

# Videos Used To Supplement Student Learning: Does The Approach Matter?

Kathryn Mac Callum  
Eastern Institute of Technology  
Napier, Hawkes Bay  
New Zealand  
kmacallum@eit.ac.nz

## ABSTRACT

Using videos to support students' learning has attracted the attention of a large number of researchers. In this paper the results of a study into using short video recordings to cover key concepts of a tutorial are presented. The purpose of this study was twofold; firstly the study determined the perception of students in relation to these videos. The second was to determine the effect of how the videos are integrated into the course and whether this made a significant difference to their perceptions of these videos. Twelve videos were created to supplement the teaching of a Project Management course. The videos contained short explanation of the main points of the week's tutorial. These videos were integrated into two offerings of this course (run over 2012-2013). The videos were made available each week on the course learning management system. The results showed a very positive perception to these videos with students identifying a wide number of benefits to their learning. These benefits were increased when adopting a "flipped" approach to integrating the videos into the course. This study however highlighted the need for a culture change within the classroom to realise these benefits.

## Keywords

Video recordings, flipped classroom, technology integrated learning.

## 1. INTRODUCTION

The use of videos to supplement student learning have been the subject of a number of studies in higher education. The purpose of this paper is to present the results of a study into the perceived effectiveness of using video to supplement student learning and determine the best way that these videos can be integrated into the teaching process. By combining these two aspects, this paper provides a unique perspective on current literature. Most studies typically only addressed the effectiveness of integrating videos and do not consider the impact of how they are integrated.

Twelve videos, one per week, were created to supplement the teaching of Project Management. These videos were integrated into two offerings of Project Management over two years (2012-2013). These videos were accessible via the course's learning management system (LMS) where students were able to view and download these videos. The videos contained short explanation of the main points of the week's tutorial.

The approach taken to integrate these videos into the course was changed between the two offerings of the course. In the first

offering, students were required to view the videos before the week's tutorial. And in the tutorial it was assumed that all the students had viewed the week's video. This approach is typically referred to as 'flipping the classroom' in current teaching literature [2]. In the next offering, the students were not required to view the videos before the tutorials; rather students could view the videos anytime during the course duration. The tutorials therefore did not assume existing background knowledge.

Student's opinions were collected at the end of the each course to gather feedback on how useful students found these videos. Opinions were compared to see whether the different approaches to integrating the videos made a significant difference to how the students' perceived the usefulness of the videos.

A literature review covering some aspects of the use of video recordings in educational contexts is presented. This is followed by an outline of the methodology followed in the paper and a description of how the videos were used in each offering of the course. The results from a survey of students enrolled in the courses are then presented. This is followed by an analysis and discussion after which conclusions pertaining to the success of the study are drawn.

## 2. LITERATURE REVIEW

### 2.1 Using video to support students learning

Technology has given educators an opportunity to support learners in more effective and efficient ways. Learning management systems can provide a repository of resources that can cater towards students with different learning styles and needs. In particular technologies, such as mobile devices, the Internet and digital sound and imaging, have made it easier for educators to support their diverse student population [8].

Video recording in particular can be utilised to provide improved communication as it is a permanent record and may be viewed a number of times. Also the nature of the multimedia delivery can help students better retain learning concepts, compared to just verbal communication [6]. Video recordings, as an educational tool, have been found to support rich descriptions of concepts and help articulate tacit information and knowledge that may be difficult to achieve through text or verbally [4].

### 2.2 The different ways that videos are used in teaching

The use of video recordings in the educational context has been varied. These recordings can be anything from recordings of full lectures to short informational recordings of demonstrations or concepts [10]. These recordings can be then released to students giving them the opportunity to view at their leisure or at some predetermined time.

These videos recordings have also been integrated into the teaching context to cover different educational aims. For example

This quality assured paper appeared at the 4<sup>th</sup> annual conference of Computing and Information Technology Research and Education New Zealand (CITRENZ2013) incorporating the 26<sup>th</sup> Annual Conference of the National Advisory Committee on Computing Qualifications, Hamilton, New Zealand, October 6-9, 2013. Mike Lopez and Michael Verhaart, (Eds).

these videos can be used to introduce a topic, reinforce a concept discussed in class or provide students further background after a class.

The approach taken will vary depending on the aim of the videos. Each approach has various benefits and will depend on the aim of educator.

### 2.3 The flipped classroom approach

A recent approach taken by some educators is to provide video recording to students before the class. These videos are used to introduce new topics or concepts. Students are required to view these videos before the class. The classes then focus on discussing the concepts introduced in the video rather than introducing the concepts themselves. This approach is called “flipping the classroom”.

The concept of the flipped classroom is to shift the focus of the class from the teacher to the learner. Therefore the educator’s role is no longer “sage on the stage” but rather “guide by the side” [9]. The aim being that by using the videos the educator is able to reduce the amount of time spent in class on lecturing, opening up class time for the use of active learning strategies.

The key benefits of this approach have been identified [1] as:

- Educators can focus more on understanding and application than on recall of facts, while not sacrificing presentation of factual base.
- It provides students with more control over their own learning
- Students are given a greater sense of responsibility for their learning.
- It provides students with more opportunities to learn from their peers.

Successfully flipping a class however can be challenging for educators to achieve successfully. This approach requires a new student culture as students are required to do work before class. The success of the approach relies on students coming to class prepared and having watched the video. If students have not watched the videos before the class it would undermine the whole approach.

### 2.4 The challenges of flipping the classroom

To successfully implement the flipped classroom approach, a change is needed to the existing traditional teaching approach. These changes have been conceptualised by Hamdan et.al. [3] into four important elements referred to as four Pillars of F-L-I-P. These four pillars stand for Flexible Environment, Learning Culture, Intentional Content, and Professional Educator.

#### 2.4.1 F: Flipped learning requires flexible environments.

Educators need to develop a teaching environment that allows students to choose when and where they learn. Students are able to choose when and where they watch the videos including the device the use to view the videos. The in-class environment will also be more flexible. Students will direct the in-class learning in terms of the discussions and pace rather than this being teacher-led.

#### 2.4.2 L: Flipped learning requires a shift in learning culture

The flipped classroom requires educators to develop a student centred approach. The in-class teaching time is now meant for students to explore topics in greater depth and create richer learning opportunities. Students need to take ownership of their own learning. The students also need to be self-directed to survive the student-centred approach. The aim of the educators is now to help students explore topics in greater depth using student-centred pedagogies aimed at their individual understanding and readiness level, where they are challenged but not so much so that they are demoralized [12].

#### 2.4.3 I: Flipped learning requires intentional content

Educators need to carefully select the content of their teaching and what they get students to explore outside the classroom on their own. Educators need to arrange the content of the classroom teaching so that it supports active learning strategies, peer instruction, problem-based learning, or mastery.

#### 2.4.4 P: Flipped learning requires professional educators

The role of the educator is vital to support this new approach. If educators are developing the videos themselves they need to be skilled in audio and visual editing. So too in class the educators need to be able to observe their students, provide them with feedback relevant in the moment, and continuously assess their work.

## 3. USE OF VIDEOS IN THE COURSE

In the first offering of the Project Management course in 2012, every week a new video would be uploaded to the LMS. Students were then required to view the video before the tutorial for that week. In class the lecturer would briefly reflect on the video but mainly concentrate on applying the concepts into practical exercises.

In the second offering (2013) the “flipped” concept was dropped. The reason for this was the lecturer found that it was becoming very difficult to maintain the “flipped” process of requiring the student to view the video before class. As the semester progressed more and more students had not watched the video and the lecturer was finding that she was covering the video in more and more depth. It therefore resulted in the key benefit of the “flipped” philosophy being lost. The second offering did not require the students to view the video before the class however the students were directed to the video before the tutorial but not required to view.

## 4. THE SURVEY

### 4.1 The respondents and survey questions

A survey was undertaken to gauge students’ perceptions of the videos. The survey was made available via the courses LMS at the end of both offerings of this course. The questionnaire was divided into three main sections:

- The frequency they watched the videos. Students were asked to self-report on how often they watched the videos. This scale was based on a 5 point scale where 1: Never, 2: Seldom, 3: Sometimes, 4: Often and 5: Almost always.
- Open ended question: Why they may not have watched the videos

- Their perceptions of the videos. This section was split into two parts, 6 statements asked students to rate on a 5 point likert scale (1: strongly disagrees and 5: strongly agree) their opinions (see table 1). The second section was an open ended question asking the students to state what the biggest advantage of the videos.

The course that was evaluated was a level 6 Project Management course. This paper comprised of students from Computing, Business, Sport and Wine Science degrees. Some students were also enrolled in the Diploma of Business. Of the 38 students enrolled in the first offering, in 2012, 33 students responded to the survey, resulting in an 87% response rate. In the second offering, in 2013, 40 students from the 48 enrolled responded to the survey, also resulting in an 87% response rate.

Of the two groups of students, the first offering had 37% female (n=14) compared to 48% (n=22) female in the second offering. The average age in the first offering was 26 years old compared to 27 years old in the second offering.

## 5. RESULTS

### 5.1 The frequency they watched the videos

Students were asked to self-report on the frequency they watched the videos uploaded for the Project Management course. Based on the philosophy of the flipped classroom adopted in the first offering only, students were asked to watch the videos before class. However it became clear that not all students were watching the videos before class. This was reflected in the self-reported frequencies where the flipped class students watched the videos “often” (mean=3.63, SD=1.362). However this was substantially higher than the second offering, where students were not required to watch the videos before class. They rated their frequency as “seldom” (mean=2.43, SD=1.174).

### 5.2 Open ended question: Why they did not watch the videos

The second question in the survey asked student for a reason why they did not watch the videos. This was an open ended question. This question was asked of both offerings. Even though the first offering required students to view the videos as indicated some students did not actually watch the videos before every class.

In the first offering (the flipped class) the reasons provided by students fell into four main categories 1) I forgot, 2) I didn’t have time, 3) I didn’t think it was necessary and 4) technical issues. Most respondents stated that either they didn’t have time to watch the videos (6 responses) or forgot to watch them (9 responses). Other excuses included that they didn’t think the videos were necessary as they either had a good grasp of the topic under discussion or it repeated what was discussed in the lecture (4 responses). Another excuse given for not watching the videos was technical difficulties:

- “[the videos] did not work the first time and would take a few attempts to open.”
- “I had ran out of internet data and was on a slow speed”
- “maybe the videos is too big or somewhere cannot download”

The second offering (the non-flipped group) gave fewer reasons for not watching the videos (13 responses compared to 19 in the first offering). In this group the majority (11 responses) of the

answers stated that they didn’t watch the videos as they felt they were unnecessary. Responses included:

- “I found I could just as easily pass the course without the need for the videos”
- “I did not watch the videos because in my experience I retain more information by reading and making notes and then applying what I have learnt. With media such as audio and visual I find I keep having to rewind/pause a lot of the time which I find frustrating.”
- “I wrote down notes in every class and understood the material that was discussed so I didn't need to look at the videos.”

Only one student said they didn’t have time to watch the videos and two students stated they were not aware there were any videos to watch.

### 5.3 Students’ perceptions of the videos

Students’ were asked to rate their perceptions of the videos on 5 point Likert scale (1: strongly disagrees and 5: strongly agree). Six questions were asked. To compare whether there is significant difference between the attitudes of the first offering (the flipped-group) and second offering (the non-flipped-group) a two-tailed, unequal variances assumed t-test was carried out. Though this study does not undertake random sampling the adoption of statistical analysis is still considered appropriate due to the high response rate. T-testing is a statistical test that enables the testing of the statistical difference between two or more means [7]. An independent t-test was appropriate for testing whether there was a significant difference between two different groups of students and their perceptions of the videos. Since multiple tests were conducted, it was important to avoid a type 1 error (a false-positive). Therefore the Bonferroni correction value of 0.00833 was used. From these results shown in table 1, it can be seen that there were no significant differences between the flipped and non-flipped classes.

Table 1: The perceptions of students towards the use of videos

	First Offering (2012) – Flipped class (n=33)	Second Offering (2012) – Non-flipped class (n=27)	T-Test
I found the videos were easy to understand and explained the content well	Mean=3.88 SD=0.545	Mean=4.00 SD=0.480	.903 0.370
I think other courses should have introduction videos for their tutorials/lecturers	Mean=3.79 SD=1.219	Mean=4.11 SD=0.875	1.156 0.252
I found the videos valuable to my learning	Mean=3.67 SD=0.854	Mean=3.96 SD=0.598	1.494 0.141
The videos were appropriate	Mean=3.64 SD=0.8223	Mean=3.81 SD=0.557	.961 0.341

length			
I watched the videos more than once	Mean=3.12 SD=1.166	Mean=3.30 SD=1.203	.570 0.571
I found these videos a waste of time	Mean=2.12 SD=0.992	Mean=1.64 SD=0.870	- 1.984 0.052

Overall the results indicate that on average, students had a very positive attitude and perception of the videos developed for this course. It also shows that these perceptions did not change when integrated differently into the course.

In addition to the rating scale, students were asked to comment on the benefits of these videos.

For the flipped class a number of students commented that the videos were beneficial as they gave an insight into what was coming up in the tutorials (12 responses). For example; one student commented that; “[the videos were] time saving because we know before entering in the class what we will learn today”. Another student stated; “It added discipline of preparing for lectures, and meant it wasn’t the first time some of info was received”. Another said; “Prep for class and everyone has a basic grasp of what the lecture will be about. + teacher have more time working with students.”.

In addition to the responses that related to the benefits of the videos used to “flip” the classroom, a number of comments were made in general about videos benefits:

- “[The videos provided] extra info available for the course”
- “Being able to pause and write notes and rewind if did not understand”
- “Explains information in an easy to understand way”

A number of students also stated that these videos were beneficial as they could also be referred to after the tutorial and formed a great revision tool (8 responses). In particular, one student stated “Allows an introduction to the topic, so when in class we are hearing the info for the second time and it sticks.” Students also stated that it was a good tool for those that missed class so that they could catch up on what was missed (4 responses).

For the second intake, comments related primarily to the benefits of these videos for supporting revision (21 responses). A large number of respondents stated that the videos were an excellent resource to refer back to help reinforce concepts covered in class. Another benefit cited by students (n=6) was that the videos could be used to overview topics when students missed classes. Three students also highlighted the benefit of the nature of the videos being visual and not just audio. For example “[I found the videos beneficial as I could] just sit back and watch and listen... it offered an alternative learning style”.

## 6. DISCUSSION AND CONCLUSION

From the results of this study we can see that though the perceptions of the students’ did not change significantly when compared, the way that the videos were integrated did make a difference.

Firstly and most obviously the number and frequency that the students viewed the material differed. The “flipped” group viewed

the videos more often compared to the “non-flipped” group. Though students did not always view the videos in “flipped” group it did mean that more student watched the videos. It seemed that when it was not made a focus of the course it was less likely students would actually view the videos. This was further illustrated in the students’ feedback in the second offering. A small number of students said that they were not even aware of the videos and therefore did not watch them. By continually referring students to the videos in the first offering students were also made aware of the videos.

An additional interesting point highlighted in this study was when comparing reasons for not viewing the videos, more students in the second offering stated that they did not find the videos useful. It may be assumed that by not making the videos a core compulsory part of the course it also made students perceive them as less important and therefore less useful.

Overall the results indicate a wide variety of benefits to using videos to support student learning. These videos were partially good for recapping and reinforcing concepts (this was indicated in both offerings). The videos were also great for covering concepts before class, however the issue seemed to be ensuring that student would actually view the videos. The flipped concept did seem to be beneficial, however in practice it did not work if all students did not view the videos. The study therefore reinforces the need for a strong student culture where students are prepared to consistently view the videos before class. However if this culture change is not possible the benefits of the videos would not be lost.

Overall, it can be concluded that the videos themselves are a great tool for supporting students learning. Integrating these videos to support a flipped classroom approach has additional benefits however it does require significant effort on the part of the lecturer to ensure that students are aware of the requirements and on the students to be diligent enough to view the videos beforehand.

## 7. LIMITATIONS AND FUTURE STUDY

The study aimed at determining the impact the approach taken to integrate videos into a class impacts on the perception of the student. The study comprised of a voluntary convenience sample therefore some caution may be needed in interpretation the results. However a large-scale study would be needed to confirm the results of this study. Future work will be to replicate this study with a larger group in other subject areas.

## 8. REFERENCES

- 1 Baker, J. W. (2000). The “Classroom Flip”: Using web course management tools to become the guide by the side. In J. A. Chambers (Ed.), *Selected papers from the 11th International Conference on College Teaching and Learning* (pp. 9-17). Jacksonville, FL: Florida Community College at Jacksonville.
- 2 Berrett, D. (2012, February 19). How ‘flipping’ the classroom can improve the traditional lecture. *The Chronicle of Higher Education*. Retrieved from <http://chronicle.com/article/How-Flipping-the-Classroom/130857/>
- 3 Hamdan, N., McKnight, P., McKnight, C. & Arfstrom, K. M. (2013). A review of flipped learning. Retrieved from [[http://www.flippedlearning.org/cms/lib07/VA01923112/Centricity/Domain/41/LitReview\\_FlippedLearning.pdf](http://www.flippedlearning.org/cms/lib07/VA01923112/Centricity/Domain/41/LitReview_FlippedLearning.pdf)

- 4 Goodyear, P. & Markauskaite, L. (2012) Pedagogic Designs, Technology and Practice-Based Education. Practice, Education, Work and Society, 6, 131-144
- 5 Gordi, T., & Khamis, H. (2004). Simple solution to a common statistical problem: interpreting multiple tests. Clinical therapeutics, 26(5), 780-786.
- 6 Mayer, R. E., & Anderson, R. B. (1991). Animations need narrations: an experimental test of a dual-coding hypothesis. Journal of Educational Psychology, 83, 484-490.
- 7 Pallant, J. (2007). SPSS: Survival Manual (3rd ed.). Maidenhead: Open University Press.
- 8 Phelps, J. & Tidmarsh, A. (2005). Extending digital video for learning and teaching . ALT-C, Manchester.
- 9 Johnson, L., & Renner, J. (2012). Effect of the flipped classroom model on secondary computer applications course: student and teacher perceptions, questions and student achievement. Doctoral Dissertation, University of Louisville.
- 10 Young, C. & Asensio, M. (2002) Looking through Three 'I's: The pedagogic use of streaming video. Banks S, Goodyear P, Hodgson V and McConnell D (eds.), Networked Learning 2002, Sheffield, March. Proceedings of the Third International Conference, pages 628-635.
- 11 Whatley, J. & Ahmad, A. (2007). Using Video to Record Summary Lectures to Aid Students' Revision. Interdisciplinary Journal of E-Learning and Learning Objects, 3(1), 185-196.
- 12 Vygotsky, L. S. (1978) *Mind in society: The development of higher psychological processes*. Harvard University Press: Cambridge, MA.