Professors Experience Benefits of DyKnow/Tablets Across Disciplines

As one of the nation's top undergraduate colleges for engineering, science and mathematics, Rose-Hulman Institute of Technology in Terre Haute, IN is challenged with staying ahead of the technology curve.

Since 1995, Rose-Hulman students have been required to purchase an institution-specified laptop computer with an installed suite of software (e.g., Microsoft Office, AutoCAD, Maple). While students and faculty alike benefited from the power of laptops, technology staff was keenly award of another product that had the potential to be even better for student learning experiences – the Tablet PC. In 2003 and 2004 Rose-Hulman received *Mobile Technology Solutions in Learning Environments* grants from Hewlett Packard Company to purchase HP/Compaq Tablet PCs. More recently, the school has been honored with grants from Microsoft and Hewlett Packard's Teaching with Technology program. There are currently three pen-based computing classrooms (tablet PCs and slate devices), and classes that use pen-based computing are scheduled into these rooms.

With the purchase of hardware, Rose-Hulman was charged with finding software that would make capabilities of the tablet meaningful and useful to its students. In 2004, Rose-Hulman began using DyKnow Vision with tablet PCs. DyKnow Vision software fosters interaction through collaborative note taking, student response tools, content replay, and anywhere, anytime access. Teachers can use DyKnow Vision to instantly transmit content to student computers for annotation. DyKnow Vision works with desktops, laptops, Tablet PCs, and interactive whiteboards in fixed, mobile, and distance environments. DyKnow Vision's design allows for central server management and bandwidth optimization, allowing teachers to focus on delivering a more engaging and effective learning experience.

The use of Tablet/DyKnow solution has allowed new and innovative educational opportunities for students and faculty.

Chemistry
The chemistry department at Rose-Hulman offers engineering chemistry to students pursuing engineering degrees (with the exception of chemical engineering), as well

physics and mathematics majors. The course, taught by Dr. Rebecca DeVasher, is designed for students with diverse backgrounds in chemistry. DyKnow and the Tablet PC have encouraged assessment in the classroom, giving Dr. DeVasher better tools for addressing the unique needs of each individual. One DyKnow feature, participant status, allows students the ability to indicate their level of understanding on a topic. Coupled with polling and panel (work) submission, Dr. DeVasher can reach out to the students who are struggling with a particular concept and reward students who are grasping the material.

Computer Science and Software Engineering

Dr. Archana Chidanandan likes to write and draw while teaching her operating systems course. She also likes to have students work in pairs or individually and write solutions to share with the class. She now employs DyKnow to accomplish these goals. Inserting blank panels into her notebooks, Dr. Chidanandan allows students the opportunity to write their answers to problems. Using panel submission, the work is reviewed and shared with the rest of the class. Work is also submitted, graded and returned through DyKnow. Dr. Chidananda says, "DyKnow definitely makes the room a useful classroom, enabling active learning and giving students the opportunity to actively participate in the class."

Dr. Larry Merkle utilizes DyKnow in his Computer Architecture I class. He has had great success utilizing DyKnow to measure student learning more immediately in the classroom. For example, using DyKnow's polling feature, students are asked multiple choice questions about the effects of code snippets to determine the degree to which students have learned the semantics of assembly languages. Utilizing the panel submission feature, students anonymously submit short assembly language programs. The work is then presented to the class for critique.

Electrical and Computer Engineering

In a highly mathematical electrical and computer engineering course, students using DyKnow are now able to focus more on comprehension and less on copying everything down from the board. Professor Mario Simoni also finds real value in panel submission, as work problems can be presented to the class to illustrate common mistakes and instruction can be provided on how to avoid those mistakes. Professor Simoni says, "Learning requires feedback and the sooner students can get feedback on their thoughts the better the potential for learning to occur." DyKnow also offers the opportunity for these students to have a record of the problems that were discussed.

Mechanical Engineering

Dr. Patrick Ferro found students to be "disinterested and falling asleep" when he taught his Design for Manufacturing class utilizing one-way presentation software. His goal was to increase interaction and DyKnow has allowed him to do that. The vast majority of his students are now wide-awake, engaged, answering questions and participating in polls.

In a mechanical systems class, most students need more than 50 minutes to absorb the material. Dr. David Fisher wanted his students to have high quality electronic notes to study with later. Using DyKnow, his students now have an electronic record of lectures and are also experiencing a more interactive classroom. Dr. Fisher utilizes the polling feature, as well as panel submission, to showcase student work. He finds that when students can submit problems anonymously they are more likely to participate, rather than suffer the embarrassment of incorrectly solving a problem on the board. Dr. Fisher also utilizes the audio features to capture recordings of his lectures along with the notebook and posts them to his website for later viewing.

Physics
Dr. Sudipa Kirtley did not want her student to slip into "lazy mode" if all the class notes were presented to them in a prepared notebook. So, she utilizes the private ink feature of DyKnow to bring her notes for class without discouraging students to take their own notes. Private ink allows professors to write private comments in their notes prior to class. The notes show if the professor prints his or her notebook before class, but when the notebook is used as a set of prepared notes during class, private ink is not visible.
Dr. Kirtley has also had success with creating specific task which students must use DyKnow and their Tablet to accomplish.

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