

Dare to Discover Everywhere

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ABSTRACT: We are using Tablet PC technology to transform two of our department's capstone (senior-level) design courses, in computer engineering and software engineering. The goal is to increase student engagement and satisfaction in these team-oriented project courses. The students will use the Tablet PCs to develop and maintain electronic design workbooks. In year two, the software engineering capstone lectures will be redesigned using discovery-based learning.



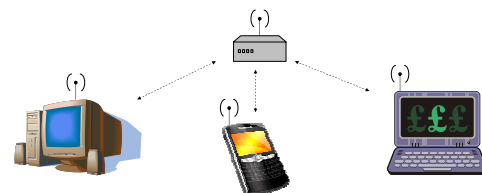
Impact on Student Learning

We believe students in a capstone course are motivated by both intrinsic and extrinsic rewards. Intrinsic rewards include the satisfaction of performing well on a creative project the student cares about. However, the documentation elements of producing a design tend to be less intrinsically rewarding. We hope to change this dynamic by using mobile technology to streamline the design process and (in CMPE 440) transform the learning experience to a discovery-based approach. The two questions we are trying to answer are: 1) will these interventions positively affect student engagement and satisfaction; and 2) what is the relative effect of the Tablet PC technology? These will be measured using both the standard student ratings of instruction (which contains both engagement and satisfaction items), and a specialized survey instrument examining the different technological elements. This latter is based on the Technology Adoption Model (TAM).



Technology Implementation

In both courses, electronic design workbooks are being implemented. In CMPE 440 this will be a Wiki for requirements & design prototypes; and a CVS repository for code. In CMPE 490 design team members using the tablets will be able to access design documentation and code remotely and from different sites. It is expected that this will facilitate faster design and system debugging. Also, the wide-format plotter will produce larger, more convenient hard copies of design circuit layouts. The tablets are also a target platform for the CMPE 440 projects; they will be linked to desktops and a group of smart phones via a private WLAN. In Year 2, the DyKnow software will be employed to link the tablets into a smart classroom to facilitate our discovery-based learning approach.



CMPE 440 Lab Environment

Impact on Teaching

CMPE 440 has very limited lecture components (1 hr/wk), but is taught using a traditional lecture format in a classroom setting. The lectures cover principles of mobile application development. The class will change to a problem-based approach in Year 2. Mobile application design problems will be posed during each lecture; the students will then solve them. Being a software course, working out the solutions will require on-line access, collaborative work tools, and the ability to switch rapidly between voluminous text and freehand drawing. The key question to be answered here is whether the Tablet PC is the *right* technology for this application. This will again be measured using a survey instrument based on technology adoption theory.

Keywords: engineering, capstone design course, electronic design workbooks, discovery-based learning