Assessing the impact of students' video watching behavior on academic performance

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Indicate your track

Academic research: comprehensive evaluations of recent innovations in learning and student analytics approaches.

1   Purpose

Increasing numbers of universities provide videos to their students. Analyzing video watching patterns provides an unique opportunity to understand how students learn with multimedia. Prior studies have indicated that students watch videos more and more nonlinearly (Sinha et al., 2014) in view of their needs and requirements (McNulty et al., 2009). Accordingly, traces of students' interactive behavior with the video can provide insight into students' engagement (Sinha et al., 2014). This exploratory study investigates how students' engagement, namely, pausing and replaying the video, moving or skipping to a new position in the video influenced students' performance on exams.

2   Design

The study took place at University of Lille (France). Participants were 19 students of Computer Sciences. The intervention consisted of an online environment incorporating four different videos (average 148s/video). Each video presents a sequence of actions corresponding to Unix Commands or software configuration items (e.g. loading a certificate into a browser). The videos could be consulted during a work session, supervised by the professor. In order to retrieve data of students' watching behavior, Javascript/html5 software was created that stored students' IP address, session details (date, time) and the events (onplay, onpause, onseek) in a trace file. *Onplay* and *onpause* reveal the amount of clicks on play and pause. *Onseek* reveals the amount of moving or skipping to a new position in the video. Based on this data, additional variables could be retrieved such as time spent, rewatching the video and dropout (navigating away from a video before completion). Correlation analysis was conducted in order to investigate the correlation between students' watching behavior and performance. Since the amount of *onplay* and *onpause* were similar in the dataset, *onplay* was not incorporated in the correlation analysis. Performance measures were students' scores obtained at the end of the training module.

3   Results

Of the 19 students, 8 students watched the videos. As we were interested in students' watching behavior, analyses were conducted by using the data of the 8 students. Of these 8 students, on average 3 students rewatched a video; 3 students did not watch a video to the end (i.e., drop-out), and students spent on average 36 minutes (2157 s) on watching the four videos. In a first phase we visualized the data in order to have insight into the differences in use. Visualizations revealed large differences in use as show in *Figure 1*. The time is displayed on the x-axis (s) and the video timestamp is displayed on the y- axis. Each video timestamp indicates an activity, namely: *onpause, onseek, onplay*. For instance, participant 7 reviewed the video several times and frequently skipped the video to a new position, while participant 20 watched the video in a more linear way, but occasionally paused the video.
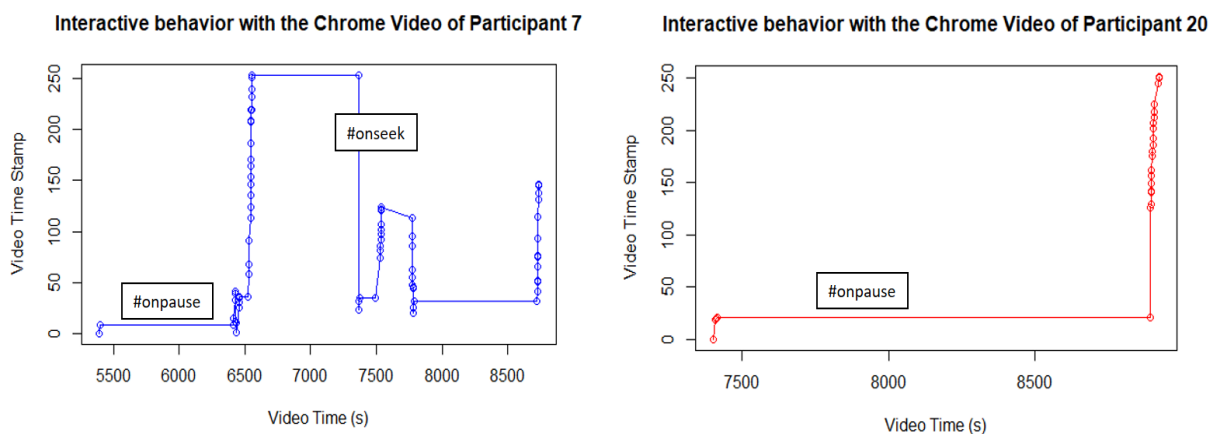
Figure 1: Visualisation of participant 7 and 20

In a second phase we investigated whether the differences in use are dependent of the videos *(Figure 2).* Results revealed that students' behavior was dependent of the content of the video that they were watching (regardless of the duration of the video).
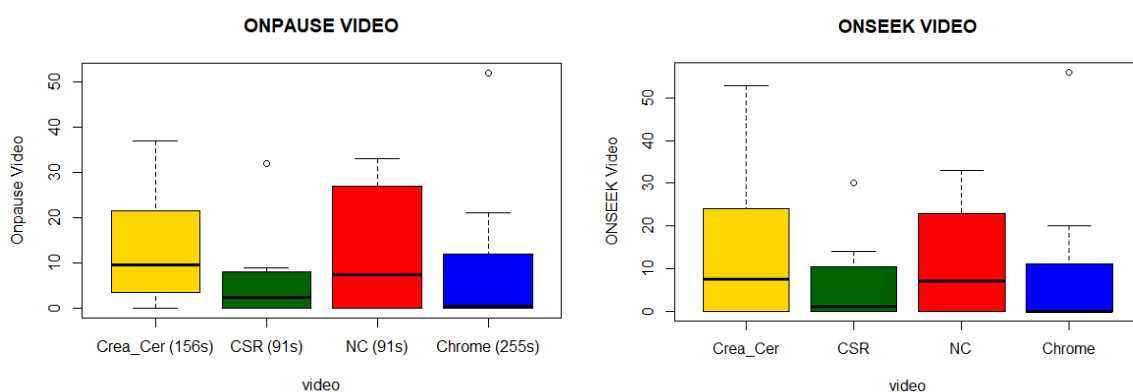
Figure 2: visualisation of the differences in use of the four videos

In a third phase we investigated correlations between students' behavior and their performance (i.e. score) on the module as shown in *Figure 3*. Results reveal a significant positive correlation between *onpause* and *score* (r=.72,p=.04). Additionally, *onseek* and *score* are significantly positively related (r=.79,p=.02). Furthermore, a non-significant relationship between *time spent* and *score*, between *rewatching the video* and *score*, and between *drop-out* and *score* was observed.
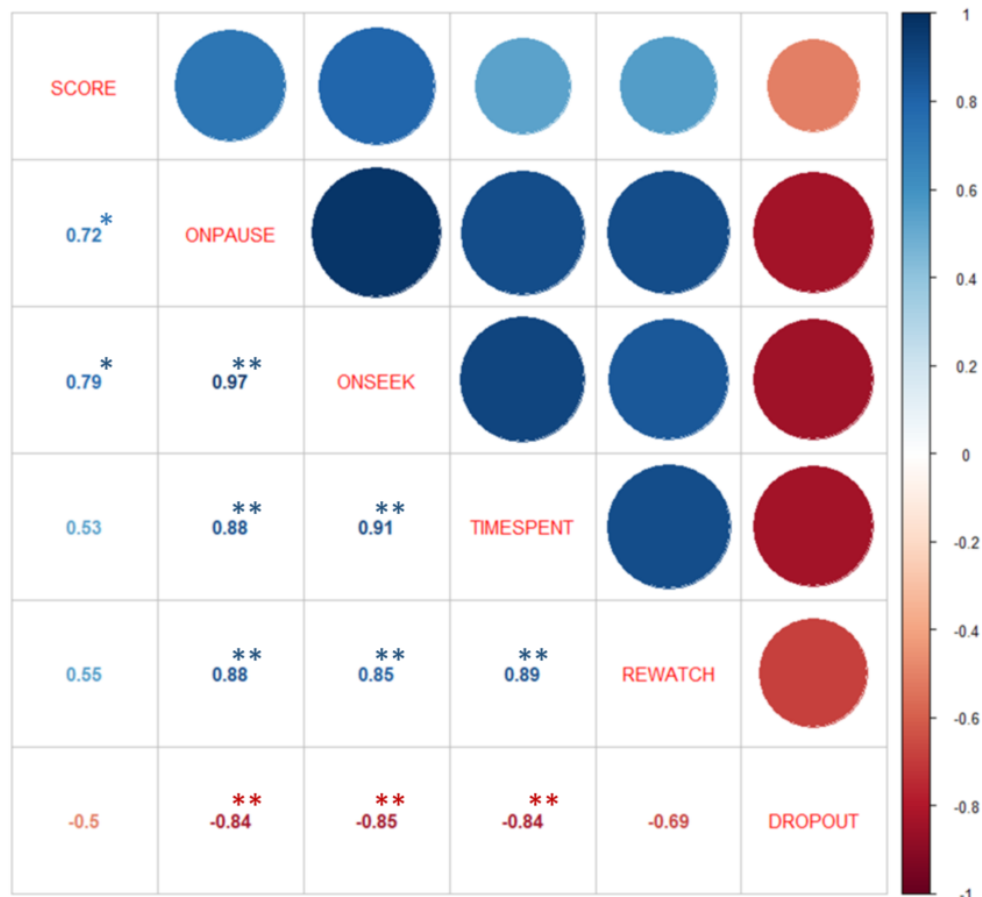
*significant at .05 level/**significant at .01 level/ blue: positive correlation/red: negative correlation

Figure 3: Correlations (Pearson)

4 Implications

The results of the exploratory study reveal that students who watch the video more adaptively (i.e., pausing and skipping) had better performance on this module, suggesting that video traces can be related to student engagement. Results furthermore indicate that it can be important for a follow-up study to control for complexity of the content of the videos as descriptive statistics clearly indicate that the amount of interactive behavior is related to the content of the video (Giannakos et al., 2015). Follow-up research should incorporate bigger sample sizes and a larger amount of videos in order to be able to conduct more complex analysis to detect students' activity patterns and the relationship with performance (Kim et al., 2014).

5   References

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