How technology enhances teaching and learning assignment

Education

Owen School's Strategy In the New Economy seminar enter a classroom that looks like any other, except that a projection system and video screen have been installed. Their professor announces that today they will be joined by a guest lecturer, a senior UP from a Fortune 500 corporation. What makes this guest lecture unique is that the students are sitting in a Nashville classroom but the guest lecturer Is speaking from his home office in Estonia, via video technology.

This Is an example of one of the creative ways faculty members at Vanderbilt are using technology to enhance their students' learning. In the scene described above, Owen Professor David Owens, along with Professor Bart Victor, use video conferencing to bring an international guest speaker to their organization studies seminar. Across the University, faculty are using technology to help students master subjects from elementary and secondary school Instruction to bioengineering to structural equation modeling.

They are developing their own skills while making students comfortable with the technology that will help them be successful after leaving Vanderbilt. As they introduce more and more technology into the classroom, occult are finding it raises the quality of class discussion and involves students much more deeply in their own education. The employers of today are looking for the very best employees to fill positions In their organizations. The desired traits of an employee used to be centered on experience. The more experienced an applicant was, the more likely they were to get the job for which they applied.

Today, employers are not only looking for experience, they are also looking for a person that has a degree in the field. Employers have begun to realize the importance of strategic thinking and leadership skills that an education affords. Because of this shift in desired qualifications, modern adults have been unable to adequately compete In the Job market. The aforementioned time and responsibility constraints, as well as the fact that they have been focused on bulling the experience that was previously desired has put adults at a disadvantage.

Being able to obtain a college degree via technology-based education methods has greatly reduced that disadvantage. It has also had an impact on their ability to execute the functions of the position when the Job is obtained. For this Issue of the Teaching Forum, we spoke to four Vanderbilt faculty members, ACH of whom is using technology to enhance their students' learning. Owen Management Professor David Owens uses videoconferencing links to bring in guest speakers and incorporates video and audio technology into most of his lectures. Imputer lab, allowing him to integrate traditional lecture with demonstration projects using the methods he is teaching. Peabody Professor Margaret Smithy guides her students in the preparation of multi- media classroom presentations including clips from the Internet, video, audio, and news archive footage. She has opened an e-conference for interns from her courses ho want to stay in touch with their fellow students and professors, and she maintains a library of digitized video clips, taken from live and simulated classroom settings.

Department of Biomedical Engineering Chair Tom Harris directs a new NSF-funded center focused on developing technology-based bioengineering teaching materials and curriculum. He is collaborating with several partners, including Peabody Professor John Branford. What Technology Brings to the Classroom What these faculty members have in common, and what they share with many others across the campus, is a commitment o exploring the opportunities technology offers for improving the quality of classroom instruction. Professor Margaret Smithy describes how technology allows her to capitalize on unexpected turns in class discussion. Austerity afternoon my students had specific questions about classroom management, so at that point I said ' let's look at these scenarios that I have on a CD. ' The CD brought to life their questions. I think seeing actual classroom scenarios related to their questions makes learning come alive for my students better than if I gave my opinion or told a story. " Professor Toymaker, who teaches advanced statistics and methods classes, says incorporating computers into class discussion can also make extremely difficult courses much easier for students to grasp.

One of the challenges of teaching advanced statistics to students who often lack a strong math background is " translating theoretical stuff into a workable set of concrete analysis, " Toymaker says. " I find that it's really important to talk about different types of models from the point of view of specific problems and that's really where the ability in class to have stuff be on the projection system is critical. Access to a computer-equipped classroom can also be important. " I like to get students interacting with software in the class, " Toymaker says. L find if you Just send them home to

do it on their own, they run into real problems. When they follow me, typing in on their own computers, that facilitates their learning. " Last semester, Toymaker also faced another problem – the lack of a good textbook for teaching structural equation modeling to social science students – that he solved class. There are either books that tend to be too easy or too hard or Just not broad enough in scope. Toymaker solved this problem using the Prometheus system, by placing his lecture notes on the web.

This not only replaced the textbook, it allowed students to spend more time focused on the lecture and less time copying formulas from the board. " I told them, you don't have to write anything, it's all on the web, Just listen. " Technology Changes Teaching, Not Teachers While all the faculty members interviewed for this article believe technology has great power to influence their teaching, no one feels it fundamentally changes them as teachers. " Vive always wanted a very interactive classroom," Smithy says. Want it to be very theoretically based and I know exactly what I want my students to learn. I think technology has improved the quality of what we can access. " Smithy also emphasizes the importance of technology being used for a clear purpose. " l never want to use technology Just for technology's sake but to support my students' learning. " Professor Toymaker feels that integrating statistical software and visual models into his courses means he comes into class " better prepared" but doesn't think it changes him as a teacher. " l usually am pretty interactive with the class. He does, however, reedit the accessibility of computers with reducing the " passivity factor" in his classes. " They have to type things in, they have to click on the mouse. I think it's pretty lively in a lot of ways. " How Technology Enhances Learning Professor

Owens, Smithy, and Toymaker all feel they can see technology enhancing their students' learning, particularly when students use the technology directly. David Owens requires his students to do at least one group project entirely over the Internet. " They're not allowed to do it face to face," Owens says. They aren't allowed to say, " I'll call you tonight. They have to do everything virtually. In this project, they have a lot to figure out about group process, what things are done best face to face, what things are done best asynchronously, what things are done best in an anonymous chat room. And they figure it out. It's... So much more powerful than my sitting up there saying " the group process models show... " Professor Smithy requires her students to complete a series of computer assignments from a course CD that she has developed.

Smithy values these pre- class assignments because they save classroom time and improve the quality of class concussion. " When the students complete their CD assignments, they come to class with a common context. We are able then to discuss particular class dilemmas or teaching dilemmas that everyone has watched, analyzed and reflected upon. So, we can start there and go with our class discussion rather than having to take 20 or 30 minutes of class showing the video and asking the specific questions. They've done all that in the computer lab. " leading to enhanced learning. Students can see you're doing a lot of work to further their education and I think that there's an appreciation factor that ultimately nutrients to their own motivation," Toymaker says. Students who may question how much their professors care about teaching can also see evidence of the time and trouble taken to prepare for class. " I think sometimes graduate students, or

possibly even undergraduate students, go in with the mindset that this teachers doesn't really give a darn about teaching and I think using technology is a real way of communicating yes I do," Toymaker adds.

Technology Brings Challenges Introducing technology into the classroom can also bring a set of challenges. First among them is finding the time needed to incorporate ewe technology into courses. Professor Smithy not only uses the technology herself but also requires her student to produces multi-media projects during the semester. " If you're going to ask the students to do such a challenging project, you have to be available to them. You have to have support. There has to be some relief time to learn about the technology.

You don't have to know the details of technology but you have to understand it well enough that you can envision what your students need to know about using it. " The technology itself can fail, leaving an instructor to resort to back up. Technology also changes rapidly and it takes time to keep up with technical changes that influence how equipment and software perform in the classroom. Professor Owens points to a digitized news show he purchased from CBS: " I have the CD in here and one of my fears is that someday I'll pop it in the classroom and it won't work. It's a constant upkeep. Professors Toymaker and Owens also note that having computers in the classroom can distract students from the class itself. Teaching in a classroom equipped with computers " actually introduces the potential for students to be doing something on he computer that doesn't have anything to do with the class," Toymaker says. " I occasionally go parading around and check out what people are up to," Owens says. Some people take notes on the computer,

some people try to get the lecture slides up on their screen so they can see them up close, some people do e-mail, surf the net, do whatever. He agrees with Toymaker that students' personal use of computers in class is an issue that needs to be examined, " through whether that's worse than day dreaming I don't know. " Need for University Support Support by the University for the use of technology is also critical. Bringing technology into the classroom uses resources ranging from computers to classrooms to graduate assistants, and university wide coordination is essential for ensuring an effective learning environment for students. Dents with technology," Smithy says. " It is impossible for one faculty member to support an entire class of students in creating innovative ways to use technology. You can continue to use CDC that you have in your own library, you can continue to connect to the Internet from the classroom, but additional faculty support is necessary to take technology use to the next level of requiring our students to use genealogy in a way that prepares them for using it in the future classrooms. " Physical facilities are also important.

Keeping the technology in working order is crucial but so are other issues such as ensuring a classroom's physical design supports the best possible use of the technology. Mimi have a very real problem if you have big nice screens and nice projectors but the screen is in front of the white board; if you want to write and have slides at the same time, it's difficult if not impossible," Owens says. Moving Forward with Technology As the University moves towards an increasingly ordinates approach to the use of technology, several efforts are underway at Vanderbilt to determine Just how technology can be used to most effectively enhance learning.

One effort is the Vaunt Center in Bioengineering Educational Technologies, a Joint effort between Vanderbilt, Harvard University, University of Texas, and Northwestern. Among is several priorities is research into the value of technology, such as web-based education for teaching bioengineering. The research team is collaborating with specialists from the Learning Technology Center at Peabody and tit the Institute for Software Integrated Systems (ISIS). " It's recognized that bioengineering teaching materials are not very well developed and there is not a broad consensus on bioengineering curricula," says Thomas R.

Harris, chair of Vanderbilt Department of Biomedical Engineering. " We need a new way to look at bioengineering education. Why not use the modern methods that we've been developing in the learning sciences and learning technology, and really take a look at this from an entirely new point of view? " The result is a $10 million NSF grant for Vanderbilt and its academic partners to evolve a new curriculum in bioengineering, one that utilizes fundamental principles of learning science and " is driven by technology, web based technology, simulations, slides, interactive systems, and tutoring and homework systems," Harris says.

Although the grant focuses on the development of bioengineering, the collaboration between Peabody Learning Technology Center and the Department of Biomedical Engineering has the potential to benefit students and faculty in all areas of the university because part of the research involves determining exactly which technological tools best enhance learning. One of the things of concern is that in higher education a lot of

people are very critical of technology as being Just a waste of time and money and so forth.

Well, is " If a particular piece of learning technology is no good, we're going to be happy to identify it as such. We'd like to be able to guide the decision of educators and administrators about what is effective and what is not. And if you can begin to show major advances for some of this, then the Justification for the additional investment is there. " Another potential benefit this research offers is the opportunity to develop a much utter understanding of the kinds of resources required for faculty to use technology in ways that consistently enhance student learning. There could be a small investment that could dramatically increase our effectiveness if we do it right," Harris says. " That's the key. We have to know how to do it and what to do. So if we get in and do research in this center and we find out some of the mistakes and things you ought to avoid, I think that you could tailor a system that could dramatically increase effectiveness and make faculty more effective. " Harris believes that effective use of technology has the potential to transform the tuned-teacher relationship at the undergraduate level. L think we're going to see a revolution in the interaction between students and teachers," he says. " l think the relationship to undergraduates is going to become more like the relationship to graduate students in the sense of more direct personal interaction. By using technology we're going to be able to use the power of the person, who they are and what they are. The teacher's inspirational role is going to become much greater. " Like Harris, Professors Owens, Smithy and Toymaker also see new opportunities to SE technology in the classroom.

David Owens wants to pursue his interest in virtual teams by developing a course run exclusively on the Internet. Andy Toymaker plans to continue integrating computer interaction with more traditional classroom activities. Margaret Smithy would like to use videoconferencing links to allow her students to observe a live classroom setting and then interview the teacher afterward, all via video. In each case, these faculty members, like many others across the University, will continue to use technology to challenge both themselves and their students.