

Use of interactive video for teaching and learning

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This paper focuses on the findings of Phases I and II of an institution-wide project on the effective use of interactive video for teaching and learning in a university in New Zealand. Responding to the emerging growth of video in teaching and learning practice and scholarship, and also to the university's strategic focus on providing blended, flexible learning opportunities, this project explores the ways in which lecturers currently use videos in teaching, their challenges, and their attitudes towards making video as well as students' perceptions of learning through video. This paper discusses what we conceptualise as effective learning moments and conditions and how these can be created and maximised through the effective production and manipulation of relevant, purposeful interactive videos. The overall project combines both research and impact and develops opportunities for lecturers to enhance their competencies in creating interactive videos.

Keywords: video pedagogy, interactive video, video in teaching, engagement, teaching, learning

Video in teaching and learning

As one of the most diversified technologies, video offers numerous opportunities and possibilities for developing effective teaching and learning contexts. More recently, video has been widely integrated into many blended courses and fully online learning environments, including the main delivery mechanism in MOOCs, such as FutureLearn and Coursera. Research shows that video constitutes a critical factor in achieving learning outcomes (Boyle, 1997; Mayer, 2009) and is an effective tool for teaching and learning in various disciplines (Allen & Smith, 2012; Hsin & Cigas, 2013; Rackaway, 2012). However, simply presenting information in video format will not automatically lead to in-depth learning (Karppinen, 2005). The pedagogical design and development of videos with critical elements is crucial for video to be an effective tool in educational contexts, and tertiary teachers need to consider ways to include elements that promote active learning. This paper will showcase some aspects of a multidimensional research project on video pedagogy that we designed and developed for the University of Waikato's context to implement the university's strategic focus on providing blended, flexible learning opportunities.

This project explores the effectiveness of the use of video in teaching and learning and the ways in which interactive videos can be used and promoted as a means for active, flexible learning. Focusing on the use of video, the project was designed on the basis of a real, pressing gap identified through the lead author's consultations and work with teaching staff as eLearning designer, as well as the opportunities that were observed and identified in teaching and learning across faculties. Lecturers often report that creating purposeful, engaging video content for their teaching is time-consuming and laborious. This project investigates (a) the ways lecturers currently use videos in teaching, and students' perceptions of learning through videos; (b) how to train staff to create their own interactive videos; and (c) the effectiveness of the use of videos in teaching and learning in a fully online paper through a case study approach.

Several decades of research show the pedagogical benefits of video in education, particularly in teaching and learning. Articles written back in the 1990s discuss the ways in which video benefits student engagement, so the use of video in teaching and learning is not a new topic. However, what is new is to be found in understanding the ways in which the nature of learning has been transformed through the dramatic changes that have occurred in the world of audio-visuality and multimodality in which we live. Our students spend their lives primarily engaged with some device, interacting with multi-screens and saturated media environments. How far has this shift in the nature of learning and the ways our students engage and learn been thought out pedagogically in our teaching plans and learning designs? In essence, this project engages with this question but focuses on exploring video pedagogy for practical solutions.

Video has proven to have great potential to provide several avenues to facilitate active, blended learning. Studies have shown the ability of video to engage the learner and activate cognitive and emotional learning



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(Greenberg & Zenetis, 2012), increase motivation in learning (Saeed & Zyngier, 2012), and have a positive effect on students' perceptions of learning (Bravo et al., 2011). However, little has been written on the use of interactive videos in teaching and learning. An early attempt on interactive video was through making a system called LBA (2006), similar to Panopto, which allowed students to click and pause the video anywhere they desired. The video clip explained the PPT slides and if the student did not interact, the whole recorded lecture would flow from beginning to end. In our project, we define interactive video and the way it can be made by embedding interactive learning moments (Zalipour & Gedera, 2017).

In this paper, we first describe the design of the project, comprising three phases, then define and conceptualise interactive video and the ways in which it can be created and incorporated in teaching and learning contexts. Next, we present and discuss the findings of the research. We conclude by discussing the importance of video pedagogy for facilitating active learning in tertiary education.

The project design

The project comprised three phases. In Phase I, we investigated the ways in which video is used in teaching and student learning through a pan-university online survey with staff and students. We wanted to explore both teachers' and students' perceptions and attitudes towards the use of video in facilitating learning. In Phase II, we designed and conducted a series of professional teaching development workshops to train staff in creating what we conceptualised as interactive video. In these workshops, staff were introduced to simple, easy-to-use video tools that we identified in our research project. The hands-on nature of the workshops provided opportunities for staff to experiment with making and manipulating videos for their own teaching contexts. The workshops included pedagogical discussions where we could encourage positive attitudes about the effectiveness and usefulness of using videos in teaching and learning. Through these workshops, we collected observational data on how staff responded to the idea of interactive videos for student learning and the challenges they experienced when making the videos. In Phase II, we also designed and produced a video toolkit for staff, exemplifying how interactive elements are embedded in videos.

In Phase III, we identified a case study where we could support a lecturer to develop a series of videos for a course in Semester B in 2018. As part of this phase, the lead author offered pedagogical and pragmatic support to the lecturer to review and redesign the paper and develop examples of interactive video-based content, including various forms and types of videos to facilitate active learning in a fully online course. At the end of this paper, the effectiveness of teaching and learning with videos will be evaluated through a focus group with students and one or more semi-structured interviews with the teaching staff involved. The overall research questions are:

- In what ways are lecturers at the University of Waikato currently using videos in their teaching?
- What are students' and lecturers' perceptions and attitudes towards the use of video in learning and teaching?
- How can videos be used for active, flexible learning?
- What are students' and lecturers' views on the ways the videos in the papers supported learning?
- What are the benefits and constraints of using video for promoting active, flexible learning?

Interactive video and workshops

In this project, we have focused on what we conceptualised and promoted as 'interactive video'. We define interactive video as videos that embed interactive learning moments in which deep learning can occur for students. Interactive videos create opportunities for students to actively engage and participate in the learning process in numerous ways. The manipulation of videos by lecturers creates the conditions in which students can interact with the content of the video as intended in the paper's learning outcomes and based on students' prior learning, the content of the lecture, and any other materials and elements of the paper and assessments the lecturer can think of. It is evident that making links and inter-connections enhance student learning. Interactive learning experiences can be created by manipulating and editing videos to include moments in which students are led to pause and engage with a focused learning activity.

There are many ways to create interactive learning moments in videos—through embedded questions, guided conceptual understanding, prompts for generating discussion and reflective pauses, receiving instant feedback, getting involved in creating content for the next lecture, self-centred learning, and many more. Interactive

videos allow students to receive feedback, rate the usefulness of the videos utilised by the lecturer in a way similar to ‘active media audiences’ and move from being passive receivers to participating in their own learning in useful ways (Zalipour, 2016). These are moments when students have to pause and think critically, analytically or creatively about the video content and the embedded learning activity. Furthermore, using interactive videos enables lecturers to understand – through analytics or summary data – if the concepts, examples, activities, and assessments in class associated with the videos are truly effective in student learning.

In Phase II, the workshops offered professional teaching development, focusing on the design and implementation of video in teaching and learning contexts, with particular emphasis on assessments and feedback for learning and active, flexible learning approaches. The participants were invited to focus on a particular paper they were teaching in their current semester, where they used or were planning to use videos. The video tools for making and manipulating videos were introduced as the participants worked with them to embed interactive learning moments, at the same time discussing the pedagogical thinking behind their choices. The sharing and participatory atmosphere of the workshops allowed everyone to feel safe trying out different ways they could make their selected videos interactive. The workshops focused on three major ways of creating interactive video content by using screen-casting software, Websites and Learning Management Systems (LMS). For each of these, we demonstrated several tools and how they could be used in teaching and learning. The details of these tools will be discussed in another article or presentation.

For screen-casting tools, we trained staff to use Screencast-O-Matic and Loom. The participants brainstormed and discussed the ways screencast could be used in their papers. Videos can be employed in a variety of ways to enhance active, flexible learning, for example (a) to give an introduction to the course and guidelines, or walk students through instructions of an assignment; (b) as an assessment tool; (c) to record lectures (as short videos/segments), especially the invited guest speakers who cannot attend the class; (d) for demonstrations or tutorials that students may need to watch several times; (e) to record a weekly summary of the class; (e) to provide an overview of assignments or projects; (f) for demonstrations and feedback, and (g) to have students record presentations, reflective commentaries and peer feedback (Gedera & Zalipour, 2017). As part of the Moodle (LMS), H5P offers ways to create interactive learning moments. The training programme was well-received by workshop participants. Web-based tools such as Ed Puzzle and Playposit were introduced and experimented with in the workshops, which concluded by providing some quick tips on the effective use of video in teaching and learning.

In Phase II of the project, we developed an interactive video toolkit that contains succinct professional teaching development resources in the form of video. The toolkit includes a series of both interactive and non-interactive videos, helping lecturers to refresh their ideas and thinking about several key areas in learning and teaching, such as ‘reflective practice’, ‘maximising learner engagement’, ‘designing and teaching blended and fully online papers’, and ‘work-integrated learning’. Part of this initiative aims to allow teachers to see for themselves how video can create flexible learning.

The existing tertiary teaching development resources and programmes at the university are made available largely in the form of booklets, which are usually printed for those participating in the face-to-face teaching development workshops, or which can be downloaded by staff as a PDF file from the university’s website. Such workshops are offered on campus or in other places to enable staff to discuss and share examples of effective teaching and learning. We wanted the staff to engage with teaching development materials at anytime, anywhere, and at their own pace. The recent feedback from tertiary teaching staff at the university shows that they prefer concise, focused, practical teaching development resources and activities. The modules consist of focused, succinct, self-directed and interactive videos which incorporate current, innovative pedagogies. They are designed to stimulate reflection when designing and developing various aspects of teaching and learning, and are guided by voice-over, real-life scenarios, and staff interviews.

Staff and Students: perceptions and use of video in teaching and learning

For Phase 1 of the project, we had 107 staff survey responses and 642 student survey responses across various faculties at the University of Waikato. The staff questionnaire centred primarily on lecturers’ current use of video in teaching, as well as their perceptions and attitudes towards the use of interactive videos and how these could benefit student learning. The survey results showed that lecturers utilise videos for a variety of purposes related to their content and teaching subject, mainly from YouTube, Vimeo, eTV, and TED talks. These purposes include using video to supplement the lecture content, illustrate points, explain and exemplify ideas, introduce concepts and frame discussion topics. Some lecturers referred to the specific purpose of incorporating video to trigger critical thinking and discussion among students. One lecturer wrote about the benefit of videos

in illustrating marketing concepts in his course “by way of viewing then critiquing television and social media advertisements”. Another lecturer commented: “Sometimes, I will start with a provocative video to stimulate curiosity and discussion”. There was an overall consensus that videos should be used in current learning contexts (“I use YouTube videos to break up the course material in order to appeal to students who are visual learners”), and that videos could offer alternative views and perspectives for students. “I often find YouTube videos which discuss topics from a perspective different from my own so as to reposition or reframe the in-class discussion.” Others provide videos for students to watch outside classroom time, so they can engage with examples and “exemplars for oral presentations and for at home aural/listening practice”.

We observed that the use of video in teaching and learning tends to be discipline-based. Videos are used in teaching some disciplines more than others. Our findings show that there is a more extensive use of video in the areas of education and science than in the humanities. Some lecturers mentioned that they make their own video lectures, lecture summaries and simple how-to or instructional videos. Overall, there were many references to the use of personal mobile phones and iPhones, Panopto, Camtasia, Office Mix and iMovie.

The analysis of staff survey responses revealed the types of difficulties lecturers face when creating videos. The overarching challenges were the lack of knowledge and skills to create videos, poor access to equipment, hardware and software, workload issues, lack of time, and lack of funding to create quality videos. A few lecturers also pointed out some specific challenges:

“Not knowing how to record effective interactive videos that hold the students’ attention”.

“Complexity in video production/editing; having to store videos outside LMS (e.g. G-drive) – perceived loss of control; time and labour-intensive process”.

Through the staff survey responses, it was evident that lecturers do use existing videos and create their own videos, but they do not use interactive videos in their teaching in the sense defined in the present project. However, the lecturers recognised the value and benefits of interactive video in teaching and learning and described some of the affordances and benefits of interactive videos in their survey responses and during workshop discussions. They commented that through interactive videos, they are able to “stimulate students’ thinking and discussion” and “encourage autonomous learning”. Lecturers also acknowledged that “interactive apps/videos are among the innovating engagement tools” and “would definitely encourage students to use their cell phones, tablets in a more fruitful way”. Lecturers’ views also highlighted their long-standing concern and awareness of the shift in the nature of student learning: “Interactive videos enable students to engage rather than passively viewing”.

It was encouraging to receive an overwhelming response number to the survey on the use of video by students across the university. In the pan-university student survey, most students affirmed that learning through videos is useful (see Figure. 1).

They have been EXTREAMLY helpful in helping me understand the concepts more. Like in Digital marketing we had youtube videos shown in the lectures about how ads work ect and having another explanation and visual example really solidified my understanding of the concepts

Yes, they have been useful. A lecturer occasionally uploading a documentary instead of a reading, for example, can be extremely engaging and gives you access to a range of different ideas and projects that are going on outside of the realm of academic articles. Documentaries especially can demonstrate the real world application of concepts you learn at uni.

In other cases, my lecturers have used a short youtube clip during the lecture to illustrate a point. This is engaging and can add humour, or give you something to analyse with fresh eyes given what you’ve just been learning.

Yes. They are the only way around a clash

We use ads in marketing consumer behaviour classes to understand the theory more practically

Videos have been used in accounting as a pre-recorded discussion of the lecture info (as opposed to Panopto), which has been useful for missed lectures.

Yes the use of showing videos such as youtube clips or documentaries in class or in addition to content being taught is a useful way of learning and creates variety.

absolutely, perfect for when I miss something in class or want to revisit the topic or miss a class for some

Figure 1: Usefulness of videos to support student learning

Students were also asked how their lecturers used videos in their classes and the students were given the following options to choose from:

- Using videos during lectures for teaching concepts or content of the paper
- Using videos during lectures to discuss examples or case studies
- Using video to give a summary of the paper content or lectures
- Using video to give feedback on assignments or your work
- Using 'how-to videos' to show how something works; for example, to show how a particular technology or software works
- Using videos to provide instructions or guidelines about assignments or tests

Figure 2 below presents a summary of students' responses to the above question, indicating that the most common use of video has been during lectures for teaching content.

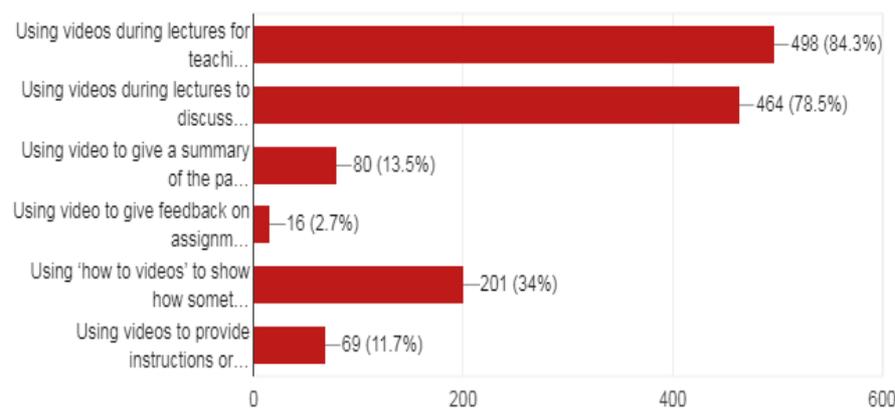


Figure 2: The ways lecturers use videos in papers (student responses)

In the main, students prefer learning through video rather than reading articles or any other forms of academically written materials. In the students' view, videos create interest in the subject and help revise content easily. They mentioned that videos "have been extremely helpful in understanding the concepts" and videos are "extremely engaging and they give you access to a range of different ideas and projects that are going on outside of the realm of academic articles". In the course of conducting the student survey, we came across personal correspondence by individual students asking us if we had considered the use of video for students who have special needs and disabilities. This is an interesting area that will add a new dimension to this research project.

Conclusion

In exploring the video and teaching and learning nexus, we aimed to understand the lecturers' and students' perceptions and attitudes towards the application of video. The findings of this research indicate that students and staff hold positive views of the use of interactive videos in teaching and learning. The workshops on creating interactive video content for teaching were extremely well received. By offering ways to create interactive videos easily and quickly for effective teaching and learning using simple tools, this study has contributed to university lecturers' positive perceptions and attitudes towards creating engaging, purposeful interactive videos. We were informed by several lecturers that they now feel more confident in manipulating and personalizing videos to create interactive learning moments. The use of video in teaching and learning engages students and provides flexible, autonomous learning options to students. The incorporation of interactive learning moments into videos gives students a sense of control and puts them in charge of their learning.

References

- Allen, M. W., & Smith, R. A. (2012). Effects of video podcasting on psychomotor and cognitive performance, attitudes and study behaviour of student physical therapists. *Innovations in Education and Teaching International*, 49(4), 401-414.
- Boyle, T. (1997). *Design for multimedia learning*. Prentice-Hall, Inc.

- Bravo, E., Amante, A., Simo, P., & Enache, M. (2011). Video as a new teaching tool to increase student motivation. *Global Engineering Education Conference, 2011 IEEE*, 638-642.
- Gedera, D. S. P., and Zalipour, A. (2017). Creating interactive video content for your teaching. *Learnfest*. University of Waikato, New Zealand.
- Greenberg, A., & Zanetis, J. (2011). The impact of broadcast and streaming video in education [white paper]. San Jose, CA: Cisco. Retrieved from http://www.cisco.com/web/strategy/docs/education/classromconnect05_3012.pdf
- Guo, P. J., Kim, J., & Robin, R. (2014). How video production affects student engagement: An empirical study of MOOC videos. *ACM Conference on Learning at Scale (L@S 2014)*. Retrieved from <http://groups.csail.mit.edu/uid/other---pubs/las2014---pguo---engagement.pdf>
- Henderson, M., et al. (2017). What works and why? Student perceptions of 'useful' digital technology in university teaching and learning. *Studies in Higher Education*, 42(8), 1567-1579.
- Hsin, W. J., & Cigas, J. (2013). Short videos improve student learning in online education. *Journal of Computing Sciences in Colleges*, 28(5), 253-259.
- Karppinen, P. (2005). Meaningful learning with digital and online videos: Theoretical perspectives. *AACE Journal*, 13(3), 233-250.
- Mayer, R. E. (2009). *Multimedia learning* (2nd ed.). Cambridge University Press.
- Rackaway, C. (2012). Video killed the textbook star? Use of multimedia supplements to enhance student learning. *Journal of Political Science Education*, 8(2), 189-200.
- Saeed, S., & Zyngier, D. (2012). How motivation influences student engagement: A qualitative case study. *Journal of Education and Learning*, 1(2), 252-267.
- Zalipour, A. (2016). Learning through screen and the learner's emotional knowledge. *Association of Visual Pedagogies*. Zagreb, Croatia.
- Zalipour, A. and Gedera, D. S. P. (2017). The use of interactive video discourse in making digital teaching development toolkit. *Association for Visual Pedagogies*. Aalborg University, Denmark.
- Zhang, D., Zhou, L., Briggs, R.O., & Nunamaker, J.F. (2006). Instructional video in e-learning: Assessing the impact of interactive video on learning effectiveness. *Information & Management*, 43, 15-27.

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