students are primed for instructor feedback. We compare performance on common exams in the sections using Tablet-PCs, web-based software, and projectors with our traditional sections. We query students (and instructors) on their impressions of this technology.

Objectives:

To show the audience the great potential of digital ink, tablets, and projectors to enable active learning in the classroom, especially in symbolic-heavy disciplines. To show the methodology behind our initial attempts at evaluating the effectiveness of the project. We look at: (1) Initial student comparability variables; (2) Performance measures; (3) Student behaviors and satisfaction; and (4) Instructor investment of time and satisfaction.

Audience Involvement: If there are internet connections in the room, a few tablets could be interspersed among the audience, and individuals could make submissions using the two web-based software programs.

What Audiences will learn: They will experience a new way of teaching and will learn what this technology makes possible, even with a minimal number of Tablet PCs. Tablet PCs, projectors, and web-based software allow active learning to be achieved in the classroom because communication now occurs even with that subset of students who would rarely participate in class. Instructors teach new concepts in a context that has meaning for the students—i.e., an individual student, working on his own or with others, to solve a problem, receives from the instructor immediate detailed feedback on his work (usually submitted anonymously). And everyone sees and benefits from this feedback.