innovations & implementations
Exemplary Practices in Teaching and Learning

DukeCapture: Automated Classroom Lecture Recording

Duke University

What is it?

After completing a trial in 2005, Duke University began developing DukeCapture, a service for automatic, easy-to-use lecture recording that will be launched in the fall semester of 2006. Instructors schedule a time when the recording should begin, and the system captures the audio and visual components, synchronizing the lecturer's voice with projected slides, videos, or other visual materials; compresses the files; and delivers them to a server for download. By the time students make it back to their dorms, the recorded lecture, published in multiple formats and optimized for various bandwidth connections, will be waiting for them on the course Web site in the university's learning management system.

Students have a variety of viewing options because DukeCapture can create streaming audio files, streaming video files, or files that can be downloaded to portable media players. Students can view the streamed lecture online or download the files to portable devices for review anytime, anywhere. Instructors also have the option of asking students to subscribe to a podcast syndication service that automatically delivers new audio and video files over the Internet for immediate online viewing or for download.

During the pilot, Duke instructors and staff recorded well over 200 lectures and events; those recordings were accessed 17,486 times. On several occasions, the system recorded more than 30 lectures in a single week. Allaying the concerns of many faculty, students continued to attend class regularly despite the availability of recorded lectures. While the Duke faculty involved in the pilot did not keep attendance figures, simple observation demonstrated that students not only continued to attend in their usual numbers but also became more interactive during class sessions, using the time to ask questions derived from their review of recorded lecture materials.[1] As a result of this successful experiment, Duke is expanding the service to accommodate the needs of a greater number of instructors and students. When it launches in August 2006, the broadened DukeCapture service will become a key component of the Duke Digital Initiative, a new instructional technology program dedicated to institutionalizing innovation.

What problem does it solve?

The DukeCapture initiative was prompted by the success of the 2004–2005 Duke iPod First-Year Experience. iPods were distributed to some 1,600 incoming undergraduates and to faculty teaching courses deploying the technologies in innovative ways. The experiment turned out to be a powerful catalyst for engaging faculty in technology-supported curricular innovation.

The iPod First-Year Experience generated considerable faculty interest in capturing classroom lectures and discussions. Although recording devices were distributed with the iPods so students could record lectures, the sound quality of the student-generated recordings was uneven, and students were unable to capture and synchronize crucial video components—such as presentation slides—with audio components. Faculty wanted an automated live capture solution that would allow them to record their lectures without disrupting the normal flow of instruction. Three campus units at Duke—the Office of Information Technology, Arts and Sciences Information Science and Technology, and the Center for Instructional Technology—determined that the selected product would need to meet the following criteria:

- Demonstrate a record of reliability and effectiveness
- Provide an enterprise-wide solution
- Provide nonproprietary access to digital files, along with files that were themselves nonproprietary
- Provide capture of audio only, as well as of audio and any projected video (for example, PowerPoint presentations)
- Allow easy authentication of student users
- Make use of existing investments in classroom and campus technological infrastructure
- Require minimal staff resources to maintain
- Be cost-effective in its implementation
- Provide faculty control over scheduling
- Allow faculty to record without action on their part
- Allow student access to content from anywhere at any time

These criteria were met by a recording system known as Lectopia, developed in 1999 by the University of Western Australia (UWA) and currently in use at nine universities throughout Australia. The Lectopia recording system (including the recording units, system server, and accompanying software) matched these criteria, offering a highly cost-effective approach compared with other automated event recorders. Whereas other solutions would cost tens of thousands of dollars per lecture venue, the Lectopia recording system could be installed for a fraction of that cost while supplying the desired audio/visual recording and processing features, inexpensive maintenance, faculty-friendly capabilities, scheduling control, and flexible content-delivery options.

How did they do it?

Having heard about the success of Duke's iPod First-Year Experience pilot, UWA contacted Duke in 2005 to see whether the university was interested in becoming the first institution in the United States to test the Lectopia recording system. At the time, UWA alone had recorded some 9,400 lectures and

had received 382,000 hits on its campus Web site in Perth (http://lectopia.uwa.edu.au). Duke's Lectopia proof-of-concept trial equipped a handful of campus venues with fixed recording units and supplied portable units to the library, the Fuqua School of Business, and the Franklin Humanities Center. In the operational model for the expanded DukeCapture production service, the cost of equipping targeted venues with recording units will be borne by the requesting academic department or division, while central funding will cover infrastructure support.

Why is it noteworthy?

- **Transformational:** Student access—anywhere, anytime—to recorded lectures reinforces course content, improves in-class discussion, reduces the need to take detailed notes while listening and participating, alleviates a certain degree of student anxiety, and allows students to update notes and review difficult concepts before taking exams.
- **Requested by faculty:** Following the iPod initiative, an increasing number of Duke faculty expressed interest in recording the audio and visual components of their lectures and in-class discussions. When these instructors introduced portable media players with recording devices into the classroom, students were captivated by their own capacity to record lectures and discussions or perform interviews in the field. Convinced by this experience that students would continue to attend class because of the opportunities that face-to-face class time offered for asking clarifying questions, Duke faculty wanted a tool that would deliver a better quality recording of a lecture's audio and visual components (slides, video, and so on), synchronizing and distributing these files without distracting students or interrupting the flow of classroom interactions.
- **Easy to use:** The university's Center for Instructional Technology generated a simple online process for instructors to book a system-enhanced room at a given day and time. Once the instructor stops the recording by turning off the microphone, the system automatically compresses the audio and video files and uploads them to the system server, at which point the instructor is sent an e-mail notification containing the Web address where the files will be made available. Importantly, instructors retain control over when the recordings are disseminated and to whom. The instructor chooses whether to make the recording available to students as a downloadable or a streaming file. Finally, the instructor makes the files accessible to students by posting the Web address on the course Web site within Duke's learning management system or sending students the address by e-mail.
- **Scalable:** There are a number of factors to consider when judging the scalability of an enterprise-level implementation of an automated lecture recording service, including the audio/visual capabilities in lecture theaters, hardware costs, support/maintenance costs, internal local area network (LAN) performance, intellectual property policy issues, and student computing skills. Duke used its trial to assess staff and student responses to the system, address issues of integration with existing learning management systems, and develop an appreciation for the administrative processes that would have to be in place to support automated recording on an enterprise level. The positive user response, the cost-effectiveness of the automated Lectopia alternative, and the creation of a digital media central support unit for handling and anticipating infrastructure-related issues ultimately tipped the scales in favor of expanding the DukeCapture operation. Over the summer months, Duke will process requests from academic units across the university and outfit additional campus venues with the requisite recording units.
- **Cost-effective:** Rather than purchase third-party recording systems for lecture halls at a cost of tens of thousands of dollars per unit, academic departments and divisions at Duke can purchase the DukeCapture (Lectopia-based) recording system at a fraction of that cost while receiving centrally-funded support for their recording infrastructure needs.

To learn more

Visit the Duke Center for Instructional Technology's Lectopia Recording Pilot Web site at
http://www.oit.duke.edu/dms/capture.html

To share your innovation

If your institution has a practice that you believe would be of interest to the EDUCAUSE Learning Initiative, please share it with us. To submit your innovation for review, please use the ELI Innovations Contribution Form on our Community Exchange page <http://www.educause.edu/ELICommunityExchange/6797>. A panel will review your submission and make a recommendation to the ELI staff.

About the EDUCAUSE Learning Initiative

The EDUCAUSE Learning Initiative (ELI) is a community of higher education institutions and organizations committed to advancing learning through IT innovation. To achieve this mission, ELI focuses on learners, learning principles and practices, and learning technologies. We believe that using IT to improve learning requires a solid understanding of learners and how they learn. It also requires effective practices enabled by learning technologies. We encourage institutions to use this report to broaden awareness and improve effective teaching and learning practice.

[1] When asked if having the lectures available as downloadable files would affect their attendance during a similar pilot of digital lecture recording performed at the University of California, Davis, 5 percent of the students surveyed said they were more likely to attend class, 7 percent said they were less likely to attend class, and 81 percent said it would have no effect on their likelihood to attend class. See <http://clm.ucdavis.edu/podcast/2005-06_DLRP_report.pdf>.