

What do on campus students do with mathematics lecture screencasts at a dual-mode Australian university?

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Abstract

The University of Southern Queensland (USQ) is one of Australia's leading distance education providers, with about three quarters of its students enrolled in distance mode. While it can certainly be argued that screencasted lectures extend learning opportunities for students who cannot physically attend classes by providing a near live lecture experience, the question is raised: Would students who were given a choice and purposely enrolled on campus access these recordings, and if so, for what purpose? This paper uses a case study approach to investigate this question with a first year Operations Research course allowing on campus and distance enrolments. Data analysed and matched to follow individual students' behaviours includes lecture attendance rolls, weekly screencast access on the course Moodle site, anonymous solicited student feedback provided by attendees in the last two lectures and a student survey at the end of semester. While a number of students used the recordings to catch up on missed classes, the majority of enrolled students stated that they attended classes because they had decided to enroll on campus rather than in distance mode, as they valued interaction with the lecturers and the ability to receive an immediate answer to questions.

1. Background

The lecture method is traditionally the most commonly used teaching approach in universities. It has been identified as accomplishing "important and valuable purposes" [1], however, particularly for the net generation, lectures do not fulfill "the learning potential of typical students today" as these students want interactivity, with a computer, a professor or classmate [2]. On the other hand, a large proportion of Australian university students are of mature age and combine studies with work and family commitments [3]. As students' learning styles and approaches to learning vary, more flexible options should be explored. One approach to making lectures more effective and accessible for students is to record them [4,5], to allow students to revise the material whenever they want, wherever they are, at their own pace, and to repeat for reinforced learning as often as they like. Students have also been found to ask fewer repetitive questions when provided with recordings [6]. While not meant as a general substitute for the face-to-face lecture, students may catch up on missed lectures, and this learner-centred approach puts students in control of their learning experience.

A recently completed comprehensive study funded by the Australian Learning and Teaching Council [7] investigated the impact web-based lecture technologies have on practice in learning and teaching [8] in the context of specific units. While 76% of the 815 students surveyed across four large universities reported positive experience with these resources, only 54% of the 155 staff who responded found the experience positive, and a quarter even thought it was negative. Students appreciated the flexibility in access and support for learning, and on campus and distance students showed similar patterns in the use of the recordings for their studies, leading to the questions: is the distinction between enrolment modes "of relevance to an increasing number of students"

and is there a “difference between the learning needs of an internal student who cannot attend and an external student who is not expected to attend” [8].

It should be noted that in [8], mathematics lecturers commented they would not use recordings of lectures “which involve demonstrations of procedures that cannot be adequately captured” [8, p.29]. As it is important in a mathematical explanation to show the development of the solution to a problem and to be able to react to student responses for an interactive learning experience [9,10], handwriting (e.g. with tablet technology) needs to be captured as well as speaker audio. Screencasting software is available for this purpose, for example Techsmith’s [11] Camtasia Studio for individual computers, or the recently released server-based Camtasia Relay for lecture theatres and individual computers.

This paper takes an explorative case study approach as a first step towards a larger study across several courses at the University. The benefit of using a case study “is in the process, rather than outcomes, in context rather than a specific variable, in discovery rather than confirmation” [12]. The paper reports on an evaluation of on campus student use of lecture screencasts in a first year mathematics course. Initially recorded with Camtasia Studio, later in the semester a beta trial licence of Camtasia Relay was made available for the recording. A tablet PC was used to write on specially prepared PowerPoint or Windows Journal documents. While these recordings were produced with the distance student in mind and student questions or answers were repeated by the instructor for the recording, they were also made available to on campus students, but not meant to replace face to face lectures for these students.

2. The case and findings

MAT1200 Operations Research is a first year mathematics course taken by students from various programs such as teacher education, IT, science, and double majors in commerce and science. It is offered annually both in on campus and distance mode. In semester 2, 2008, 36 students were enrolled in the course, of which 14 had elected to study in on-campus mode. No printed material was made available as the course had been transformed to multi-modal format where all material was provided in electronic form on a CD as well as through the Learning Management System, Moodle, with the option for students to print study modules from PDF files as required. A discussion forum was maintained, where students enrolled in both modes could ask questions which were answered by the instructor. Weekly three hour lectures, one hour in the morning, two consecutive hours in the afternoon of the same day, were scheduled for on campus students, and printed copies of the lecture PowerPoint or Windows Journal slides with blank spaces for writing were handed out to students attending the classes.

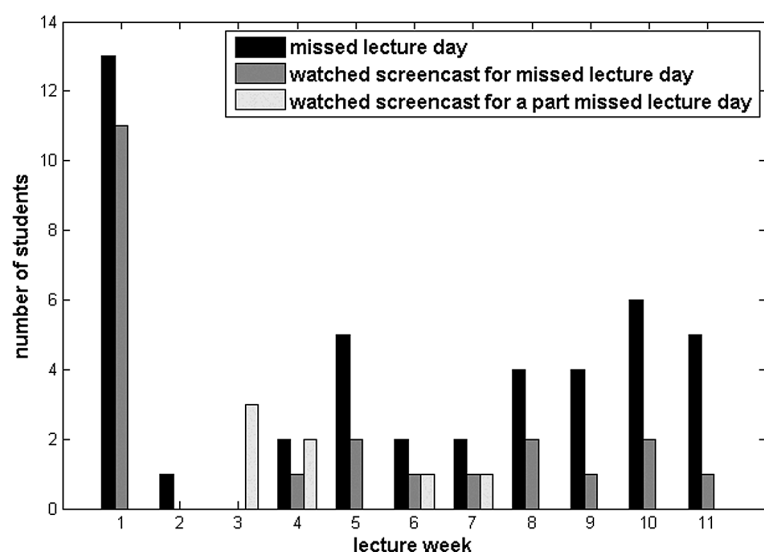


Figure 1. Weekly totals: The number of students not attending a whole lecture day, the number of students who accessed screencasts when they had missed a whole day of lectures, and the number of students who watched the screencast corresponding to part of a missed lecture day.

The instructor was away at a conference in the first week of semester and provided a recording of the lecture instead. The lectures in week 2 of semester were not recorded, but starting with week 3 every lecture recording was made available to all students in Adobe Flash format for web-based playback. Lecture attendance rolls were kept from week 2, and Figure 1 shows week by week the number of on campus students who missed all classes for that week (dark shading, first bar), who watched the screencast for this week (medium shading, second bar), and those who missed part of the classes and watched the missed component of the class (light shading, third bar). The sum of each second and third bar gives the total number of students who accessed the screencasts for each week. One of the 14 enrolled students did not attend any lectures and looked at only one screencast during the semester. This student is not listed in the statistics below unless stated otherwise, as she did not engage in any on campus activities, but completed the course successfully in the traditional fashion of a distance student.

While this chart shows that some students seem to have used the screencasts to catch up on missed lectures, it doesn't provide evidence of individual strategies followed by students. For this it is important to look at individual student behaviour and corresponding comments made by the student. For instance,

- Out of the six students who attended at least 9 of the 10 lectures,
 - › one watched screencasts for weeks 3-5 when he had attended classes, but did not look at any later recordings, not even for the class he missed.
 - › Three did not look at any screencasts apart from week 1
 - › Two watched the screencast for the only lecture they missed
- Out of the four students who attended 3-6 of the 10 lectures,
 - › One did not look at screencasts after week 1
 - › One looked at all screencasts
 - › Two accessed nearly all lecture slides for missed classes but only one screencast
- Two of the remaining three students looked at lecture slides for missed classes but not screencasts, and one used the recordings to catch up on the missed classes.

Nine students who had attended the last two lecture weeks responded to an anonymous class survey at the end of the semester. Their responses to the open answer question, why they attended classes, are summarized in the table below. Two thirds of the students wrote that they wanted to be able to ask questions and receive an immediate answer. This confirms the view that for students, "learning through social interaction is important. Feedback from the professor is vital", and on campus learning is not an isolated experience. "[S]ocial interaction [...] comes with being in class with their peers" [2]. Two education students commented they missed classes because they went on teacher practical sessions, and that this was when they watched the screencasts.

Why do you attend classes, although the handwritten annotations and screencasts are available [via the learning management system]?	Ability to ask questions and receive immediate answer	6
	Easier to learn in company	1
	Personal contact helps understanding	2
	Reinforces study schedule	2
	I have chosen to study on campus	1
	Screencasts are boring	2

Table 1: Student responses to the open ended question why they attend face to face lectures, sorted into categories, n=9 out of 14 students enrolled in this mode. Some students responded across categories.

Further comments from students included: "I work better in a face to face classroom environment where I can't day dream, get bored etc."; "more immersive experience" and "because I know I wouldn't do it at home".

More information was provided by two of the 14 on campus students who responded to an identified survey at the end of the semester. One of these was a student who had attended all lectures and indeed did not look at screencasts after week 1. This student voiced a clear opinion by commenting "I watched the first screencast, but I don't really find this artificial environment useful to my learning. I require a more personal one on one exchange when learning allowing for feedback and gestures to assist the message". This student also thought that by embedding recordings into next year's study material, it would "excuse lecturers from doing their job, which is to 'teach' the students, especially those who have paid and elected [... for an] on-campus experience". The second student had attended only the first four lectures, but accessed all recordings. He commented that the screencasts were extremely helpful, and that they allowed him to go at his own pace as he had missed these lectures. He said "I usually sit with a blank piece of paper and scribble down thoughts as I'm watching the lecture". He appreciated the breaks when students asked questions, as this provided "little intervals of time to write down notes and reflect".

Of the 14 students enrolled on campus, all but 1 passed. This student failed as he scored very low on the exam, despite good assignment marks. He had missed the final three lecture weeks and did not access recordings after week 1.

3. Conclusions

It appears that the students at the focus of this investigation realized that watching a recorded lecture takes as much time to absorb as a live lecture, without the opportunity to ask questions. For this reason, and because they had made a conscious choice to enroll on campus rather than to study at a distance, many still attended class and would not rely solely on the more flexible lecture recordings. In fact quite a few students did not access many, if any at all, of the recordings after week 1. "Value for money" was mentioned by a student as a reason for attendance, and the benefit of a study schedule that is maintained for the student through regularly scheduled classes when they attend lectures. While students who did not attend one of the last two lectures were not surveyed for this study, it is interesting to note that in [8], the statistics show that 68% of students using web-based lecture technologies believe they can learn just as well using this technology as they can face-to-face. While this case study is certainly too small to be generalized to all courses offered in dual mode at the university, it provides room for discussion of the high value students place on lectures if they are enrolled in on campus mode. For example, if recordings were to replace the face-to-face lectures, how could these be created to make a difference to the on campus survey results?

The situation of distance students' use of recordings will be investigated in a future study. Particularly in first year mathematics courses, distance students tend to drop out without officially un-enrolling from the course for personal or work related reasons, more so than on campus students, which leads to high fail rates for non-academic reasons and this gives a misleading picture of the difficulty of the course and actual student performance. For instance for the course under investigation in this paper, out of the 22 distance students: 8 passed; 12 failed to sit the exam despite completing assignments or did not submit any work; and two didn't complete enough work or failed outright. Investigation of the impact of screen recordings to keep these students engaged and on target is a future direction in this research.

4. Acknowledgements

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5. References

1. Ayers, E.L. (2002) "Technological Revolutions I have known." In Burton, O.V., ed. *Computing in the Social Sciences and Humanities*, Champaign, IL: University of Illinois Press.
2. McNeely, B. (2005) "Using Technology as a Learning Tool, Not Just the Cool New Thing." In Oblinger, D. and Oblinger, J., eds. *Educating the Net Generation*. Accessed via <http://www.educause.edu/educatingthenetgen> (16 November 2009)
3. Phillips, R., McNeill, M., Gosper, M., Woo, K., Preston, G. and Green, D. (2007) Staff and student perspectives on Web-based Technologies: insights into the great divide. In R.J. Atkinson and C. McBeath (Eds.), *ICT: Providing choices for learners and learning. Proceedings of ascilite*, Singapore. Accessed via <http://www.ascilite.org.au/conferences/singapore07/procs/phillips.pdf> (16 November 2009)
4. Williams, J. and Fardon, M. (2007) Perpetual Connectivity: Lecture recordings and portable media players. In R.J. Atkinson and C. McBeath (Eds.), *ICT: Providing choices for learners and learning. Proceedings of ascilite* Singapore. Accessed via <http://www.ascilite.org.au/conferences/singapore07/procs/williams-jo.pdf> (16 November 2009)
5. Laurillard, D. (1993) *Rethinking University Teaching: A Framework for the Effective Use of Educational Technology*. Routledge, London.
6. Kates, P. (2006) "Lecture Podcasting". Accessed via <http://www.math.uwaterloo.ca/~pkates/LT3/podcasting.html> (16 November 2009)
7. Australian Learning and Teaching Council. Accessed via <http://www.altc.edu.au/> (16 November 2009)
8. Gosper, M., Green, D., McNeill, M., Phillips, R., Preston, G. and Woo, K. (2008) "The impact of Web-Based lecture Technologies on Current and Future Practices in Learning and Teaching." ALTC report. Accessed via http://www.cpd.mq.edu.au/teaching/wblt/docs/report/ce6-22_final2.pdf (16 November 2009)
9. Loch, B. (2005) Tablet Technology in First Year Calculus and Linear Algebra Teaching. *Proceedings of Kingfisher DELTA'05*, Fraser Island, 22-26 November, 231-237.
10. Loch, B. and Donovan, D. (2006) Progressive Teaching of Mathematics with Tablet Technology. *e-JIST, e-Journal of Instructional Science and Technology*, Vol.9 No.2. Accessed via http://eprints.usq.edu.au/1716/1/Loch_Donovan_EJIST.pdf (3 January 2010)
11. Techsmith website. Accessed via <http://www.techsmith.com> (16 November 2009)
12. Merriam, S. (1998). *Case study research in education: A qualitative approach*. San Francisco: Jossey-Bass Publishers.