

Notes re: Lecture Capture & Publishing and Related DMS Activities

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Caltech's Digital Media Services, part of IMSS, has been involved in the development of academic presentation and publishing for almost 10 years. Pioneered the Institute's first media-integrated production service for video presentations over the web. The materials produced through this service can be seen on the Caltech Streaming Theater. Over the years has generated hundreds of quality online presentations providing a window on the work and accomplishments of the Institute. In 2003, DMS provided the academic community with the industry's first-generation integrated recording and serving device that has been used by faculty to webcast, videoconference, and record many hours of courses and other academic presentations. Currently, DMS is working with next generation technology toward development of a fully-automated classroom capture and publishing service built around the Echo360.

INTRODUCTION

Teaching and learning technology is one of the fastest growing categories of technology at colleges and universities. And within this category, Lecture capture

systems (or class capture systems as they're sometimes known) ranks near the top of the list. Class capture systems record entire class sessions including audio, video, PowerPoint slides, and other media, enabling students to access and review the classroom experience through any course management platform and/or through direct access from their computer or mobile media player. These capture systems, which are being adopted at a growing number of colleges, provide academic benefits to students and provide a user-friendly technology resource to faculty. The early outcomes point to improved student engagement, increased academic achievement, and satisfaction.

While not intended as a replacement for in-class instruction, lecture capture systems can provide important benefits by enhancing and extending existing instructional activities, whether in face-to-face, fully online, or blended learning environments.

DESCRIPTION OF LECTURE CAPTURE SYSTEM

The Echo360 Class Capture system is the first fully automated lecture capture and Web publishing system for higher education. It automatically produces Web-based versions of the classroom experience for on-demand student review. Students only need a computer, an internet connection and a web browser to review a lesson.

Echo360 is a Flash-based system which makes lectures universally viewable on every operating system (Windows, Mac OS X, Linux etc.). Once a lecture is captured, it will automatically be sent on to its server for publication. Lectures can easily be integrated within leading Content Management Systems (Moodle among them) or be provided as podcasts so students can follow them 'on-the-go' on their iPod or MP3-Player.

The capture system works unobtrusively. Once an instructor elects to participate, lecture contents for the entire course are scheduled and automatically recorded by

classroom equipment. No additional participation from the instructor is required. Before a student can leave class and walk to a computer, the lecture is simultaneously webcast, podcast, and posted to their CMS <eg, Moodle>.

The Echo360 capture and publishing platform sits at the heart of the fixed classroom capture system and into it connect various peripheral devices such a video camera and microphone that provide the all-important inputs for capture. The system is designed to be auto-scheduled, auto-activated, and auto-publishing once the class session ends. If desired, the system can be set up to provide a presenter with the ability to pause and resume capture should there be a need for excluding something from the published class recording. In the event the capture appliance were to fail during a class session, a replacement unit would be available for quick exchange.

Also, and very important, is the fact that the capture system is not restricted to the classroom. It is also available in a portable software-only version that can be installed on laptops and tablet PCs. This allows the faculty, as well as students, staff and others, to create presentations and learning modules from beyond the classroom.

Lastly, equipped with an installation virtually identical to the above campus classroom installations, the NewMedia Classroom facility would continue to serve as an educational technology lab for trouble-shooting and refining the system as well as providing an alternative classroom space in an emergency or when a space is not otherwise available. A laboratory space like the NMC is very important in providing the necessary tools and environment for experimentation (both technical and educational) as well as for testing and problem-solving. It is also important in the development of new edtech capabilities and practices and for serving as a visible commitment to pursuing state-of-the-art, world-class education at the Institute.

IMPORTANT REQUIREMENTS & CONSIDERATIONS

- Scalable
- Integrate with other existing systems for automation
- Ease of use for faculty
- Flexible
- Customizable
- Contributes to the enhancement of teaching and learning
- Promotes student involvement and engagement.
- Provides a roadmap for optical capture recognition on recorded presentations in order to enhance search capabilities.
- technical infrastructure underlying lecture capture must require minimal human intervention. Otherwise, the workload on technical staff can rapidly become unmanageable and engender extra costs.
- a primary aim going forward must be to actively adapt technology to students' needs while leaving lecturers insulated from the technical aspects involved in order to concentrate on teaching.

SOME OF THE WAYS CLASSROOM CAPTURE IS BEING USED

- study tool for students
- course material supplements (eg, lab training videos)
- student-generated content (eg, proof of learning, digital portfolio content, etc)
- archive of course
- Instructors are creating multimedia materials to help students be better prepared for class and raise the quality of interaction and debate.
- test review
- aid to ESL students
- learning disability accommodation
- provides make-up of a missed class,

- instructor can reuse them in future courses to free up lecture time for more participation time

SAMPLING OF REPORTED BENEFITS & POSITIVE IMPACTS

A recent University of Wisconsin (Madison) study listed the following as leading reasons undergraduates ranked online-lecture availability as very or somewhat important:

- making up for a missed class (93 percent);
- watching lectures on demand for convenience (79 percent);
- improving retention of class materials (78 percent);
- improving test scores (76 percent);
- reviewing material before class (52 percent).

The study also reported:

- Value in having course material available after course completion: More than half of the undergraduates indicated that, even after course completion, having course material available online would be important and that there was interest in accessing online material in professional life.
- Preference for paying on a course-by-course basis: More than 60 percent of the sample was willing to pay for lecture capture services. Of those willing to pay, the majority of undergraduates (69 percent) expressed a preference to pay on a course-by-course basis rather than having fees bundled with existing technology fees.

Among other benefits cited elsewhere:

- Better class time use
- Increased opportunity for learning to occur outside of the classroom
- Efficient and easy way for faculty to create multimedia
- Effective way for students to review key lectures

- Better way for students to manage note taking for fast paced class sessions, especially science and technical classes.
- Ability for students to keep up with the class if absent
- New capabilities such as using class capture as prior learning activity for enhanced classroom discussion
- Colleges can use for training, professional development, and other campus activities such as orientations and lectures.
- The technology is clearly advantageous to those students who are unable to attend lectures because of illness, an emergency, or for some other good reason and still gain the benefit of viewing the lecture.
- Students can re-listen to portions of lectures in order clarify complex points whenever and wherever they like, providing convenient, on-demand education.
- Students no longer need to make as many notes while in lectures, enabling them to listen more effectively. This offers greater opportunities to students who learn better visually and aurally or who may have subtle learning needs, and thereby generating greater inclusivity.
- It has been reported that students experience higher satisfaction in courses which use audio recordings to accompany course material than those which do not.
- Research has suggested that recording lectures can be effective in developing collaborative learning and social networking given that the outcomes can be shared across academic communities.
- With the advent of the internet and faster computer processors, lectures can not only be recorded digitally but also streamed live over the internet for use in classes being taught in collaboration with remote institutions or in other ways involving remotely located groups.

POTENTIAL CONCERNS & NEGATIVE PERCEPTIONS

3 concerns occasionally expressed:

- The recordings will undermine the instructor's role;
- Students will stop coming to class;
- The recordings will be used to critique instructor's teaching practice.

Another comment frequently seen goes like this: "Who would want to sit through having to watch a 1 hour video replay of a lecture they may have already heard?" Reflects a misconception about how lecture captures work. When utilizing technology like Echo360, the recordings are broken up into chapters. This means that students don't have to sit through the entire lecture but can seek out parts they want to review. In many cases the recorded content can also provide for text searches or searching the presenter's spoken words.

A few other negative views of lecture capture:

- Faculty concern about intellectual property
- Students say it gives an excuse for other students to sleep, skip class, come to class late, etc.
- Students need broadband access to playback the lecture
- Campus infrastructure bandwidth concerns
- Faculty worry about "everyone" seeing their teaching.

CONCERNS/CHALLENGES RE: IMPACT ON ATTENDANCE

Many instructors worry that as soon as recordings are available, classroom seats will collect dust. By far the No. 1 fear.

There are indications that the attendance impact is far less in courses involving science and rigorous technical instruction and that the availability of recordings improves learning and retention in these subject areas in particular.

Some of the ways others have gone about managing the non-attendance issue:

- Make classes more interactive.
- Give regular in-class quizzes.
- Shut off the camera when talking about what will be on upcoming tests &

quizzes.

- Wait 10 days after each lecture to offer a replay.
- Stop offering recordings if class attendance drops.

Many faculty suggest that attendance is not a problem if the instructor is really engaging the students. Instructors like Howard Rheingold, who teaches Digital Journalism at Stanford and Berkeley, actually encourages backchannel communications using Instant Messaging, and other collaboration tools.

LEVELS OF CAPTURE SOPHISTICATION, COMPLEXITY, & COST

Lecture capture systems can involve different levels of sophistication. For the most sophisticated systems, tracking techniques to keep the camera focused on the lecturer and to display audience members when they talk have been conceived as substitutes for video production teams.

- Level 1: basic presentation from a podium with powerpoint slides or other projected content displayed on an adjacent screen
- Level 2: level 1 + the added capture of hand-written slide annotations or whiteboard-like hand-written content or other non-digital contents
- Level 3: level 1+ 2 + the added need for av capture of complex room arrangements or walkabouts by presenter
- Level 4: special presentation characteristics such as panel discussions, audience participation, table demos, etc