Panel Session - Pen-based Computing in the Engineering and Science Classroom: Implementation Scenarios from Three Institutions

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Abstract - As digital ink technology continues to make an impact on the technical classroom, faculty members are exploring the different strategies for using this technology to improve student learning. The purpose of this panel is to demonstrate how faculty members are implementing this technology in engineering and science classrooms at three different institutions: Rose-Hulman Institute of Technology, University of Texas at Austin, and University of Vermont. The panel is designed to show both experienced pen computing users and those who are new to the field the different ways this versatile technology may be employed. In addition to the demonstrations, the presenters will discuss the pedagogical implications that result from the implementations. Faculty who are interested in both the pedagogy and assessment of pen-based computing in the classroom should find the session informative and useful.

Index Terms – Camtasia software, DyKnow Vision software, Microsoft Journal, Pen-based Computing, Tablet PC.

INTRODUCTION

The implementation of pen-based computing technologies in the technical classroom is in its infancy, and yet its potential to transform the classroom and to impact both student learning and faculty teaching appears promising. Thus, we see the ways in which pen-based computing (both tablet PCs and pen slates) can enhance not only the visual dimension of a course, but also “facilitate collaboration, promote active learning, encourage note taking, and provide frequent opportunities for formative assessment.” [1] As the research into pen-based computing pedagogies grows, we see the potential of the technology to change fundamentally the technical classroom. [2-10] As the panelists demonstrate how they are implementing pen-based computing in their institutions, they also share best practices that have emerged through their experiences.

IMPLEMENTATION SCENARIO 1 - ROSE-HULMAN INSTITUTE OF TECHNOLOGY

At Rose-Hulman, we have been developing pen-based computing pedagogies since 2003, when we received our first Mobile Technology Solutions grant from the Hewlett Packard Company. Implementations of pen-computing have occurred in a variety of engineering and science courses. We are demonstrating several of these implementations: the use of tablet PCs and DyKnow Vision software that is being used in the Medical Imaging course offered by the Electrical and Computer Engineering department, the Japanese Language class, several courses in the Computer Science and Software Engineering department, and the Design for Manufacturing class in the Mechanical Engineering department.

In addition to the technology demonstration, we plan to discuss the pedagogical implications that result from the implementations, drawing on two years of assessment data that we collected in these courses. Faculty who are interested in both the pedagogy and assessment of pen-based computing in the classroom should find the session informative and useful.

IMPLEMENTATION SCENARIO 2 – UNIVERSITY OF TEXAS AT AUSTIN

The pursuit of interaction and engagement in classrooms takes on many forms. One current approach is utilizing readily available technology (i.e., a Tablet PC) coupled with software that allows for dynamically enhancing presentations and moving beyond the ability to annotate. In the Cockrell School of Engineering at UT Austin, we began our investigation of such tools with an early look at a product called “Silicon Chalk.” While it wasn't yet ready for the rigors of classroom demands, other products are available that help to transform classroom interactions and collaboration. Several of our engineering professors are field testing DyKnow Vision software in their classes and finding that the ability to become mobile in a classroom yet still be connected via their Tablets is a real asset. No longer are they tethered to the front of the room and instead they can move
around, annotating as they go as well as sharing what is on the screen with their students. They can even go a step farther and collect feedback by polling their students.

We plan to share some of their classroom tales and highlight what is working. We've also collected some student reactions to this technology and we can share what they are saying. We can't stake the claim that what we are doing is transformative, but we do believe it is helping to invigorate both faculty and students in the teaching and learning process.

IMPLEMENTATION SCENARIO 3 – UNIVERSITY OF VERMONT

Utilization of Tablet PCs in the engineering curriculum at the University of Vermont has been ongoing since 2003. Efforts have focused on two distinct pedagogical aspects. Early work explored the use of Microsoft Journal for content development and in-class instruction. This experience has recently been leveraged, along with the use of Camtasia Studio, to efficiently develop online content. The second aspect of the work has integrated Tablet PC use into learning environments where students collaborate most frequently: namely, in laboratories and design courses. The objective of that work was to ascertain how mobile, pen-based computing can enhance both individual and team learning in these settings from both student and faculty perspectives. The working premise was that Tablets have added benefit, in comparison to laptops, since much engineering content consists of equations and diagrams, entry of which is cumbersome at best with a keyboard and/or mouse. Various implementations of both aspects are discussed.

BIBLIOGRAPHY