

Effective/Cost-effective Screencasting

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Introduction

This article reports on a case study exploring the use of screencasts in three different areas in the School of Computing and Mathematical Sciences (CMS) at the University of Greenwich. The case study was done over the academic year 2012/13 with a variety of courses at undergraduate and postgraduate level. A few lecturers who initially participated in the case study found that technical issues with recording screencasting were interfering with the delivery of their course and therefore did not fully participate; the authors of this article persevered and were able to use screencasting to add value to their courses. Lessons learnt from this case study, particularly in terms of streamlining the process, should encourage more lecturers in the school to experiment with screencasting in future academic years.

What is screencasting?

Screencasts were introduced a few years ago, with screen capture software packages like TechSmith's *Camtasia* and Adobe's *Captivate*. The screencasts are often referred to as videos by students and others, but we would like to make a clear distinction between a screencast and a filmed video.

A screencast differs from a filmed video as it is not a lecture or a lab session or tutorial that has been filmed, but is instead a digital recording of any events or presentations on the lecturer's computer screen, with voiceover narration and explanation (Roach, 2006). Examples of screencasts are a *PowerPoint* presentation with an explanatory voiceover and a demonstration of a software tool with voiceover. Some advantages of this method over filmed video recordings are smaller file sizes, making laptop or memory stick storage manageable, and ease of editing. Many filmed video recordings are quite complicated and require equipment setup as well as a technician to operate the recorder. Live filmed video recording can also be distracting for the students. Other advantages of screencasts include the flexibility of the presentation (which may be just snippets or whole lectures and either pre-recorded or live) and, since the presentation is audio, elimination of the need to worry about personal appearance. Screencasts add an active, visual element to resources available outside scheduled class time (Educause Learning Initiative, 2006).

The School of Computing and Mathematical Sciences has experimented with the effective and cost-effective recording of lectures and tutorials as screencasts, using low specification equipment and minimal technical support. The main additional cost has been for portable radio microphones (several hundred pounds each) and the main technical problem has been achieving consistent quality in the recording of the sound, owing to unreliable batteries and difficulties with software installation.

Most filmed video recording of lectures has relied on dedicated recording equipment supported by a technician able to monitor the recording as it happened and to edit it before publishing a final version. This was not an option for CMS.

What is effective screencasting?

To make screencasting effective, a range of approaches was used: lectures delivered online before the timetabled lecture slot (a 'flipped classroom'); screencast snippets to show how to perform specific technical tasks (screencast tutorials for practical sessions); live recordings of lectures. The choice depended on the subject matter and the lecturing style of the presenter. Some recordings were done live (effective in use of time and perhaps more engaging, but with risks), or pre-recorded (more polished and with opportunity for retakes).

What is cost-effective screencasting?

To make screencasting cost-effective, only minimal technical support was needed, viz. a semi-automated, overnight procedure for transferring the raw recording to the School's Intranet for *HTML5* browser access by students enrolled on the course. With only screen and sound stored, not the video, file sizes were smaller and therefore more manageable and the recording was easier to edit (though editing amounted merely to "topping and tailing" the recording and adding a splash screen).

Implementation

The CMS School used a variety of screen capture software, including *Microsoft Expression Encoder 4 Screen Capture* to record all types of screencasting. *Expression Encoder* is easy to use: the user can choose to capture any portion of the screen or to capture live audio and, optionally, a webcam. The encoder can then be used to edit the footage and choose when to use the webcam footage, if captured. A free version of the software, limited to ten minutes of recording, can be downloaded from Microsoft (Download Center, current) and there are user-guide videos on *YouTube* (Microsoft Expression, current). The full version is expensive, but is included in a Microsoft site licence at many universities and colleges.

Example 1: Pre-recorded lectures for 'flipped classrooms'

Pre-recorded screencasts of the lecture material is one of the necessary cornerstones of the implementation of the 'flipped classroom' approach. Logistically, screencasting of the pre-recorded lectures has its challenges. First of all, it requires additional time at the computer to customise the traditional lecture notes into a more dynamic presentation, adding, for example, animation and sound to *PowerPoint* slides as well as embedding other screencast materials into the lecture. Second, it requires a quiet place and additional time to record the screencasts.

Also, implementation of a 'flipped classroom' approach leads to a rethinking of the activities during the contact hours with students and requires extra materials, like quizzes, interactive exercises, discussions etc.

There are many benefits of the pre-recorded lecture screencasts. From the technical point of view, the lecturer has full control of the recording environment and can edit the screencast if required or, in rare cases, re-record the lecture partially or completely.

From the learner's perspective, this method has a wide range of benefits:

Since the recording is done in advance, the screencast lectures are made available to students to watch before the contact hours (lecture/seminar/workshop), allowing them to come prepared for interactive, inquisitive, thought-provoking sessions, and thus helping them to assimilate their knowledge in a deeper way and apply practical context to theoretical concepts.

The students can watch the screencast when it suits their schedules and life styles; they can watch it once or several times; they can re-wind and go over a particularly difficult concept. There is also a sense of a personal connection with the instructor, which is an important element of the learning process (Evans, 2011).

The 'flipped-classroom' approach also stimulates the ability to learn independently and then verify the acquired knowledge interactively in the classroom (HEA, 2013). It encourages and builds confidence in students, especially at the beginning of a course, by providing opportunities for them to bring to the class questions and observations which have arisen from watching the screencast (Berrett, 2013).

Example 2: Screencast tutorials for practical sessions

With the preparation of lab materials for courses that utilise software, there is an imbalance between the time it takes to research, hone, organise, write and annotate various tasks and the time it takes for the students to attempt to complete the tasks. This is an issue that comes up repeatedly in media-related courses, where the software will change with annual releases. Such amendments as buttons changing their icons, the renaming of techniques and new methods for completing tasks can make steps in a tutorial redundant within a year of their creation.

In previous years, for the course 3D Animation, the highly visual tasks were written in a step-by-step method, utilising static screen-grabs to illustrate the location of commands and actions, and would often become lengthy documents that students would need to follow in order to practise the practical skills needed for the course, let alone synthesise their own implementation.

With screencast capture, the process becomes entirely different. Previously, with written tutorials, a tutor would need to ensure that the wording used was clear and had no ambiguity, as the only other method that could communicate the same intentions would be static illustrations which would be constrained by the dimensions of the page. Screencast tutorials allow the real-time demonstration of techniques with a more personable tutor narration, which is instantly contextualised with the actions seen on screen. By watching the actions and listening to the contextualisation of the methods presented, the students will be more likely to apply them in their own projects, rather than simply emulate the tutor's example.

The time taken by the tutor to produce the tutorials is significantly reduced. Aside from researching and honing the task to fit the learning outcome of the practical, the time it takes to record is the time it takes to carry out the task. The only additional time is taken up with encoding the screencast into a format for the VLE, but this can be batch-processed and left to run with no interaction.

One method for the preparation of screencast tutorials is to break the tutorial into separate methods and techniques, rather than recording as one whole screencast or as a step-by-step process. From a pedagogical viewpoint, there are numerous benefits to this approach: for example, students would be presented with the concept and how to carry it out, but, as it would be presented and contextualised as a separate process rather than as a step in a larger process, students would be able to apply that technique to other situations, such as animating a sack of flour in the 3D Animation course. One stage of this is to create a dummy object which can be used as a handle to alter a section of the sack model; whilst this is a critical step in the process, it is also a technique that can be used in other scenarios. Presenting this as its own technique distinguishes it from a step used only in the animating of a certain object. The tutor should then not need to repeat the process.

Another benefit of breaking a tutorial into distinct chunks is that it relieves pressure on the tutor. If a tutorial is carried out in one long recording, a mistake can ruin everything done before it, unless the tutor is prepared to edit the recording. Keeping screencasts to two- or three-minute chunks, the tutor can save the tutorial at that stage and begin the next; if a mistake is made, then the screencast can be stopped and scrapped and the tutorial set back to the last save point.

With screencasts in bite-sized and appropriately-named chunks, students can quickly and easily find a process that they are having problems with, rather than having to trawl through a lengthy screencast.

As the screencast medium is one that can be rewound, paused and fast-forwarded, students are able to stop at a particular point and not lose their place. If they are unsure of the point being explained, they can rewind, and, if they are revisiting the material, they can skip to the part they are looking for.

Example 3: Live recordings

Experience shows that recording live lectures requires planning. *Microsoft Expression Encoder 4 Screen Capture*, available at no extra cost within Microsoft licensing by the University, was used to make the recording, and this needed to be installed and configured on all the lecture theatre main computers. A portable radio microphone needed to be brought to the lecture and plugged in, and the recording software set up and tested before the start of the lecture.

With live recordings, it is essential to tell students when the recording is about to start and then remember to press the start button! Students need to be aware that, if they ask a question or make a comment during the lecture and do not want it to be part of the published recording, they must inform the lecturer at the end of the lecture. It is also essential to tell students when the recording is finished and to press the stop button!

There are many hazards with live screencasting. Things can go wrong, and usually do. It is advisable to check that the software is available on the machine being used, that the microphone has sufficient battery life and that the sound recording level is set appropriately. The lecturer needs to repeat questions from the audience so that they are recorded clearly and sometimes editing is required: for example, when a fire drill interrupts the session. Crucially, managing the recording at the same time as delivering the teaching is a challenge.

Process for making recordings available to students

In all cases, the recordings were made available to students through the CMS Student Intranet, with links to it from the Moodle course. Students had to agree to the following terms and conditions before they could access the recordings and they had to be attached to the course in the University's Management Information System.

Terms and Conditions for viewing this video

This video is the copyright of the University of Greenwich 2012

It is only for use by current enrolled students and staff in the School of Computing and Mathematical Sciences

No unauthorised copying is permitted

Figure 1: Terms and Conditions for student viewing

Statistics

Having the recording hosted on the CMS Student Intranet means that extensive statistics are available. For example, the courses with many snippets had the most accesses, but the most watched screencast was one of the live lectures, probably because the requirements for the coursework were explained in detail in that lecture.

The 3D Animation course in the year 2012/13 utilised 148 individual tutorial screencasts over 22 teaching weeks. The total length of the screencasts came to 9 hours and 3 minutes, with an average of 3 minutes 51 seconds per screencast.

There were 75 students registered to the course in the 2012/13 academic year and, across the whole cohort, the 148 screencasts had 10293 views between them, equating to 137 views per student. This statistic suggests that some students must not have watched all the screencasts, even though all techniques covered were assessed in their work.

The visualisation in Figure 2 that plots screencast views against a student's achieved grade indicates that students who viewed the screencasts more than once passed the course, allowing them to apply the required skills into their work. This is far from the only variable which could affect academic achievement; in fact, there are examples of students who did not view all of the screencasts available and still achieved a grade of 70% or over. This could indicate that they had prior knowledge of the software, that they had gained enough knowledge from the lecture demonstrations or that they had sourced other tutorials.

There is one exception to the assertion that if a student watched all of the screencasts, he or she would pass. One student in particular had 398 views in total, but failed the course. This would indicate that screencast tutorials did not work at all well for this individual, but, as the data was anonymous, no correlation is possible with other course performances or mitigating circumstances.

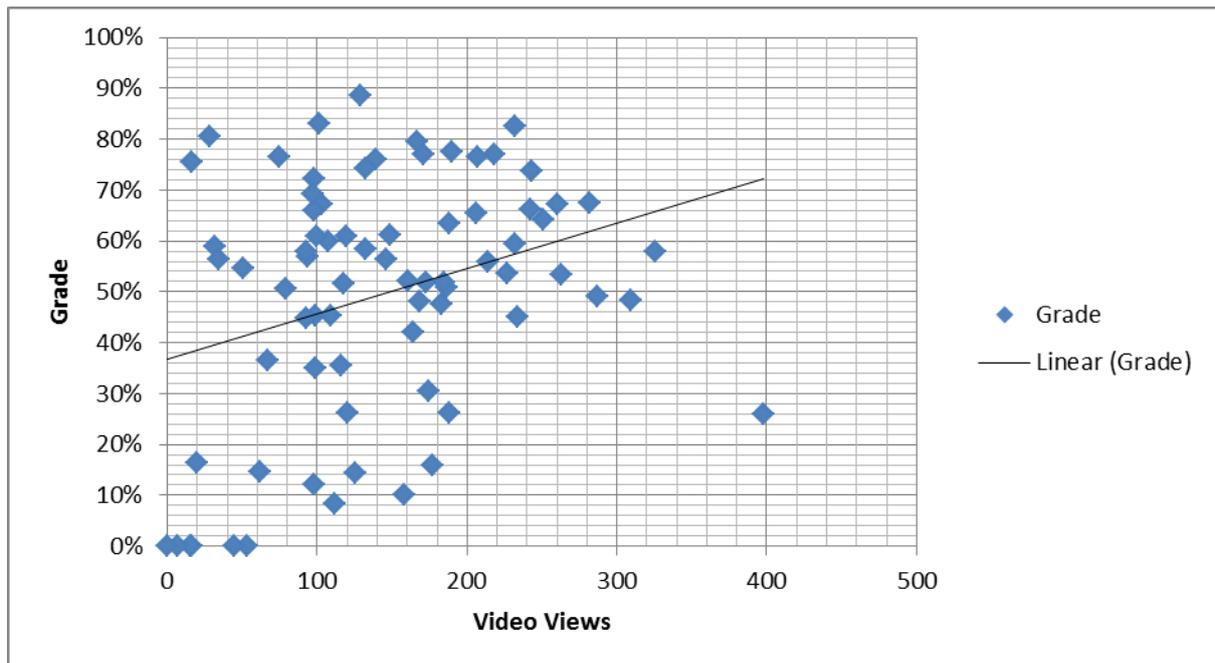


Figure 2: Screencast views vs. Grades **Feedback from students**

The online CMS Student Feedback system provided many positive comments. MSc students commented:

- "... the videos prepared me for the class ahead and therefore made the class less strange and more interactive."
- "It was a refreshing change from traditional teaching methods mainly because it helped me get more involved with the subject of the course. It gave me more time to deepen my knowledge of the subject rather than spending unnecessary time on basics."
- "I watched the videos most of the times before class and in some cases I re-watched them while I worked on the coursework."

Undergraduate feedback included:

- "Good to go and watch the video before the start of the lecture because it helps to understand it more."
- "I found the video lectures which were released before each lecture to be extremely useful. Watching the video and taking notes prior to the lecture meant that I was able to prepare questions to ask during the lecture so that I can clarify my understanding."

There were no negative comments from students.

Conclusion

The obstacles to effective screencasting have been a combination of technical issues, especially hardware and software unreliability. The best solution for this would be integration of the lecture theatre sound system with the recording software, but this was not part of the specification of the systems currently in place in the university lecture theatres. however, this is being implemented for 2014/15.

The benefits of the varied approach taken by CMS have been motivated and satisfied students and resources that can be re-used, with minimal extra costs apart from staff time.

In summary, to the question "Is screencasting worthwhile?", students clearly say "yes", but lecturers currently say "maybe". Once remaining technical issues are overcome and the long-term benefits of recorded screencasts become clearer, it is hoped that lecturers will change their response to "yes".

References

Berrett, D. (2013). 'How "Flipping" the Classroom Can Improve the Traditional Lecture', *The Chronicle of Higher Education*, May 13, 2013 Available at: <http://chronicle.com/article/How-Flipping-the-Classroom/130857/> (Accessed 30 May 2013).

Educause Learning Initiative (2006). *Seven things you should know about screencasting*. Available at: <http://net.educause.edu/ir/library/pdf/ELI7012.pdf> (Accessed 7 October 2013).

Evans, Darrell J. R. (2011). 'Using Embryology Screencasts: A Useful Addition to the Student Learning Experience?' *Anatomical Sciences Education* 4 (2): 57-63. ISSN 1935-9772.

Falconer, J., De Grazia J., Medlin W. and Holmberg M. (2009). 'Using Screencasts in ChE Courses.' *Chemical Engineering Education* 43 (4): 302-305. ISSN 0009-2479.

Independent Learning (2011) - Higher Education Academy Available at: http://www.heacademy.ac.uk/resources/detail/internationalisation/isl_independent_learning (Accessed 7 October 2013).

Microsoft Download Center, current Available at: <http://www.microsoft.com/en-gb/download/details.aspx?id=18974> (Accessed 16 June 2014).

Microsoft Expression videos Available at: https://www.youtube.com/watch?v=VGqIsIUd_Wc (Accessed 16 June 2014).

Palaigeorgiou, G, and Theofanis D. (2010). 'Known and Unknown Weaknesses in Software Animated Demonstrations (Screencasts): A Study in Self-Paced Learning Settings.' *Journal of Information Technology Education* 9: 81-98. ISSN 1547-9714.

Roach, J. (2006). 'Using screen capture technology to develop on-line course material'. In C. Crawford et al. (Eds.), *Proceedings of Society for Information Technology and Teacher Education International Conference 2006* 519-520. Chesapeake, VA: AACE.

Sams, A. (2011). 'The Flipped Class: Shedding light on the confusion, critique, and hype', *The Daily Riff*, Nov. 11 2011. Available at: <http://www.thedailyriff.com/articles/the-flipped-class-shedding-light-on-the-confusion-critique-and-hype-801.php> (Accessed 1 May 2013)

Thompson, R. and Lee, L. (2012) 'Talking with Students through Screencasting: Experimentations with Video Feedback to Improve Student Learning', *The Journal of Interactive Technology and Pedagogy*, 1 Available at: <http://jitp.commons.gc.cuny.edu/2012/talking-with-students-through->

screencastingexperimentations-with-video-feedback-to-improve-student-learning/ (Accessed 7 October 2013).

Tucker, B. (2012). 'The flipped classroom'. *Education Next*, 12(1), 82-83 Available at: http://hdexplorations.eportalnow.net/uploads/7/1/0/0/7100009/ednext_20121_btucker.pdf (Accessed 1 May 2013)