The role of Screencasting in statistics courses

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Abstract

Recent advances in technology have allowed lecturers in the Department of Statistics at the University of Auckland to experiment with screencasting as a way of enhancing our students' experiences while studying statistics. A screencast is a digital recording of computer screen activity, often containing audio narration. This paper describes the thoughts, challenges and experiences of a group of lecturers during the transition to providing lectures on-line to a large number of undergraduate students. On-line lectures are not provided as a substitute for class attendance, but to assist students in choosing a method of learning that works for them as individuals.

1. Introduction

The Department of Statistics at the University of Auckland is the largest statistics department in New Zealand and Australia. Undergraduate courses are delivered at first, second and third-year levels, with 3571, 1335 and 715 student enrolments respectively in Semester 1, 2007. Of 3571 first-year enrolments, 3317 are undertaking our large introductory data analysis and statistical inference course while 995 of second-year enrolments are taking our second-year course in data analysis.

Screencasting [1] records the screen activity of a live lecture and subsequently makes it available for viewing on-line. New technology allows teams of lecturers involved in course delivery at the University of Auckland to experiment with novel techniques for the purpose of enhancing the students' learning experience. Screencasting is intended to complement lectures and is not viewed as the primary source of dissemination of lecture material.

2. Background

For the large first-year statistics courses we offer a flexible learning and teaching environment. The principal teaching pathway is via a lecturer presenting to the class, which may have more than 500 students in attendance. However, many complementary teaching pathways are provided so that students can learn in a variety of ways and at their own pace. Additional resources have included narrated PowerPoint lectures, interactive SPSS and Excel viewlets, explorative Excel spreadsheets and small movies. Delivery to such a great number of students is made possible through a large team of lecturers, tutors, laboratory demonstrators

and student markers (Cunliffe et al, 2003), and through internet and intranet access.

The large second-year data analysis course has used some of these resources, while the more theoretical second-year courses, and the majority of third-year courses, tend to rely more on the use of PowerPoint/LaTex slides and transparencies with overhead projectors in conjunction with lecture workbooks.

For 5 years, narrated lectures were provided for the large first-year course (3 years for the large second-year course), by means of PowerPoint slides complete with narrated pre-recorded soundtrack, to enable students to review the material presented in their own time on any computer. In Semester 2 2006, a new scheme called screencasting was introduced. Screencasting provides a recording of activities specific to the lecture the student attended, or at least was expected to attend. The investment in time and resources to produce screencasts of each lecture is much less than that to generate narrated PowerPoint slides, with the advantage that updates and amendments to each course can be incorporated with minimum additional effort.

Associate Professor Paul Bonnington, a colleague in the Department of Mathematics, had some thoughts on trialing a low-cost, minimum effort 'lecturing method that would enable the student to revisit any part of a lecture'. The rationale behind this came from a feeling that 'much of the information presented in lectures is lost, and this is particularly true in the Mathematical Sciences'. Over the 2005/2006 summer break, Paul evaluated several screen-recording packages, finally settling on a combination of an HP Tablet [2] and BB-Flashback [3].

3. Screencasting

Screen-recording packages produce a screencast capturing the visual display used by the lecturer, and the audio recording of the lecture. Visual and audio content is captured using BB-Flashback. This software enables both recording and editing of onscreen activity and associated audio. It is relatively inexpensive and easy to use. For courses that involve writing on overhead transparencies, PDF annotator enables the capture of annotations made by the lecturer on the PDF version of the lecture notes. PDF annotator enables one to write on any PDF document using a variety of pens and highlighters. In most cases, writing was done on an HP Tablet which is straightforward. Other modes of lecture display, such as the document camera and the overhead projector, are not visible on the screencast. Although products enabling screencasting have been available for some time (e.g. Lotus Screencam in 1993 [4]), these products produced large files and were limited in their editing facilities. Recent technological advances support smaller, more compact file formats such as Macromedia Flash [5] and have enhanced editing capabilities.

Delivery of screencasts is supported by Cecil [6], the university's own platform for internet delivery of resources, administration and communication. It can be accessed from anywhere in the world. Students are familiar with Cecil which they use for routine management of their learning across all courses at the university. As a result of the students' exposure to Cecil, they are able to find each day's lecture easily. They can either play the lecture in its entirety (really only possible with a broadband connection), or they can download the lecture to a memory stick for playing on their home computers without relying on internet access. The exporting facility of the BB-Flashback software allows for more than one format, such as Shockwave files [7] and executable files.

4. Discussion

Screencasting offers the student the opportunity to revisit lecture material which they find difficult. A particular advantage of this approach is the association between the concepts delivered in the lecture and the reinforcement that they receive from the screencasting of the same lecture. This is an important difference between screencasting and pre-recorded lectures.

At the end of the first trial, an announcement to first-year students was posted on Cecil, asking for their feedback on ways of improving the course. Questions related to the provision of the screencasts were posed, which provided us with some useful information. Of 680 responses, 53% of students said they found the screencast useful at revision time, while 58% said they used screencasts to play (and replay) any concepts

with which they had difficulty. There are additional advantages for students who miss a lecture. These students are able to catch up and to hear virtually exactly what they would have heard had they attended class that day. 66% of respondents to the survey reported that they used the screencasts for this purpose. The following comments come from Michael Kitching, a first-year student, who worked for Air New Zealand as a long-haul flight attendant and had a complicated work schedule that made it difficult to attend class each day. “With the recorded lectures being posted online I can access the class I missed. Then I can run through it in my own time, at my own pace via my laptop in any hotel I stay in anywhere in the world”. He adds that “The audio from the recorded lectures is great, and combined with the PowerPoints that the students see in class, sometimes the only thing I feel I’m missing out on is paying for parking!”

Another advantage in our large first-year introductory course, which is taught in multiple streams by several lecturers, is that students can choose to tune into their own lecturer, whose style and manner is familiar, rather than adjusting to another delivery method. However, this can work both ways. For example, if a student finds a certain concept difficult to grasp, perhaps another lecturer’s approach may provide an alternative perspective which is more comprehensible to the student.

Traditionally, the first lecture of our introductory course was geared towards dealing with administration and our expectations of the students. We are now able to pre-record this information so that the students can download and listen to the information in their own time.

Prior to the mid-semester term test, students were able to access a step-by-step run through of a previous term test, provided by one of the lecturers. This proved to be very popular with students, with feedback such as “definitely the most useful part of my test revision” and “Extremely helpful and really clarified a lot of concepts”.

Subtle changes in software installation instructions from semester to semester can cause technical problems for some students. Interactive instructional viewlets produced to minimize this problem were costly to produce, so were not updated regularly. A useful advantage of screencasting is that it allows the provision of updated installation instructions every semester, with minimum cost and effort.

For the teaching teams and individual lecturers, the advantage of the recorded-lecture approach is that any course amendments and improvements can be integrated with minimum effort. For example, a recent course rewrite in our first-year introductory course would have meant an enormous amount of time and effort to reproduce narrated PowerPoint lectures, but there is virtually no additional effort required in screencasting while they are being delivered.

Evidence suggests that only about half of our students have English as their first language, with a similar proportion being relatively new arrivals to New Zealand and its education system. We believe that screencasting provides real benefits to these students since they have the opportunity to listen to each lecture as many times as they require to fully understand the lecture material.

While most of the student feedback to our survey was positive, it is worth mentioning the negative aspects as issues that we wish to address in the future. The most common negative response (12 students) was that the download speed was too slow. Seven students who responded to our survey noted that sometimes the quality of the sound was poor. We need to think of ways of solving these problems so that students are not frustrated by them.

Our survey suggested that 24% of respondents used the screencasts instead of attending class. We anticipate that for many of these students no added-value is achieved by attending class and that they have the discipline and initiative to learn and study at their own pace. We do not wish to discourage students from attending class when there is a very real benefit in them doing so.

In many instances, uptake of the technology relies on individual lecturers buying in to the concept. With our large first-year introductory course, which is a complex operation involving a team of lecturers, the idea of being recorded during lectures brought out a range of responses. Reactions initially ranged from the enthusiastic and positive, a willingness to give it a go despite certain misgivings, right through to outright rejection, e.g. “no way – I’m not doing it.” If some lecturers on the team decided to trial the technology

while others didn't, then there would have been equity issues for the students. It wasn't considered reasonable to have some classes benefiting from recorded lectures while other classes did not. One of the primary hurdles to overcome was apprehension about being recorded. Anxieties included concerns about scrutiny of presentation style, and the prospect of being recorded making mistakes! These reservations were overcome by reaching an agreement that none of us, including the head of department, would listen to anyone else's lectures without prior permission. In the situation where we had a need to demonstrate the trial, one lecturer, who had no concern with others listening to her classes, agreed to be our "show pony". As a result, despite early reluctance from some, the entire team ended up participating in the trial.

5. Conclusion

Screencasting is a very efficient way to provide students with a narrative of the Stage 1 course without consuming additional human resources. The low-cost of this resource makes it accessible to other, possibly much smaller, courses. Once certain technological issues surrounding access, download speed and sound quality are addressed, we feel confident that screencasting will play a large role in the delivery of statistics courses at the University of Auckland.

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[1] Screencasting http://en.wikipedia.org/wiki/Screencast

[2] HP Tablet http://www.hp.com

[3] BB-flashback http://www.bbsoftware.co.uk/

[4] Lotus screencam http://www-306.ibm.com/software/lotus/

[5] Macromedia Flash http://www.macromedia.com/software/flash/

[6] Cecil http://www.cecil.edu/html/about.htm

[7] Shockwave files http://sdc.shockwave.com