USE OF RECORDED LECTURES IN AN ANIMAL PHYSIOLOGY CLASS

K.M. Yam

The Chinese University of Hong Kong (HONG KONG)

Abstract

People have been talking about flipping their classrooms all over the world these days. Flipped classrooms do have the advantages to allow students to learn at their own pace before class and more time can be saved for in-class activities that help learning at depth. However, as more and more classes are flipped, students, especially those not as bright, are complaining about heavy workload before each class. Is there a way to ease this out? Should all classes be flipped and face-to-face lectures be wiped out altogether? Or should we also try to make our lectures more interesting and engaging for our students, so that more can be inspired?

Interactive lectures in a highly-rated animal physiology class of ~50 students were recorded every time using the Panopto video platform. Recordings were made available to students right after each class. Students loved the lectures and found the recordings very useful as reflected by the free comments they put down in the term-end course evaluation. In order to figure out how students used the recordings and how this might affect their academic performance, usage data were pulled out and an online survey was also conducted after the final examination to see how, when and why students used the recordings from their point of view; course performance was then compared against these. Results suggest that these recordings served different students differently. Though 97.2% of the respondents (n=37) found the recordings very useful (86.1%) or pretty useful (11.1%), students were using these for different reasons. Some interesting findings will be discussed.

Keywords: lecture recording, self-paced learning, useful study aid.

1 INTRODUCTION

Flipped classroom has been around for about 20 years since J.W. Baker introduced it in year 2000 [1]. Since then, more and more teachers are adopting this approach to allow students to learn at their own pace before class; and more class time can be saved for in-class activities that help learning at depth. As the approach is becoming more common, more and more research was done to investigate its effectiveness. Some recent meta-analyses have shown that the flipped method is associated with greater academic achievements in medical education [2], and showed significant improvements in student learning in health profession education [3]; however, Gillette et al., found no significant difference in examination scores between flipped classroom and lecture-based instruction in pharmaceutical education [4]. For Biology courses, Barral et al. found students in flipped instruction performed significantly better only on low-level Bloom’s questions in an accelerated introductory biology course [5], while Adams et al. found no significant difference in scores in an undergraduate class in genetics and evolution [6].

Whether or not the approach is found effective, there has been complaints about workload [7-9]. Besides, Jensen et al., suggested that learning gains from the flipped approach may simply be the results of active learning style. When she compared an active non-flipped classroom with an active flipped classroom, no significant difference was seen between the two groups in both low-level and deep conceptual learning [10]. Gross et al. attributed the success of flipped classroom to increased pre-class preparation [11]. It is obvious that active learning has been shown to increase students’ performance in science, engineering and mathematics [12]. However, should all classes be flipped and face-to-face lectures be wiped out altogether if students, especially those not as bright, find it difficult to get everything prepared before class? Tang et al., [9] mentioned that benefits of the flipped classroom may be less valuable if students feel overwhelmed. So, is there a way out? Should we also try to make our lectures more interesting and engaging for our students, so that more can be inspired?

BIOL3630 Animal Physiology is a 3-unit major elective course mainly for juniors and seniors from various programmes in School of Life Sciences in our university. It is pretty content-rich and a lot of concepts may not be too easily understood, especially for students with diverse background. In order
to facilitate students’ preparation, class schedule (105 minutes on Wednesday and 45 minutes on Friday every week for 13 weeks), topics to be covered and book chapters involved for each class are released to all students at the beginning of the term, and students were told to get prepared before coming to class. Every Friday, an announcement will be posted summarising the major concepts that students should have learnt as well as letting students know how they should prepare for the upcoming week. At the same time, lecture materials for the upcoming week will be released. As prior knowledge and increased preparation can help students learn better in class [11, 13], I hope the early release of materials can allow students to get better prepared. When I first taught the course in 2013, no lecture recording system was available to us and there was a time where a lot of mobile phones were put in front of me because students said they needed to record what I said so that they could re-listen if they somehow missed anything. Lucky enough, Echo 360 (2014-17) and later Panopto (2018), was made available in our university. Since then, all interactive lectures given in this class were recorded and made available to all students on our eLearning platform. Students can revisit any part(s) of the lecture whenever and wherever they want. To encourage further learning after class, food for thoughts questions will be posted on the discussion forum. Besides, links to recent papers on selected topics will be posted at times to further engage the students. Ever since live lecture recordings were made available to students, every year, students put down on the free comments of term-end course evaluation form that they found the recordings very useful. In order to figure out how students used the recordings and how this might affect their academic performance, usage data from the 2018 class were pulled out and an online survey was also conducted after the final examination to see how, when and why students used the recordings from their point of view; examination scores was then compared against these.

2 METHODOLOGY

Investigation was done on BIOL3630 Animal Physiology held in the first semester in 2018. This course is an elective course mainly for Year 3 and 4 students from various major programmes in School of Life Sciences. This 3-unit course comprises of live interactive lectures which were recorded using Panopto (version 5.6.0.40685) and made available to students on our eLearning platform, Blackboard Learn SaaS. Usage data (including no. of views, minutes viewed and average minutes viewed) of these videos were pulled out and compared to students’ mid-term and final examination scores to see if there are any correlations. Statistical analyses were performed using JASP (version 0.9.2). [Remarks: Although the assessments mainly consist of mid-term (30%) and final examination (70%); students can opt to complete a project on educational material production, which will account for 10%. If such an option is taken, students will be assessed based on 10% project + 60% final examination or 70% final examination, whichever is higher. As an incentive for students to do and learn something extra, students turning in a decent piece of work will get an extra 3% as bonus.]

At the end of the term after the final examination, an online survey was also conducted on our eLearning platform to collect data on students’ reported usage of the recorded videos, their reported lecture attendance and their views on flipped classroom. Two bonus points were given for those who completed the survey before a designated deadline.

3 RESULTS

Students’ demographics, how video viewing is correlated with examination scores and students’ reported usage of the recorded live lectures will be discussed.

3.1 Demographics

Fifty-seven students were enrolled in the course; there were 21 (36.8%) males and 36 (63.2%) females. Most students were from Biochemistry (33.3%), Biology (21.1%) and Molecular Biotechnology (17.5%). There were also students from Environmental Sciences (10.5%), Natural Sciences (10.5%) and Cell and Molecular Biology (7.0%). The majority of students were in their Year 4 (50.9%) and Year 3 (29.8%), but there were also students from Year 2 (10.5%) and Year 5 (8.8%).

3.2 Video viewing positively correlated with examination scores

In order to find out if viewing recorded lectures is anyhow correlated to students’ performance in examinations, usage data including number of views, minutes viewed and average minutes viewed were pulled out from the Panopto video platform and compared to students’ examination scores.
Results showed that all these parameters are positively correlated with the examination scores. For the mid-term examination, minutes viewed and average minutes viewed on topics covered before the mid-term examination showed a statistically significant weak to moderate \((r=0.293, p=0.027)\) and moderate \((r=0.396, p=0.002)\) positive correlation to the mid-term examination score (Fig. 1a). Similar results were observed in the final examination, but only the weak association \((r=0.263, p=0.048)\) (Fig. 1b).

![Graphs showing correlation between video viewing and examination scores](image)

(a) Mid-term exam

(b) Final exam

**Figure 1.** Correlation of video viewing and examination scores. (a) Mid-term examination scores and no. of views, minutes viewed and average minutes viewed for topics covered in the mid-term examination (b) Final examination scores and no. of views, minutes viewed and average minutes viewed for topics not covered in the mid-term exam. \(r=\)Pearson’s \(r\) value; \(p=\)p value. \(*p<.05, **p<.01\) \((n=57)\)

From the scatter plots in Fig. 1, it is clear that there were indeed students who watched very little but scored very high in the examination, and on the other hand, there were also students who watched a lot but the examination performance was still not too satisfactory. It is believed that students’ background and prior knowledge to the topics may affect the results. More studies on these may help reveal the underlying reasons.

Although the positive association is weak, the sample size is small, and no causal relationship can be established, the results would still be good enough to prompt students to make good use of these resources.

### 3.3 Students’ reported usage of recorded videos

In order to know how students were using the videos from their own perspectives, an online survey was conducted after the final exam. Student were asked about whether and how much they had watched the videos, whether they found the videos useful, their watching habits, their attendance in lectures and whether they would like to have a flipped classroom. Of the 57 students enrolled, 37 of them had completed the survey. The response rate was 64.9%. Results are summarised and discussed below:
3.3.1 Most students watched most or all of the recordings

Over half of the respondents (55.6%, n=37) indicated that they had watched all of the videos uploaded, while 33.3% said they had watched most of them. 8.3% indicated that they had watched some and 2.8% said they did not watch any.

3.3.2 Most students found the videos useful

Over 97% (n=37) of the respondents found the Panopto videos very useful (86.1%) or pretty useful (11.1%), while the remaining 2.8% said they did not use the service. Many found the videos useful as they could review the lectures whenever and wherever they want. They appreciated my markings and writings on the slides, which were also captured on the videos. Overall, students treasured the resources, which help a lot with their revisions, and allow them to revisit the part(s) that they had missed or part(s) that they did not understand too well.

3.3.3 Why and how students used the videos?

Although most respondents had watched at least some videos, they were using them in different ways. These include: Re-watching everything every week as a revision; re-watching immediately after class when they found something that they did not understand; re-watching only parts that they did not understand during their revision; and re-watching everything right before the exam(s). Many reported that they would use 1.5X or 2X speed to go through the videos, some would skip parts that they already knew, some would slow down and replay parts they found difficult. Some were re-watching parts that they had missed because they were late or absent because they were sick, they overslept or were busy with laboratory work or other assignments.

3.3.4 More than half of the students attended >=80% of the lectures

Around 55% (n=37) of the students indicated that they had attended all (13.9%) or over 80% (41.7%) of the lectures, 11.1% said they had attended >50%, 16.7% said they had attended only >30%, while the remaining 16.7% said they had attended <30%, but none of the respondents indicated a zero attendance.

It is comforting to note that some students got the following responses when asked why they had such an attendance:

“Interactive lectures help my learning.”

“I saw no real reason to miss any of the lectures.”

“Attending lessons is student’s responsibility.”

“I think attending lectures is the most effective way to learn. Through the teacher’s explanation, I can understand the idea better. Jotting down notes in the lecture also gives me a sense of satisfaction.”

“It is because the course is interesting and sometimes there would be demonstrations during lecture, so I attended all lectures in person.”

“I enjoyed those lessons.”

Adams et al. in their 2016 paper, which compared partially flipped and fully flipped undergraduate class in genetics and evolution [6] also indicated that some of their students preferred the in-class lecture format because they found it more personal, engaging and easier to ask questions.

On the other, there were students skipping lessons for various reasons:

“The final year project in the School of Biomedical Sciences requires dissection of mother mice and microdissection of baby mouse to obtain samples, followed by immunostaining and observation under confocal microscope. A set of experiment takes at least 3 days and I was required to practise 3 sets per week, so most of the time, I could only stay in the lab and could not go elsewhere.”

“Because the final year project requires a lot of time. E.g. when I need to carry out an affinity chromatography. This requires me for a whole full day to do so. I would like to attend all the classes, as I think this is really an interesting course.”

“Sometimes, I have other deadlines, so I skipped the lesson and referred to the videos online later.”

“I couldn’t wake up sometimes.”

7694
“I was absent for 2 lectures due to feeling unwell and family issues (funeral). I attend the lectures in person because I think it is the best way to absorb new knowledge and my attention span in lecture hall is longer.”

“Knowing that there will be Panopto videos that I won’t miss too much things from the lesson, I prefer not to go back on Friday as I have to spend 1.5 hour to get back to school and I only got this 45 min lesson on Friday.”

Although the attendance for this course is not particularly good, I have enjoyed the atmosphere in class as none of the students were forced to be there. Many of them were actively engaged. I used to direct students to think about a scenario and then asked them what’s next. Sometimes, I would include errors on the slides and asked students to point out what is wrong. All these would be recorded and this might have helped students who had somehow missed the lesson to experience what had happened in class. I believe this is one advantage of recorded live lectures over pre-recorded lectures, which often appears to be impersonal.

3.3.5 60% like flipped classroom but 40% not

When asked about whether they like a flipped classroom, around 60% (n=37) of the respondents said yes; of which 13.9% said yes, they liked it very much, 47.3% said yes, they liked it somewhat; but 36.1% said no, not really, and 2.8% said no, not at all.

Although around 60% said yes, as this might allow them more time to exchange ideas in class, many of them did express their concerns in the survey. Some students worried that they might be too shy to express their thoughts in front of others, some said not many students are willing to prepare for their lessons, and some said it might be too demanding.

“...it would be ok to spend around 15 minutes to skim through the materials, but it were to be 1-2 hours, then the answer will be no.”

“It is hard to ensure that students would get studied before the lessons. If some students don’t do that, they would get nothing from the lessons because they don’t understand anything. It is a rather tough requirement.”

“...should one fail to keep up with the prior reading/videos, the lesson itself could become much more confusing.”

“It gives a lot more workload to students and student like me who need to take a lot of courses cannot handle it very well, even I am really interested in doing so.”

Like what has been reported in other studies, increased workload [7-9] is always a concern and students' readiness to such a change should not be undermined.

4 CONCLUSIONS

Viewing of recorded live lectures were found to have a weak to moderate positive correlation with examination scores. Most students watched the videos and found them useful. However, they used them differently and for different reasons. Whether to edit the recordings of live lectures to become micromodules for flipped classroom would require further consideration as workload and students’ readiness are still major concerns. At the moment, making some classes even more interactive so as to encourage more active learning may be the way to go. Active learning activities described by Styers et al. [14] and co-creational activities described by Uskokovic [15] may be considered.

ACKNOWLEDGEMENTS

The author would like thank all BIOL3630-2018 students who have participated in the study. The author would also like to acknowledge the financial support from the University Conference Grant offered by The Chinese University of Hong Kong (CUHK) and Shaw College Conference Grant offered by Shaw College, CUHK for covering part of the expenses for the author to present this paper in Palma de Mallorca, Spain, in July 2019.
REFERENCES


