Improving the education experience with live video streaming

Introduction

The Web has revolutionised the way schools, colleges and universities deliver tuition and engage with students, parents and other key stakeholders. As we increasingly become a society of 'digital natives' – people who have never known a world without digital technologies – technology is breaking down traditional barriers and opening up new ways of working, learning and playing.

One of the technologies with the greatest untapped potential in education is live video streaming. The most likely explanation for this is a perception by some, until now, that video streaming is expensive and requires specialist skills to deliver a successful outcome.

That may have been the case in the late 1990s, but in fact, the range of uses already being successfully applied by schools and colleges render those arguments redundant once and for all. The recent development of technology, such as the TriCaster 40, to deliver professional-quality HD video production at a low cost, has overcome the financial barrier. Here we outline some of the best ways to use this technology to enhance the educational experience.

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The basics: what is video streaming?

Anyone who has visited YouTube or the BBC iPlayer will have viewed streamed video footage. It allows you to watch a video in 'real time' online, rather than having to download a file to your computer to watch.

Streaming has been made possible as a result of the improvement in broadband speeds over the last decade. The connection must run fast enough for the continuous stream of data to show in real time, even though streaming files are compressed for efficient use of bandwidth. Any interruption in the stream is usually caused by the broadband connection – which is why a stream sometimes stops and the 'buffering' message appears while the 'buffer' of data in the PC, smartphone or tablet catches up.

Often, the video stream can be viewed at different quality levels so that interruptions are reduced when watching on slower broadband connections. The trade-off is a lower quality video stream.

The evidence: how and why video delivers improved learning

Video streaming in an educational context is still relatively new. However academic research over the last two decades into how multimedia and ICT technologies as a whole affect learning outcomes suggests they have a very positive impact.

Specifically in relation to video, a study in 2007 by Romanov and Nevgi at the Research & Development Unit for Medical Education, University of Helsinki, Finland concluded that "students who watched video clips were more active in using collaborative e-learning tools and achieved higher course grades." It assessed 121 third-year medical students who attended a course in medical informatics consisting of lectures, small group sessions and e-learning material (including video clips). A course exam determined the learning outcome.

Choi and Johnson (2005) looked at how video impacts instructional learning; they found that learners had higher attention spans for video-based instruction compared with text-based. Their 2007 study also found greater levels of learner satisfaction when video is deployed as part of an instructional programme.

The power of video in the learning context is summed up very well in a report published in 2010 by Randall Fujimoto, an expert on game-based learning with Shoyu Learning Solutions.

He identified a number ways in which video enhances the learning process:

A motivational tool
Drawing on the findings of several academics, Fujimoto advocates that video is engaging for people of all ages, thanks to it being visually and auditorily stimulating. This positive motivational effect makes video a powerful force in focusing the attention of learners on the learning material.

Single-out key information
The report identifies the power of video in focusing the attention of learners on specific information that is vital to the learning programme. The medium's ability to assist in recalling important points is attributed to the simultaneous processing of auditory and visual information required when watching a video.

Demonstrate procedures
Video is an excellent way to demonstrate how to do something, easily outperforming the effectiveness of static presentations and comparing favourably with live presentations too.

Explain models and systems
Complex systems and processes, such as how an internal combustion engine works, are effectively brought to life in video. Fujimoto's report points out that video is very useful in showing invisible or difficult to see workings within a system.

Promote active learning

By mentally engaging learners, video can be a particularly effective learning tool when learners are actively participating while watching the video. One study found that students who learned using digital video engaged more in critical thinking than those who did not, and that video stimulated cognitive processes that helped facilitate active learning (Kamin, O'Sullivan, Deterding & Younger, 2003).

Problem-solve

Fujimoto's report cites research by Choi and Johnson (2007), which found how video can be effective in problem-based learning. These academics put this down to the fact that video conveys setting, characters and action in an interesting way, and portrays more complex and interconnected problems. A large amount of information can also be conveyed in a compelling manner in a relatively short video.

Promote situated learning

Video helps learning in real-world contexts where students 'learn by doing'. Choi and Johnson (2005) believe this is because of video's ability to effectively model or demonstrate concepts or procedures in complicated contexts. For example, a short demonstration video clip is more powerful than static diagrams or text.

Promote metacognition

Fujimoto draws on a study by Wouters et al (2007) to conclude that video promotes metacognitive thinking. It does this, he says, by allowing video viewers to compare themselves to the experts or peers they are watching perform tasks in the video.

Assessment tool

Video is more than a knowledge acquisition tool, according to Fujimoto – it can also be used as an assessment tool. He points to a 2008 study which found that video-based questions were better at assessing knowledge and establishing understanding of subject material than multiple-choice questions (Hertenstein and Wayland, 2008).

Eight practical ways to use live video streaming

1. Create an on-demand digital library of support materials

As any teacher knows, video is superb for capturing important classes, lectures and seminars. Video streaming solutions take this one step further by enabling schools and colleges to establish a digital library of lesson support material. This is invaluable for students who have been absent for an important class and need to catch up, but equally so for students reviewing for examinations.

Organized into easy-to-find video clips, students can simply visit the school website and stream the sessions they need as part of their study, on-demand. By setting up markers in the footage, teachers can direct students to specific sections of the video to save time. With a solution like TriCaster 40, these video streams can also be produced to include PowerPoint slides and photographs where required.

This same digital library can include clips from other sources, such as television news channels, government departments, businesses and people.

2. Produce and stream educational programming

With video streaming, schools, colleges and universities can use their existing data networks to distribute TV programmes across the campus and at different sites, simultaneously. This may be useful in situations where remote facilities are being used to broaden access to education, but the budget does not allow for teachers to be physically present for every lesson.

3. Broadcast live events

In the U.S., where college and high school sports often attract a huge following in the local community, video streaming has proved popular for broadcasting live games, so people unable to attend can still keep track. Schools, colleges and universities in the UK are finding streaming useful for sports, but equally so for key events throughout the calendar, such as visits from dignitaries, graduation ceremonies and presentations by guest lecturers.

4. Video conferencing
In much the same way as Skype has become a popular way for family members to keep in touch face-to-face, video conferencing enables schools, colleges and universities to get together virtually to learn about and debate the hot topics of the day. By setting up each speaker and audience with the required cameras and microphones, live video streaming enables real-time discussion and debate over the Web – the whole conference can also be recorded for future use and made available in the digital library.

5. Enable distance learning
For further and higher education institutions, video streaming is extremely useful in the delivery of distance learning courses. In much the same way that educators can use video streaming to create a digital library for internal use, students undertaking a course delivered through distance learning can access recordings of lectures as part of their programme – these could even be live broadcasts (as above).

6. Lecture capture
A video recording of the live lecture, supplemented on the screen with whiteboard, presentation or class notes, makes it possible to augment material covered during the lecture and provide the class to students, at any time. The opportunity to review the lecture at their own pace can help students retain material, and instructors to make edits or updates to their video material. Additionally, instructors can prerecord lectures and make them available throughout the course.

7. Expand school collaborations
Partnering in schools, colleges and universities may not be new, but the extent to which institutions in different parts of the world can now collaborate using live video streaming, certainly is. Video streaming enables institutions to connect like never before, using live broadcasts and publishing pre-recorded footage to educate and inform students and teachers. This is especially useful for schools, colleges and universities with international collaborations, where there is much greater scope to share cultural experiences alongside academic development.

8. Strengthen community outreach
Many schools, colleges and universities sit proudly at the heart of their local community with facilities often shared, such as sports halls and arts resources. Video streaming provides the scope for far greater engagement with local residents, parents and authorities. Teachers can use streaming as their own direct TV channel to broadcast annual reports, updates on new developments and responses to media coverage. Institutions may also offer their video production and streaming resources for use by local community groups and charities to help promote their own cause, or provide much needed services through video.

9. Enhance your brand
Live video streaming can be used as part of the marketing mix to help institutions make the right impact on potential students, parents and donors. Most commercial businesses and public sector bodies use video streaming as part of their website – often via embedded YouTube clips, or even on their own channel or 'learning centre'. Schools, colleges and universities can now make their own TV productions to showcase what they have to offer, and use them as part of recruitment and funding campaigns.

Where to go for more information

If your school, college or university has already invested in video cameras, sound equipment and other kit to create videos, producing and broadcasting your video – and making it available on demand – is a very simple and low-cost exercise, thanks to the latest compact solutions.

The best products now on the market offer a full suite of production features that are normally only available on high end systems, for a fraction of the cost. The TriCaster 40 is proving a popular solution in the education sector.   Visit www.newtek.com for more information and to speak to our technical team.

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Additional references

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