

Evaluation of lecture captures in mathematics and statistics for internal, hybrid and distance modes

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For several mathematics and statistics subjects we included a variety of video-based resources including lecture captures. We surveyed students and found they appreciated and felt they learnt from the videos. Additionally, we recorded usage data and found a positive relationship between number of lecture captures downloaded and exam performance.

Keywords: lecture capture, mathematical education, video-based resources, usage data

What we did

- In several mathematics and statistics undergraduate subjects;
- For various modes: internal (with traditional lecture), hybrid and distance;
- Gave an assortment of video-based resources.
- We counted how many resources all students downloaded.
- We surveyed students for preferences.

Video-based resources used

For all subjects, the weekly lectures were captured to video and made available to all cohorts. Additionally, the following resources were used in some (but not all) the subjects:

- Shorter videos of single problem or concept;
- Video of solutions for assignments;
- Online interactive lectures (both live and recorded).

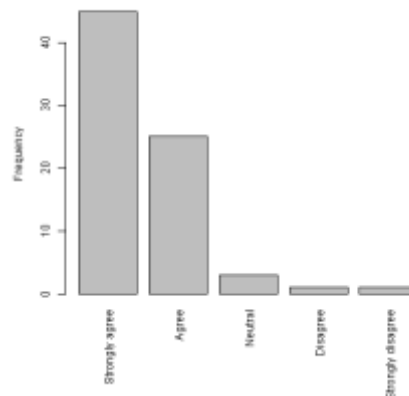


Figure 1: The lecture captures assisted with my learning

Results

Students felt they greatly benefitted from the lecture captures (Figure 1).

As a group, there was no clear preference for video vs text materials (Figure 2). To cater for all learning styles, written materials and video must coexist.

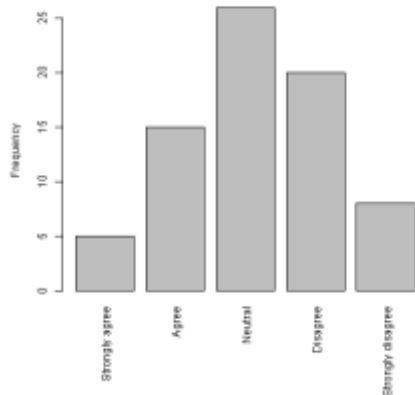


Figure 2: I learn more effectively using text based resources

About half the students (who had used both) preferred lecture captures to shorter videos (Figure 3). Furthermore, about a third of students (22 of 67) who had access to both types of resources did not look at any of the shorter videos. The most common reason selected was because the rest of the materials were sufficient.

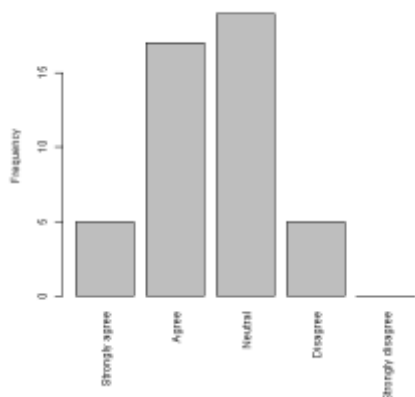


Figure 3: I prefer lecture captures to the shorter videos

Students were asked what video resources they would like to see in the future: recorded lectures, online lectures (combined and coloured red in Figure 4) and shorter videos and videos of solutions of assignments (combined and coloured blue). Students generally wanted to see more of everything, but there was a small but significant ($p=0.004$) bias to the non-lecture type resources.

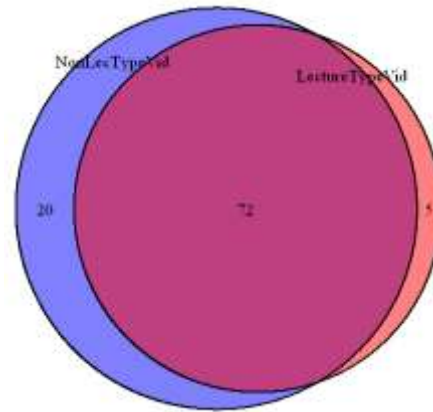


Figure 4: Preferred video resource (by type)

MTH101 - First year mathematics class

One particular subject in the study- a typical first year, first session mathematics subject – was offered in three modes: traditional lectures, hybrid = inverted classroom and distance. The difference in modes was based on geography and the cohorts' ability to learn independently. Figure 5 shows the number of lectures by mode that students downloaded in the 13 week session.

Two way ANOVA was used to investigate how exam performance was related to the number of lecture captures watched in MTH101. Mode was included in the model to avoid potential bias. There was a significant ($F=5.215$, $df=3,104$, $p=0.002$) relationship. Tukey's HSD shows (Figure 6) that students who downloaded most of the lectures (10-13) had a higher average exam mark than those who watched none or hardly any (0-2). Also, students who watched some (3-9) had a higher average mark than those who watched none. [Note: cause and effect cannot be determined from this data.]

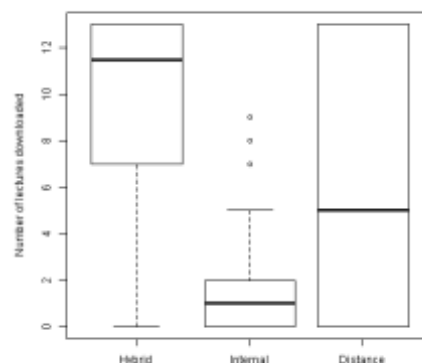


Figure 3: Number of lecture captures downloaded for different modes

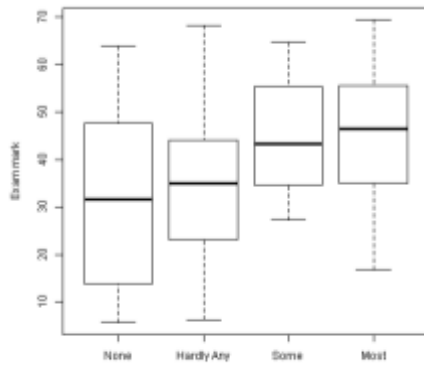


Figure 4: Exam performance versus number of lecture captures downloaded.

Conclusion

Students appreciated and felt they learnt from lecture captures and other video resources. Students who watched more lectures had a higher exam mark on average.

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Please cite as: Kemp, M., Cullis, K., Nielsen, S., & Wood, R. (2012). Evaluation of lecture captures in mathematics and statistics for internal, hybrid and distance modes. In M. Brown, M. Hartnett & T. Stewart (Eds.), *Future challenges, sustainable futures. Proceedings ascilite Wellington 2012.* (pp.465-467).

<https://doi.org/10.14742/apubs.2012.1685>

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