

Enhancing the Student Learning Experience with Captured Lectures

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Abstract: Lecture capture was introduced with the aim of enhancing the student learning experience. Some lectures were captured in real time as they occurred with students and others were pre-recorded and made available at the appropriate time. In both cases the captures were made available via the Virtual Learning Environment for students to access any time from anywhere with Internet access.

The results of the student and staff evaluation were very positive. All of the academics thought that the captured lectures had a positive impact on student learning and nearly all of students stating that their experience of using lecture capture was positive or very positive. The students used the captures to catch up, review and revise and mainly accessed them on computers at home. Despite academic concerns there was little impact on student attendance. The selection and implementation processes and support requirements are also reviewed.

Introduction

Lecture capture was introduced with the aim of enhancing the student learning experience. It was used in a range of ways by the academics. Some lectures were captured in real time as they occurred with students and others were pre-recorded and made available at the appropriate time. In both cases the captures were made available via the Virtual Learning Environment (VLE) for students to access any time from any where with Internet access.

The overall aim was to find out whether students and staff perceive that recording lectures improves student learning. In particular the research investigated:

- how students use the recordings to improve their learning (i.e. to catch up on a missed lecture/ to review a portion they did not understand)
- how students use the material e.g. on mobile devices, at home, on University PCs
- whether visually capturing the lecture is necessary or whether PowerPoint slides and audio are sufficient
- the impact on student attendance

The research investigated why staff chose to record their lectures and their perception of its impact on student learning. It also looked at academic concerns regarding the capture such as the impact on attendance and privacy. The selection and implementation processes and support requirements are also reviewed.

Lecture Capture Functionality

The lecture capture functionality enables lectures to be recorded in real time digitally through the capture of the lecture audio, screen activity and optional video. At the end of the lecture, the link to the recording and an announcement automatically appear in the appropriate course in Blackboard.

The synchronised multimedia capture is available in a range of formats:

- Streamed presentation (Flash) including VGA capture, video and audio.
- Audio (mp3)
- Enhanced audio (m4b audio book file) including VGA capture and audio.

- Video (mp4) including VGA capture and audio.

This range of formats means that the capture can be viewed online or offline on mobile devices.

Students can view the recordings as frequently as they like. The recordings are automatically divided into approximately 5 minute chunks in order for students to identify specific areas to view. They are stored automatically in chronological order.

Pedagogy

Lecture capture has the potential to enhance the student learning experience in a range of ways. Students think that lecture captures help with their learning, although academics have some reservations (Phillips et al 2007). Lecture capture can enhance student understanding as students can listen again to portions of lectures synchronised with slides in order clarify complex points whenever and wherever they like, providing convenient, on-demand education (Lim 2005). 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 (Brotherton & Abowd 2004), and makes learning more appealing to such students (Alexander 2005). It helps students who have additional learning needs and so supports greater inclusivity (Cebeci & Tekdal, 2006). It is also clearly advantageous to those students who are unable to attend lectures because of illness or work or who are distance learners, as they still gain the benefit of viewing the lecture.

The main limitation is that the capture is a one-way transmission of information. Therefore other mechanisms need to be in place to ensure interactivity to occur. Learning aurally is not a substitute for written material. Some complex information and figures are learned significantly better when conveyed in written form than in visual form (Chan & Lee 2005)

These new mediums can be effective in enhancing student engagement and reflection (Baird & Fisher 2006) and may help develop skills such as time management, critical thinking and communication (Huann & Thong 2006). This new technology empowers students who gain greater choice in learning wherever and whenever they wish (Chan & Lee 2005). It is also suggested that recording lectures or other course material in such ways can be effective in developing collaborative learning and social networking, as the outcomes can be shared across academic communities (Ratcham & Zhang 2006). Students experience higher satisfaction on courses which use audio recordings to accompany course material than those which do not (Miller & Piller 2005). However, the findings from Duke University using podcasts were relatively inconclusive but demonstrate that while some data was gathered to support the value of recording lectures using the iPod 'the extent to which having access to lecture recordings improves student performance, impacts class attendance, or enhances student's course experiences remains unknown' (Duke Report 2005:6).

Berner & Adams (2004) conducted research into the added value of video versus audio. It is possible to capture lectures both with and without video. Research into the added value of adding video to an audio presentation did not lead to greater satisfaction or learning 'despite the intuitive appeal of streamlining video, the addition of a video to an audio presentation may not be worth the extra expense and effort' (Berner & Adams 2004:189).

Evans (2007) conducted research using Likert statement tests with 200 first year IT students on the benefits of revision podcasts. The findings of this research were that students find podcasts more effective tools for revision than textbooks and are more efficient than their own notes, which further aids their learning. The findings also show that students are more receptive to learning in the form of podcasts than textbooks or lecture formats. However, this research found that while some students commented that it aided revision, others had concerns over the lack of possible interactivity as they were unable to ask questions. There were also some technical issues as one student noted that it took a significant amount of time to download at home.

The power of lecture capture to enhance learning is with the synchronisation of the presentation with the audio so that students can listen or re-listen to the academic explaining concepts.

Diversity

Lecture capture can support the diversity of students. Students with additional learning needs can access the capture in a range of formats. Visually impaired students are supported by the Screen Reader access available for each presentation. Audio can be played and all navigation buttons are in logical order for tabbing access. To support hearing impaired students presentations are compatible with closed captioning standards. Captioning is normally provided by a third party as a service. International students are also supported as they can listen again to lectures which are not in their first language.

Concerns

Academics have concerns regarding student attendance, privacy and copyright and technical problems. Also “While staff see the advantages for external students, they question the extent to which these advantages apply to internal students.” In contrast both cohorts of students were positive about the benefits of the technologies for their learning and adopted similar strategies for their use” (Woo et al 2008: 81)

Lane (2006) evaluated podcasting downloads of lectures at the University of Washington and found that approximately 65% of students did listen to at least one podcast. Significant findings are that 77% of students surveyed indicated that the availability of podcasts had no impact on their attendance, 13% said it made them more likely to attend and 10% said it made them less likely to attend lectures.

The University of Sydney for example asked students. One responded “It was nice to know that if you missed class, you could record the lectures,” and another said “But the iPod didn’t encourage you to miss class. There’s not a chalkboard that you can see or problems that you can see worked out. I think more people show up in a [podcasting] course because it encourages more interaction.” The idea that students would stop showing up to class is “bogus,” an IT lecturer says. “It’s been exactly the opposite,” and continues “I’ve seen attendance increase, mostly because the podcasting has generated interest and enthusiasm. We’re doing interesting, technology-based things in the course.” For the professors who have implemented podcasting technology, the most common concern they hear from their peers is that students will stop showing up to class if the material is downloadable. In reality, they say, the opposite is true. The trick, students say, is to make sure that there is something to gain by attending class *and* downloading the lecture. Podcasts should add a new perspective or offer supplemental material. If lectures are podcast, faculty should use classroom time to facilitate discussion, demonstrate models, or simulate problems. “You’re going to gain something out of the classroom experience—it’s that personal lecture experience,” one student responded “You get comments from other individuals, and examples are brought to the table by other parts of the class” (Windham 2007)

At Drexel University, a lecturer began to note a significant decline in attendance. The performance of the truant students, however, was nearly identical to that of the students who attended class. This finding prompted the lecturer to make his lectures out-of-class assignments and dedicate class time to interactive activities that more fully engaged the students (Coughlan et al 2007).

The report from the University of Washington report claims students and faculty disagreed about the effect of podcasts on class attendance. Most students said the podcasts had no impact on their attendance; only a small percentage said the podcasts made them less likely to attend. The majority of students felt that the podcasts were useful when they were forced to miss class (such as for a doctor’s appointment). Very few said that they would use the podcast as a regular replacement for class attendance. On the other hand, a majority of the faculty felt that podcasts made students less likely to attend. Some faculty indicated that the podcasts tended to draw off only the less academically inclined students and that most academically engaged students continued to attend regularly. One instructor thought that this phenomenon improved the quality of discussion in his class. None of the faculty were daunted by concerns about attendance; most affirmed that they wanted to continue to offer podcasting (Coughlan et al 2007).

Methodology

Selection Process

The considerable interest in the potential of lecture capture at Bournemouth University led to a comparative study of capture systems being undertaken during 07/08. Echo360, MediaSite and Tegrity were considered in relation to the following selection criteria:

- Synchronized outputs
- Range of output formats
- Integrated with Blackboard
- Easy to use by academic
- Easy for an administrator to manage e.g. scheduling
- Scalable licensing arrangements
- Cost

Echo360 was purchased for the pilot study for reasons of cost and licensing flexibility. This pilot was well received so a Business Case was developed and approved to extend the use of lecture capture beyond a single location and on both campuses. The software licence is higher for full capture so Schools were consulted to decide the number of systems which would include video. This resulted in the purchase of 3 more full systems with the Business School purchasing another.

Dates	Developments
Early 2007	Select lecture capture
May 2007	Purchase 1 license Echo software and hardware
May 2008	Implementation
July 2008	Business Case accepted to extend use
April 2009	1 new mobile system working. 3 others still not working
November 2009	All new systems working

Table 1: Timeline of developments

Implementation

Educational Development Services (EDS) co-ordinated the implementation and worked with several different sections of IT. System staff set up the server and installed the software as well as adding another building block for the integration with Blackboard. Media services installed the equipment in the lecture theatres. EDS worked with IT to test the system and resolve any problems. IT were made aware of the importance of timing in implementation in the academic year to take most advantage of the facility. The Echo360 capture system is now available in four lecture theatres on both campuses at Bournemouth University.

The lecture capture is being used in a range of ways.

- Most of the captures happen when the academic is lecturing to the students
- A few academics are choosing to capture their lectures before the start of term and then using adaptive release to enable student access at the appropriate time
- Some academics may save themselves time next year by re-using some of their captured lectures

Support

Support for lecture capture has been required by both EDS and IT. EDS provided staff development which included both the pedagogical benefits of capture as well as practical information about using it. The awareness raising included two sessions given by a representative from Echo360, who demonstrated the potential of the software and there was considerable interest its use. EDS developed guides and met with staff interested in using capture. Scheduling is managed centrally in an 'on demand' fashion whereby lecturers book online with time, location and lecture details. EDS then administer these bookings to the Echo 360 scheduler. A member of EDS would also be

present to ensure everything was working the first time an academic used the capture system. The lecturers deliver their lecture ‘business as usual’ and the event is captured, processed and links posted to their Blackboard courses as part of an automated process. All the lecturer has to do is to remember to switch on the microphone.

The figure below shows a screenshot of the Echo360 lecture capture illustrating the video capture, playback controls and PowerPoint slides.



Figure 1: Echo360 lecture capture screenshot



Figure 2: Accessing a Captured Lecture through Blackboard

Results

Pedagogy

The evaluation of the introduction of lecture capture considers pedagogical, implementation and support requirements. The pedagogical evaluation was undertaken using online surveys. The student survey was completed by 95 students on 5 courses and the staff survey was completed by 5 academics using the capture system. The staff had a range of experience with any form of teaching online from less than 1 year to up to 10 years. Within the courses using the lecture capture, 91% of students had access to online lecture notes, reading and other resources; 81% to online administration such as announcements and submissions; and 80% to online communications such as discussion forums.

The academics used the lecture capture to:

- To enable fewer notes to be taken in class
- To support students who miss lecture
- For students to review complex concepts
- To support students with additional learning needs
- To aid revision
- To help international students
- To allow students to learn at their own pace
- So I don't have to repeat lectures

They were not required to by their department and had not felt pressurised to do so by their students. The capture lecture appear to support diversity and one student commented:

“Being dyslexic, they really help and as a result feel the unit with the recorded lectures is my strongest.”

The results of the student and staff evaluation were very positive. All of the academics thought that the captured lectures had a positive impact on student learning and 96% of students stating that their experience of using lecture capture was positive or very positive. Their comments included

“All lectures should have recorded lectures”

“Very useful to supplement lectures”

“The pre-recorded lectures are very good and all units should have them in place, BUT, still keep the actual lecture as well!”

There were a few negative comments such as *“It takes a long time to download at home”* and

“You can't ask questions”. The lack of interactivity needs to be considered by the academic when considering the use of the captures in the curriculum.

The academics thought the lecture captures would make student learning easier. This view was confirmed by the students by 94% of students agreeing with the statement and only 6% unsure. Their comments included:

“It is much easier to learn from the video as you are not in a lecture theatre with 200 other students whispering/phones going off/generally distracting you.”

“The ability to pause the lecture is helpful for writing extended notes and/or reading a textbook at the same time.”

“It's useful as you can pause it to write down notes. Sometimes in the real lecture, you miss the next point because you are too busy scribbling down the last one.”

80% of the academics also agreed or strongly agreed with the statement that 'the availability of captured lectures encourages students to be self-motivated and independent learners'. 40% of the academics stated that they had changed the structure of their courses as a result of recording lectures and one commented that he had “added more depth to the content of the physical lectures.”

The students use the captures in a range of reasons which are illustrated in Figure 3.

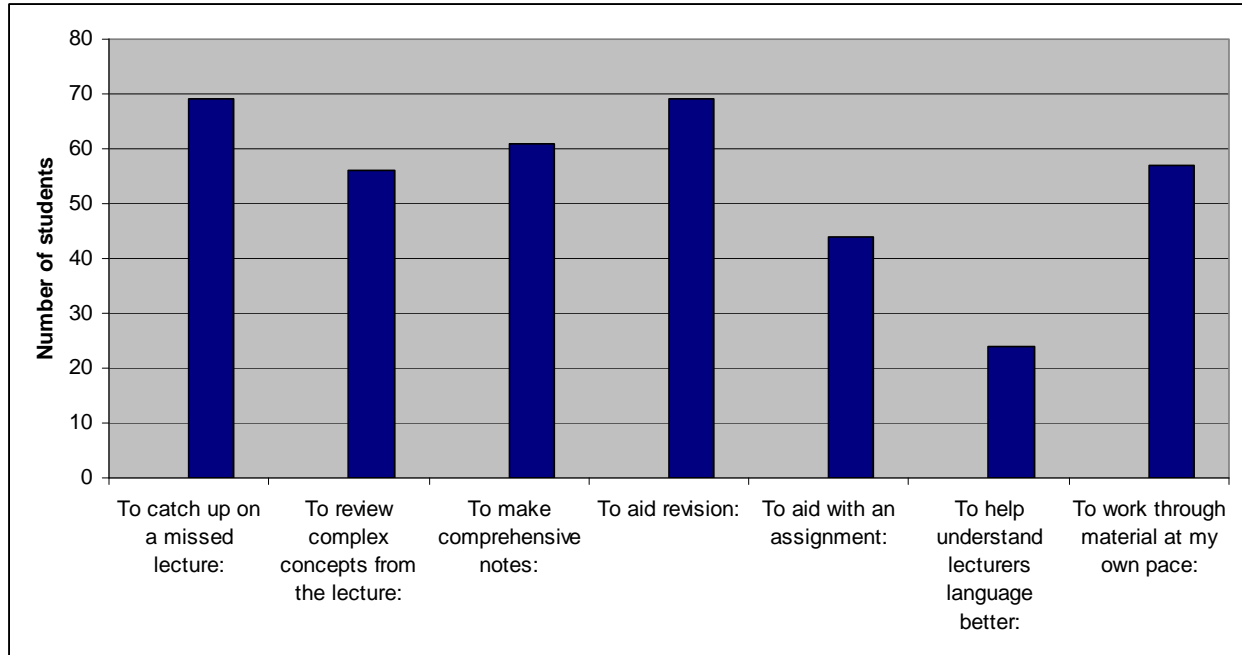


Figure 3: Range of ways in which students use the recordings

Range of Ways of Using the Capture

The most popular way to view the lectures is on a PC at home (89%), 17% viewing them on a PC in the university and only 11% on the go with mobile devices. The low figure with mobile devices is probably due to the academics choosing to include video in their capture and currently not many students have devices to view the video.

The majority of students (60%) prefer to read their notes and handouts while listening and watching the video. Nearly a third just read and listen without the video and only 5% only watch the video. 88% of the students watch the lecture from the beginning all the way through instead of scanning the recording for specific areas. This seems to indicate that most of them have either been required to view the lecture online instead of attending or before a face-to-face lecture or have missed the whole lecture.

Viewing the recording during revision and assignment periods was definitely the most popular (69%), compared with 34% before the next lecture and 17% immediately after the lecture.

Concerns

Staff concerns focused on attendance and privacy issues. Before using the captured lectures more than half the staff had anticipated that students may not attend the lectures if they were captured. However, after capturing them only 1 member of staff found that the capture negatively affected student attendance. From the student perspective, the majority, 62%, said that the recordings would not make them less likely to attend lectures. Their reasons included:

“I would only miss the lecture if that was the only lecture I have that day and I don’t want to come to the university for just one hour.”

“The recordings make me less likely to go to lectures, but much of this is because of the Monday 9am lecture start.”

Academic reservations also included concern that their captured lectures would be publicly available. This was addressed through security on the server so students either have to login via their VLE or directly to the server. If the access is via the VLE then it is easy to restrict access to the capture to students registered on the course.

Most of the academics also thought that capturing lectures had the advantage of enabling them to manage their time more effectively. One of them commented that the system “*should be available to all staff to use.*”

Technical

The technical installation of Echo was easier in some lecture theatres than others at Bournemouth University as they do not all have the same AV set-up. It was relatively easy in one lecture theatre but problematic in another due to the existing complex system and required considerable support from the company.

Integration to existing AV facilities is aimed at the existence of a “typical” Composite Video and VGA architecture, BU AV Services found integration into this set-up relatively straight-forward but felt they would have benefitted from a monitor on the box to prove signals are being received.

Support

The lecturers found the system easy to use. The amount of support required for staff development and running the system with timetabling of recordings has been as expected. However, the amount of time that has been required for EDS to work with IT to implement and test the system has been much higher than expected. For example, over a 3 month period one member of EDS spent 150 hours on this project.

Conclusion

Lecture capture has pedagogical benefits and is changing the student experience. Some academics are capturing their lectures before the start of the academic year and then using adaptive release at the appropriate time. The students may be requested to watch the lecture in advance and then the face-to-face lecture time is used in a different, more interactive way to enhance the student learning. Alternatively, the students may be asked to watch the lecture and engage in online learning activities. In some cases the students just watch the lecture which decreases contact time between the academic and student. Academics had concerns about student attendance but this has not been affected by the lecture capture. Most students view the captures on their home PC. However, as more students are soon likely to own more sophisticated mobile devices, such as the iPhone, it is anticipated that more students will view lectures on these in future.

Considerable time has been invested in implementing the Echo360 system so it has been decided to continue to use and support the existing system during the current academic year. Further evaluation will then lead to recommendations as to whether the availability of capture should be extended more widely.

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