

AC 2007-1122: TRANSFORMING TEACHING AND LEARNING USING TABLET PCS ? A PANEL DISCUSSION USING TABLET PCS

Frank Kowalski, Colorado School of Mines

Frank Kowalski is Professor of Physics at Colorado School of Mines. Interested in improving classroom communication, he spearheaded efforts to introduce the use of clickers in CSM's introductory level physics classes. He currently uses InkSurvey to enhance his teaching of a junior/senior level electricity and magnetism course.

Julia Williams, Rose-Hulman Institute of Technology

Julia Williams is executive director of the Office of Institutional Research, Planning and Assessment and a professor of English at Rose-Hulman Institute of Technology. She has published on writing assessment, electronic portfolios, and ABET.

Rob Reed, Hewlett-Packard Corporation

Rob Reed, University Relations Representative, has twelve years of experience in the fields of engineering and technology. Prior to joining Hewlett-Packard, Rob worked in a similar capacity at Microsoft. Rob earned a BS from Webb Institute of Naval Architecture, started a computer modeling consultancy, received an MBA in finance (Indiana University), worked for Deloitte Consulting and taught technology to undergraduates at Indiana University.

Jim Vanides, Hewlett-Packard

Jim is a Program Manager for Worldwide Higher Education Philanthropy at Hewlett-Packard. He leads the "HP Technology for Teaching" higher education grant initiative and community of over 200 campuses in 34 countries. He also writes a blog about best practices emerging from grant-supported projects around the world (www.hp.com/go/hied-blog). In his "spare" time, Jim teaches an online course for Montana State University on the Science of Sound (www.scienceteacher.org).

Transforming Teaching and Learning using Tablet PCs

A Panel Discussion *using* Tablet PCs

Abstract

This panel discussion will highlight emerging best practices in the use of Tablet PCs to transform teaching and improve student success in college and university STEM (science, technology, engineering, math) courses. Faculty from two institutions, Colorado School of Mines and Rose-Hulman, will share their experience in using Tablet PCs and describe their approach to measuring the impact of their course redesign on student outcomes, sharing the evidence that supports their redesign efforts.

Presenters will then lead a panel discussion with all the session's presenters and the audience. The discussion will be facilitated by the use of Tablet PCs that are provided to the audience. The audience will use the Tablet PCs to access a free InkSurvey website to ask questions and respond to the panelists. This will model some of the ways that faculty have used Tablet PCs in their own classrooms to facilitate dialog and obtain instant, graphical feedback from students.

Through this session, the audience will become participants and experience first-hand some of the innovations that are improving student achievement and engagement. This includes going beyond using classroom response "clickers" that are limited to multiple choice question types to using graphical feedback systems to ask open-ended questions that elicit underlying conceptual understanding and student misconceptions

Colorado School of Mines

At the Colorado School of Mines, Tablet PCs are used in junior-level engineering physics classes to promote active learning and facilitate real-time communication between instructors and students. We have developed InkSurvey, a web-based tool that allows instructors to pose open-ended questions to the students. Each student uses a Tablet PC to construct and submit a response, which can be text, free-form drawings, graphs, equations, etc. The instructor can monitor these responses as they are submitted, providing an opportunity to offer solution hints and prepare a thoughtful response.

Frank Kowalski will describe how this active learning experience promotes student metacognition and enables real-time feedback that can effectively guide the instructor in modifying or validating student understanding.

InkSurvey can easily be used in conjunction with other computer-based or internet-based learning activities, such as applets. Significant learning gains, as evidenced by comparison of pre- and post-test scores, have been documented in classes at Colorado School of Mines.¹

This tool is also designed to allow for differentiated learning, since the instructor can activate more than one question at a time and each student can choose the question(s) to which they will respond. Since it is web based, “just in time” (JiTT) polling is easily implemented.

InkSurvey is available for free to the higher education community (<http://ticc.mines.edu/hp/survey/>) and its use will be demonstrated during this presentation.

Rose-Hulman Institute of Technology

Pen-based technologies like tablet PCs afford engineering educators a fresh opportunity to increase the visual dimension of many different types of courses. Julia Williams has developed curricula that use tablet PCs in five courses drawn from different disciplines: Introductory Physics; Technical Communication; Software Requirements and Specifications; Design for Manufacturing (mechanical engineering); and General Chemistry for Engineering Students. And while tablet PCs may allow faculty to enhance the visual dimension of a course (an inherently laudable goal), these technologies are their most powerful when they simultaneously facilitate collaboration between faculty and students, between students, and between one class and another. The project work focuses on the assessment and evaluation of the impact of a symbiosis of hardware (Tablet PCs) and software (DyKnow Vision) on teaching and learning.

Assessment has been developed at two levels for this project. One level of assessment is the development of classroom assessment techniques, or CATs. Basing the project on the work of Angelo and Cross (1993), faculty have identified CATs appropriate to each course and then adapted them into the tablet/DyKnow environment. Faculty have also made use of CATs that are already features within DyKnow, like the participant status and polling features. Each instructor can use CATs to gauge student learning in real time and make pedagogical adjustments as needed.

Data collected during the 2006-07 academic year in the five targeted courses will be shared. The data displays will point toward conclusions regarding the impact of tablet PCs and collaboration-facilitating software on student learning.

¹ Kowalski, F.V., Kowalski, S. E., and Campagnola, L. (2005). “Tablet Computers Used for Teaching and Real-Time Assessment of Conceptual Understanding of Engineering Students.” Proceedings of the 2005 American Society for Engineering Education Annual Conference, Portland OR.