Clicking to Learn
Interactive Learning Technology Improves Class Participation, Attendance

“You think it’s B? I’m pretty sure it’s C.”
“No way. It’s definitely R.”
“Really?”
“Why?"
“Yeah, down your clicker and I’ll show you.”

A crowd of nearly 150 students sits in a campus lecture hall at 7:50 A.M. on a Thursday, but despite the early hour, the classroom is packed and nearly all the students are wide awake and clutching brightly colored devices that resemble remote controls.

After a few minutes of discussion, the two undergraduate students, Jessica and Lynsie, come to an agreement, point their devices at a small box near the upper corner of the hall, and thirty seconds later, they smile and give each other a quiet high-five when they learn they were correct.

Similar scenarios occur frequently in each of the Physics 7A lectures. Following up on a successful campus pilot program, the Physics Department decided to implement an interactive learning process called “Personal Response Systems” or “clickers.” Thanks to the successful implementation of this technology, all introductory physics classes are now using a historically passive device—the remote control—to improve active participation between instructors and students, enhance collaboration between classmates, boost attendance, and revitalize the traditional learning experience.

A Real Conversation with 200 Students

As with many introductory science classes, the Physics 7 series is taught in large lecture halls that hold hundreds of students at one time. With so many students, it is a challenge to ensure that the majority of the class understands what is being discussed. Use of the Personal Response System helps bridge this gap, as even the quietest, shyest students tend to use their clickers. “The use of clickers has given me the chance to participate more frequently than I would in a regular classroom,” says Abhi Kalepcaput, an undergraduate majoring in Neurobiology, Physiology and Behavior.

This direct, instantaneous feedback from everyone in class proves useful to instructors. “It gives me the only way I have found to carry on something like a real conversation with 200 students,” says David Webb, a lecturer in the Physics Department.

Students seem to appreciate the immediate follow-up when dealing with particularly difficult concepts. “I like the way the professor talks through the incorrect answers and explains why they aren’t right when there are too many people who didn’t agree on page 2.

Banner Student Information System
Will Get Fresh Upgrade in September

When Lana Dancy begins her Banner training course in Hoagland 330 for a small group of testers from the Office of the University Registrar, two projectors beam light onto the wall behind her. It is a Thursday in March and for most of the attendees this will be their first glimpse of Banner 7 software. As designated testers, it is their job to provide feedback to help fine-tune the system before its launch over Labor Day weekend, September 2-4, 2006.

When the group begins the log-in process, it is immediately clear the new software is different from the current version. Rather than accessing Banner via Citrix (a software interface), the group instead opens Internet Explorer and navigates to a Web page. A plug-in launches a page that asks each user for their UC Davis log-in information, and the password provided by their hard token—a special security device that generates a one-time password. The testers are then taken into a test version of Banner 7.

The projectors at the front of the room now display the current and new Banner versions. Banner 6, on the left, suddenly looks dated—vaguely resembling a Windows 95 interface—whereas Banner 7 looks up-to-date, with a larger viewing area, navigation tabs that resemble something you might find on Amazon.com, and a menu that looks similar to Microsoft Word. Holding the mouse over one of the icons at the top of the page reveals a pop-up bubble that describes the icon’s function. Dancy directs the group to open one of the forms; the testers dive in and explore Banner 7’s new features.

What Is Banner?

Banner is the main software interface for controlling and organizing vast amounts of student data, everything from admissions information to course enrollment, final grades, and financial aid. In use since 1993, UC Davis launched Banner 6 in 2000. The current upgrade to Banner 7 is needed in

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Technology Engages Students

**Personal Response Systems**

Personal Response Systems are designed to encourage every student to participate in class by way of a remote control or "clicker." At different points throughout the lecture, the instructor presents students with a multiple-choice question; the students then decide their response, point their clickers at one of the small infrared boxes installed in the classroom, and click the button that corresponds to their answer. A software program compiles the answers and a graph detailing student responses is projected onto the screen for the entire class to see. The correct response is also highlighted, so the students know if they are on the right track. The instructor is immediately aware of any concepts or topics that may need further discussion or clarification. Each student enrolled in a class using the response system purchases a clicker at the bookstore (prices range from $25 to $30). Students then register their clickers with the professor so their student identification numbers will be recognized and recorded when they answer questions. Individual responses are not displayed to the class, but are recorded for the instructor’s use (for example, to track attendance). Learn more at cts.ucdavis.edu/prs/index.htm.

Clickers in the Lecture Hall

**An Interview with Physics Instructor Randy Nelson**

What teaching goals did you have in mind when utilizing the clickers and interactive quizzes in your classes?

My intent was to make this much more interactive and participatory than a standard lecture. An important prerequisite to this was that the text material be read prior to class. So I would post clicker questions early each day to see what level of understanding had been achieved just by reading. I also used them to keep people awake and (hopefully) interested. I designed the clicker questions to force discussion and group interaction - I would not have been aware of this if the overall class attendance was significantly higher because of the clickers.

How do you utilize the feedback/responses provided by the students’ use of the clickers?

I used the results of the first few questions to see how much introductory material could be glossed over if it appeared the students already had a good grasp of it. Later questions probed whether further discussion or elaboration of that particular topic was necessary. It was a waste of all our time to continue with a topic that greater than 80 percent of the students understood.

In what ways do you feel the implementation of the interactive quizzes was successful?

Attendance, interaction, and alertness were much improved because of the clickers. The immediate feedback was invaluable.

Describe some of the challenges you’ve experienced with using the clickers/ quizzes.

The single biggest challenge was that some clickers did not seem to work during the lecture. Because this represented five percent of the final grade, I couldn’t ignore this issue. The only workaround was to have students sign in manually. The amount of lecture time spent with the clicker data was quite high—dozens of hours over the quarter. Another issue was that some clickers did not seem to work during the lecture. An important prerequisite to this was that the text material be read prior to class. So I would post clicker questions early each day to see what level of understanding had been achieved just by reading.

Any recommendations to other instructors who are considering this type of interactive learning?

I hope the students found using the clickers to be worthwhile and maybe even a bit fun.

LEARN MORE ABOUT PERSONAL RESPONSE SYSTEMS

**Classroom Technology Services**, in conjunction with the Office of the University Registrar, has installed Personal Response System equipment in several classrooms. Systems are installed in 55 Roessler Hall, 6 Roessler Hall, and 106 Olson Hall. Faculty and staff interested in using a Personal Response System can obtain more information—including best practices and links to examples of Personal Response System use at other campuses—at cts.ucdavis.edu/prs

CLICKING TO LEARN

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correct answer," says Jessica Alonso, who is pursuing a double major in Psychology and Neurobiology, Physiology, and Behavior.

System Encourages Attendance

Again proving that the best way to learn a subject is by teaching it to someone else, the Physics 7 students seem to understand key concepts more thoroughly because they need to explain their reasoning to their fellow classmates. They are often encouraged by the instructor to collaborate before responding. “When my neighbor and I disagree on the answer, we have to figure out an explanation to defend the answer we’ve chosen, which forces a little more thinking on the subject at hand,” shares Alonso.

Students and Instructors Stay Engaged

The interactive nature of the clicker questions, which are typically sprinkled throughout the lecture, keeps students and the instructor actively involved in the learning experience. Since the clicker responses are automatically catalogued, instructors can easily track who is coming to class and how often they are participating.

In coming to class and how often they are participating. Students are well aware of this fact, and so empty seats at lecture are a rarity. “Many professors expect high attendance, but it’s been a magical event where words that are written in the professor’s notes appear in the student’s notes without passing through the brains of either,” says Webb. “This is what I hope to avoid with the clickers. Let’s get everyone’s brain into gear.”
Home wireless users are responsible for their own network security and should take extra care in protecting their wireless networks against everything from neighbors pirating their Internet connection to full-scale identity theft.

Wireless at Home Securing Your Personal Network

Things you have finally gone wireless and embraced computer mobility at home. Unfortunately, you have also exposed yourself to a myriad of network piggybackers, hackers, and personal-identity predators. Because home wireless users are responsible for their own network security, you should take extra care in protecting your wireless network against everything from neighbors pigging your Internet connection to full-scale identity theft.

Router-side Security

Routers operate much like the archaic telephone telephones of a technologically simpler time and they do store data which will be sent and find the most direct path from one network to another. They also manage the flow of online traffic and functions as a bridge that allows information passage to and from your computer. It is important to ensure your personal network is inaccessible to others and your computer is protected. Here are some suggestions to help safeguard your home computer and wireless network.

• Check the reference manual that came with your wireless router to see what security features are available and how to activate them.

• Secure your network with a complex password by choosing a variety of numbers, letters, symbols, and non-English words. Longer passwords will also increase your security level.

• Do not allow your router to broadcast your network’s Service Set Identifier (SSID). Your SSID is the network code that specifies your personal wireless connection. The router’s default settings may allow any computer within range of your network to view your SSID, which gives other people the ability to log on to your network without your knowledge. Preventing open access to your wireless network will discourage rogue surfers by forcing users to enter the coedname.

• Implement a MAC Address Access Control (MAC) address filter. Every wireless-capable computer has a unique MAC address that allows you access to your network. Most routers come with a MAC address list that restricts access to just the addresses of your choice, enforcing a very secure method of filtration.

• Encrypt the data transferred across your network. Not all routers are encryption savvy, so check for this feature and make sure to activate it.

• If possible, limit the network transmission distance of your wireless router to your apartment or home.

• Visit the manufacturer’s online support page for security information. Most router manufacturers offer tips on security configuration in their products, plus information about activating advanced security features. Some manufacturers also offer email support via their Web sites. The online support pages may also identify any security patches that need to be applied to your wireless router.

Protecting your computer

Use a software firewall. Firewalls included in your operating system (i.e., Windows XP or OS X), sufficiently protect your computer. If your computer does not have a software firewall, try installing ZoneAlarm by Zone Labs or Norton Personal Firewall by Symantec.

• Be sure to turn off your wireless connection when not in use. Many laptops remain connected to the closest, open wireless network by default.

• Keep your computer’s operating system and applications secure by applying vendor security patches and regularly updating your anti-virus programs.

• Only you should decide who is allowed access to your computer. Take the time to guard your information and keep your home network secure. The extra barriers you create and precautions you take to protect your environment will make it much harder for your personal home network and computer will help keep your network connection clear, helping to keep your information safe.

Preparing for the Banner 7 Upgrade

The Banner Student Information System will be upgraded to Banner 7 over Labor Day weekend, September 2-4, 2006. To help prepare, Banner users are encouraged to check their workstations and to sign up for training.

Workstations

Banner users are asked to make sure their workstation can access the new system. Web browsers that work with Banner 7 are: Microsoft Internet Explorer 6, Mozilla Firefox 1.0 (Windows) and Safari 1.2 (Mac OS X). The Banner 7 Web site also has a larger interface, 1024 by 768 pixels, which may not work on 15-inch or some 17-inch monitors. Prior to the implementation, Banner users will be emailed information about the required plugin, Java. Please be aware of browser requirements and how to check your monitor, visit the Banner 7 Web site. sis.ucdavis.edu/future.htm

Training

Training for Banner users starts in late August and early September and will feature two separate courses: an overview class and a technical class. Classes are open to all Banner users and signups begin in May through Staff Development and Professional Services [apds.ucdavis.edu]. For new Banner users, the first introductory class for the current system, Banner 6, will be held on July 27. The first introductory class for Banner 7 will be held on September 12. For more information about Banner 7 training, contact Lana Dancy, Banner Student Information System Trainer (ldancy@ucdavis.edu) or visit bannertraining.ucdavis.edu.

JAPAN

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he can monitor all videoconferences taking place, and even troubleshoot them remotely if need be. Indeed, one can expect some problems to arise when trying to sync this wide array of tech-gadgets.

Professor Tashihkan accidentally misspells a word on the digital whiteboard. “It’s very difficult for me to erase this,” he says, shrugging with a chuckle at the camera. Later on, Davis loses the stream of Japan’s PowerPoint presentation, but Bill Sykes has it back within minutes.

To make sure the class runs smoothly, the operation requires a team effort. And it is easy to see why the teams go to all the trouble. The result of topnotch technology and teamwork is astounding. The audio and video quality of videoconferencing has greatly improved since its inception. What used to be vague and choppy pictures mixed with fuzzy audio that did not sync, is now real time video synced to pristine audio. Interac- tion between universities becomes a pleasant and enjoyable collaboration.

Although Humanities 20 sounds like a course where knowledge is typically four or five videoconferencing courses taking place around UC Davis each quarter. Departments taking advantage of the service include Animal Sciences, Economics, Nutrition, Biological Sciences, and many others.

The beauty of distance learning is in the multicultural nature of collaboration. In ex- change for Professor Takao’s class, UC Da- vis offers a class on violence in American culture for Japanese and UC Davis students.

Banner Upgrade

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order to meet federal requirements for finan- cial aid and for the university to continue to receive support from the software’s maker, SunGard SCT.

SunGard SCT may not have the same name recognition of a brand like Microsoft, but their Banner student information system is used by many universities across the country.

SunGard SCT provides the base software for more than 1,000, forms, the UC Davis team has created or modified an additional 400 forms that are unique to the campus.

Immediately, the Banner 7 testers notice that the forms from a new browser is a major improvement—the forms can be viewed practically anywhere there is an Internet connection—but the newer version of the software also has additional modifications that reflect new security concerns and chang- ing educational norms. Just some of the new and improved features include:

• Concurrent curriculum. This feature supports admissions, enrollment, and graduation of a student on an unlimited number of programs, such as degree pro- grams, extension courses, and certificate programs.

• Data history. With the addition of Con- current Curriculum tables to Banner, some of the existing data will no longer be overwritten by new entries.

• Protection of personally identifiable information. The new system features powerful security measures and improved protection of sensitive biographic and demographic data.

• Multiple identification management. This enhancement is designed to prevent the accidental creation of duplicate identifications for students.

• New architecture. Banner 7 is now an open API (Application Programming Interface) architecture, which means better integration with other applications.

• Enhanced user interface. In addition to a larger screen size, which allows more information to be displayed, Banner 7 contains new features that allow users to type bar- ans plus prompts for labels and fields. Keyboard quick keys are also still avail- able.

• Online help. Quick and easy access to on- line support is available via the Internet.

After an hour and a half of exploring the new Banner environment, the session for Office of the University Registrar winds down. As they file out the door to head back to their offices, Dancy tells them, “Go back and play with it.”

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In the following weeks, Dancy will conduct similar identification tests at the Financial Aid Office, Undergraduate Admissions, and the Office of Graduate Studies. Each office will test the Banner 7 forms specific to their unit and provide feedback to the Banner development team to eliminate software bugs prior to the September launch date. To learn more about the about the Banner upgrade, visit sis.ucdavis.edu/future.htm.
Guests Visiting UC Davis? Sign Them Up for Wireless Guest Access
UC Davis faculty and staff can offer their campus guests wireless Internet access. Accounts can be set up for up to seven days, and may be renewed for up to a total of 30 days. To create a guest account, faculty and staff must provide their guest’s name, email address, and phone number. wireless.ucdavis.edu/guestaccess.html

Complimentary Email Forwarding
If you are retiring, graduating, or otherwise leaving the campus, but still wish to receive email from your UC Davis address, you may be eligible for a complimentary service that will forward your UC Davis email to an external address of your choice. emailforwarding.ucdavis.edu

Campus Printer Repair Service Phased Out
Campus Printer Repair (CPR) has notified their existing campus clients that Hewlett Packard printer repair services will be phased out during spring quarter. Repair orders will no longer be accepted after April 14, 2006. A list of local repair vendors will be available on CPR’s Web site after April 14. campusprinting.ucdavis.edu

IET Wins Communication Award for Online Grading Flyer
IET won a communication award for “Submitting Final Grades Online,” a flyer developed to provide information to faculty about submitting grades online. IETUCDS sponsors annual communication awards to recognize outstanding publications developed at college and university computing centers. iet.ucdavis.edu/2005_SIGUCDS_Award.html

2006 University of California Computing Sciences Conference
Computing Services staff and managers throughout the university will be attending the 2006 UC Computing Services Conference, held July 16-18, 2006 at the Price Center on the UC San Diego campus. The program features four tracks—security, academic and research, business and finance, and emerging technologies—and explores the best in UC Computing Services. Registration information will be available online. ucscc.ucr.edu/

Highlights from Fall Digital Lecture Pilot
In an effort to improve lecture recording and distribution, Information and Educational Technology piloted a digital lecture recording and distribution system during fall 2005. Four classes participated in the pilot, three from the Psychology Department and one from the Nutrition Department. According to the report on Fall 2005 Pilot and Winter 2006 Developments: “During winter 2006 quarter Computer Lab Management (CLM) and Mediaworks saw dramatic growth in the number of users of this system. Currently 13 classes use the campus podcast system with nearly 1,200 current users accessing digital lectures.” The report goes on to note that a challenge to a full-scale deployment of the digital lecture recording system is that the campus would be one of the first fully independent systems. As Bob Oso, an instructional technology manager at UC Davis, has begun the application process, so a final decision on iTunes U still awaits validation. Numerous developments and questions need addressing, and the agreement presented by Apple will help shape the group’s direction. For more information, visit the iTunes U task force, please contact Liz Gibson at 752-3777 or email her at emgibson@ucdavis.edu.

educational technology

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Educational Technology Grants for Faculty
I nstructions wishing to enhance their teach- ing by utilizing computer technology can apply for several UC Davis grants. The Undergraduate Instructional Improvement Program Grant (UIIP) has a twice-yearly application deadline, however, other grant applications are accepted year-round. For more information on technology grants available to faculty—including information about how to apply and links to application forms—visit trc.ucdavis.edu/trc/grants/facul ty/index.html.

Undergraduate Instructional Improvement Program Grants (UIIP)
Instructional technology is one of this year’s areas of emphasis for UIIP grants, and projects over $500 are encouraged. These grants are intended for: innovations that enhance undergraduate education, projects that enrich the educational experience of undergraduates (especially in large enrollment core courses); and developmental plans to strengthen under- graduate curricular or improve participation in campuswide initiatives. Deadline: For spring quarter: Friday, April 21, 2006.

Educational Technology Resource Awards (ERTA)
This grant provides faculty with resources for instructional projects involving technology. Available services include—but are not limited to—digitizing slides, streaming video, and 3D animation. Faculty can also utilize multimedia database instructional software, such as Breeze or Ambage. Upon accepting this award, faculty must be willing to share the end product(s) with other faculty, either within their department or campus.

UIIP Minigrant Program
The UIIP minigrant is primarily for instructors whose technology projects are of a smaller scope and require immediate fund- ing. This grant awards a maximum of $500, to be used for resources such as digital media or software. Financial support for guest lecturers up to a maximum of $250 is also available. Deadline: None. Applications are accepted year-round.

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