

# Perceived effectiveness of lecture videos

Louwe B. Kuijer

## **Abstract**

We present results from a survey among students about the perceived effectiveness of lecture-replacing videos. The main results are that (1) 10–20 minutes was considered the optimal video length, (2) videos where the speaker was visible were considered more effective than those where the speaker was not visible, (3) students believed scripted videos to be very effective, (4) most students considered lecture videos less effective than in person lectures, (5) students liked videos broken up by brief interludes and (6) videos matching the students’ preferences did not attract more views than those that did not.

Keywords: lecture videos, online teaching, survey

## **Introduction**

The COVID pandemic forced a sudden shift to online learning in 2020, which presented a number of challenges. These challenges were most severe in primary and secondary education (Pietro, Biagi, Costa, Karpiński, & Mazza, 2020; Azevedo, Hasan, Goldemberg, Iqbal, & Geven, 2020), since students at those levels tend to require a lot of guidance. Students and teachers in higher education have also encountered a number of challenges (Office for National Statistics, 2020), but there is also some evidence (Gonzales et al., 2020) that student per-

formance in higher education may have *increased* due to COVID.

Regardless of whether it was beneficial or detrimental overall, we should learn what we can from this unplanned shift to online learning. Here, we present a small case study about the perceived effectiveness of online teaching videos. The videos in question all belonged to a single computer science module that was taught in the first semester of 2020/2021. They were a direct replacement for in-person lectures that could not take place. The videos were supplemented by other teaching activities, but these activities are not considered in this study.

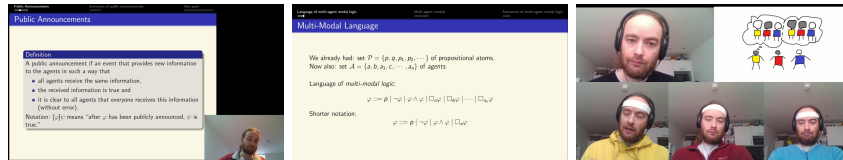
The main source of data for the study was a voluntary anonymous survey. The survey consisted of eight questions, and focused on student perception of the usefulness of various kinds of videos. Additionally, we looked at the total number of views for each video.

Approval for this study was granted by the University of Liverpool Ethics Board with approval number 5402.

## **Background**

The study took place at the University of Liverpool, and surveyed students of the computer science module ‘knowledge representation’. A total of 147 students participated in the module. Students were either in the third year of an undergraduate programme or in the first year of a postgraduate taught programme. The module consisted of several activities, of which we study one: lectures, which were in 2020 replaced by pre-recorded videos. A total of 30 videos were used, which were uploaded in batches of between 2 and 4 videos per week, which the students could watch at a time of their choosing.

Of the 30 videos, 27 were unscripted, and consisted of slides with voice over. These videos were either unedited or very lightly edited by using jump cuts to connect multiple takes. Most of the unscripted videos used the format shown



(a) The most commonly used format (b) An alternative format used for three videos. (c) Example from a scripted video.

Figure 1: Formats used for the videos.

in Figure 1a, with slides shown in 4:3 with space on the right side of the screen used for video of the lecturer. One batch of three videos used an alternative format, shown in Figure 1b, using 16:9 ratio and no image of the speaker. Due to unanimously negative feedback, the alternative format was abandoned after three videos.

Additionally, three scripted videos were used. An example is shown in Figure 1c. The scripted videos replaced demonstrations that would normally be performed in class with the assistance of student volunteers. As it was not possible to use volunteers, the lecturer recorded themselves multiple times, playing a different role in each recording, and then pasted the recordings together as if they were interacting with each other. The script was used to coordinate the recordings. In Figure 1c the top left copy takes the role normally played by the lecturer, while the three copies in the bottom take the roles normally performed by students. The space in the top right is used as a replacement for a whiteboard.

The videos were created without special equipment, using only the built-in camera and microphone of a laptop computer. The quality of the recording, both video and audio, was therefore quite low. Subtitles were available, but it is not known how many students used them.

Because they were not constrained by timetabling, the videos varied significantly in length. The shortest video was 03:50, the longest 35:15 and the average

16:14. The longest video was, however, broken up by a 20 second comedy bit.

On average, each video was watched 139 times, with the least watched video attracting 90 views and the most watched one 201. This does include multiple viewings per student, the exact number of unique views per video is not known.

In addition to the lecture videos of 2020, students were also given access to recordings of the lectures from previous years, which treated the same material. We refer to the videos created specifically for online use as lecture *videos*, and the recordings of in-person lectures from previous years as lecture *recordings*.

## Survey design and results

Students were asked to fill in an online survey consisting of eight questions. Out of 147 students, 28 voluntarily, and anonymously, filled out the survey (although not all participants answered all questions).

Of the eight questions, seven were about lecture videos. We discuss the responses to these questions. The eighth question was on a completely different topic; we will not discuss it further here.

Now, we present the survey questions and responses. The questions were rather verbose, so we paraphrase them here. The full text of the survey and the raw response data will be provided by the author upon request.

**Q1:** How many videos did you watch?

---

All of them	most of them	Some of them	None
17	7	4	0

**Q2:** In person lectures (from other modules in previous years) are . . . useful (than/as) lecture videos.

---

far more	slightly more	about as	slightly less	far less
3	10	8	4	3

**Q3:** Lecture recordings were . . . useful (than/as) lecture videos.

---

didn't watch	far less	slightly less	about as	slightly more	far more
20	1	3	2	1	1

**Q4:** Which video length do you consider to be most useful?

---

<10	10-15	15-20	>20
1	11	15	1

**Q5:** Videos with lecturer camera are . . . useful (than/as) those without.

---

far more	slightly more	about as	slightly less	far less
18	8	1	0	1

**Q6:** The scripted videos were . . . useful.

---

very	slightly	not
16	11	0

Question 7 was an open question, and asked students for anything else that they liked or disliked about lecture videos. We do not discuss each individual reply in detail here. Instead, we mention the five topics that were mentioned in multiple replies. The full text of all replies is available from the author.

- Students liked the ability to control the playback of the videos (pausing, rewinding, etc.).
- Students liked short videos that split the material into smaller chunks than the usual 1 hour lectures.
- Students liked jokes and brief comedy bits.
- Students liked the scripted videos that replaced in-class demonstrations.
- Students liked videos with lecturer camera.

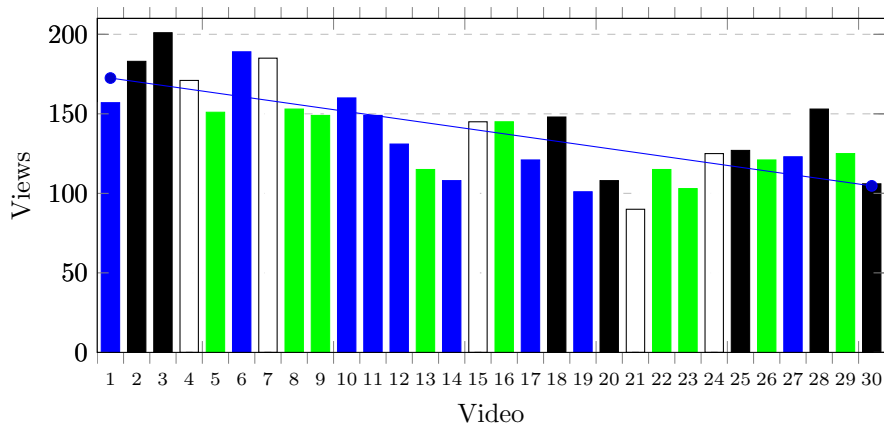


Figure 2: Views per video. Videos < 10 minutes long are drawn in white, 10–15 minutes in green, 15–20 minutes in blue and > 20 minutes in black. Videos 5, 6 and 7 did not have the lecturer visible. Videos 15, 22 and 23 were scripted

In addition to the survey results, we also consider the number of views per video, see Figure 2. Please recall this includes repeat viewings.

The later videos tended to be viewed less often than the earlier ones. This is unsurprising, as engagement always decreases over the semester. The trend is shown in Figure 2 as a line.

On average, short videos (<10 minutes) received 1.6 more views than expected based on the trend. Long videos (>20) received 13.8 extra views. Videos without lecturer camera received 14.2 more views than expected, scripted videos received 7.1 fewer.

## Discussion

In **Q2**, a plurality of students (13/28=46%) indicated a preference for in-person lecture over videos, but a significant minority (7/28=25%) preferred videos. In **Q7** some students elaborated on the advantages they perceived videos to have. Several students said that they liked the ability to pause and rewind videos, an advantage that was also identified in other studies (e.g., (Maher, Latulipe,

Lipford, & Rorrer, 2015)). Students also appreciated that videos could be made far shorter than a one hour lecture. One student also mentioned that, due to a visual impairment, they considered videos easier to see.

We should compare these results to outcomes of other studies indicating that students typically have positive opinions of the ‘flipped classroom’ approach to teaching (Pierce & Fox, 2012; Giannakos, Krogstie, & Chrisochoides, 2014; Mather et al., 2015), and of the videos used in that approach. There are several plausible reasons for the difference between the mostly negative opinion about lecture videos in this study, and the mostly positive opinion about flipped classroom teaching.

Firstly, this study was conducted while students were in COVID lockdown, which may have left them longing for shared activities such as in person lectures. Secondly, the module studied here was not designed from the ground up to be taught in this manner, whereas a flipped classroom module generally would be.

We had hoped that **Q3** would help compare purpose-made videos to recordings of lectures. Unfortunately, the vast majority (20/28=71%) of students did not watch the old recordings, so no comparison could be made.

In **Q4**, a large majority (26/28=93%) of students indicated a preference for videos between 10 and 20 minutes in length, with 15–20 minutes being the most popular (15/28 = 54%), followed by 10–15 minutes (11/28=39%). This matches results from the literature; see, e.g., (Lagerstrom, Johanes, & Ponsukcharoen, 2015), although in different contexts other times are suggested, e.g., 5 minutes for mobile videos (Cheng, Huang, Shadiev, Hsu, & Chu, 2014).<sup>1</sup>

Early on in the module, one batch of videos was made without lecturer camera. The students immediately responded by asking the lecturer to go back to using a lecturer camera. As such, the response to **Q5** was expected, with

---

<sup>1</sup>For in person teaching a similar limit of 10–15 minutes is often suggested, but the evidence for this is mixed (Wilson & Korn, 2007).

26/28=93% preferring a visible lecturer. Furthermore, existing research also indicates that seeing the speaker increases learning performance (Chen & Wu, 2015; Yu, 2021). Some students felt strongly enough about the matter to mention their preference again in **Q7**.

This is, of course, bad news for the single student who strongly preferred videos *without* lecturer camera, as the overwhelming preference of the other students means that we must recommend using some kind of facecam whenever possible.

In **Q6**, most students (16/27=59%) indicated that they considered the special, scripted videos to be very useful, with the remaining 11/27=41% considering them somewhat useful. Several students also stated their appreciation again in **Q7**.

Looking at view counts, videos matching student preferences attracted fewer views than those that do not: videos over 20 minutes in length and those without lecturer camera received more views than expected, whereas scripted videos received fewer views.

One possible explanation might be that longer videos received more views precisely because they were less effective. One student stated in **Q7** that they rewatched longer videos for this reason.

## Conclusion

This study surveyed a self-selected sample of students from a single module. As such, we cannot expect the participants to form an especially representative sample of all students. Furthermore, since the survey was done during the COVID-19 pandemic, the results may not be fully applicable to teaching videos created for use after the pandemic. Still, we can tentatively draw some conclusions.



The surveyed students expressed a preference for videos between 10 and 20 minutes in length where they can see the lecturer speak. Given that it is relatively easy to produce videos satisfying those criteria, we would recommend doing so.

Even with these relatively short videos, students appreciated brief interruptions that allowed them to reset their attention span.

Students also stated that they liked scripted and edited videos that provide a practical demonstration, although such videos were not viewed very often. These videos are significantly harder to create than unscripted ones, so it is unclear whether they are worth the effort.

Most students believed the effectiveness of lecture videos to be lower than that of in-person lectures, but a significant minority preferred videos. Of particular note is that videos had better accessibility options than in-person lectures, allowing some students to participate more fully. This study therefore seems to encourage a return to in-person teaching now that has become possible, but to also make the existing videos available to the students as alternative teaching material.

Finally, given that the videos that satisfy the students' preferences generally received fewer views than the videos that did not, view counts seem to be, at least in some situations, a poor proxy for student satisfaction.

## References

- Azevedo, J. P., Hasan, A., Goldemberg, D., Iqbal, S. A., & Geven, K. (2020). *Simulating the potential impacts of covid-19 school closures on schooling and learning outcomes: a set of global estimates* (Tech. Rep.). World Bank Group.

- Chen, C.-M., & Wu, C.-H. (2015). Effects of different video lecture types on sustained attention, emotion, cognitive load, and learning performance. *Computers & Education, 80*, 108–121.
- Cheng, P.-Y., Huang, Y.-M., Shadiey, R., Hsu, C.-W., & Chu, S.-T. (2014). Investigating the effectiveness of video segmentation on decreasing learners' cognitive load in mobile learning. In Y. Cao, T. Väljataga, J. K. Tang, H. Leung, & M. Laanpere (Eds.), *New horizons in web based learning* (pp. 122–129). Springer International Publishing.
- Giannakos, M. N., Krogstie, J., & Chrisochoides, N. (2014). Reviewing the flipped classroom research: Reflections for computer science education. In *Proceedings of the computer science education research conference* (p. 23–29). doi: 10.1145/2691352.2691354
- Gonzales, T., de la Rubia, M. A., Hincz, K. P., Comas-Lopez, M., Subirats, L., Fort, S., & Sacha, G. M. (2020). Influence of covid-19 confinement on students' performance in higher education. *PLoS ONE, 15*(10). doi: 10.1371/journal.pone.0239490
- Lagerstrom, L., Johanes, P., & Ponsukcharoen, U. (2015). The myth of the six-minute rule: Student engagement with online videos. In *2015 asee annual conference & exposition*.
- Maher, M. L., Latulipe, C., Lipford, H., & Rorrer, A. (2015). Flipped classroom strategies for cs education. In *Proceedings of the 46th acm technical symposium on computer science education* (pp. 218–223).
- Office for National Statistics. (2020). *Coronavirus and the impact on students in higher education in england: September to december 2020*.
- Pierce, R., & Fox, J. (2012). Vodcasts and active-learning exercises in a “flipped classroom” model of a renal pharmacotherapy module. *American Journal of Pharmaceutical Education, 76*.

- Pietro, G. D., Biagi, F., Costa, P., Karpiński, Z., & Mazza, J. (2020). *The likely impact of covid-19 on education: Reflections based on the existing literature and recent international datasets* (Tech. Rep. No. EUR 30275 EN). Publications Office of the European Union. doi: 10.2760/126686
- Wilson, K., & Korn, J. H. (2007). Attention during lectures: Beyond ten minutes. *Teaching of Psychology*, *34*(2), 85–89. doi: 10.1080/00986280701291291
- Yu, Z. (2021). The effect of teacher presence in videos on intrinsic cognitive loads and academic achievements. *Innovations in Education and Teaching International*.