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The Impact of Closed Caption Use on Learning Outcomes in Fully Online Classes

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Abstract

This brief summarizes research conducted by the Oregon State University Ecampus Research Unit regarding closed captioning, or the practice of providing a text version of spoken words and sounds for video or other multimedia. This research investigates the impact of closed caption use on learning outcomes in a college-level fully online class.

Introduction

Closed captioning is a central component of making courses accessible for students with disabilities. Although higher education institutions are required to caption their videos out of legal obligation, some research and anecdotal evidence suggests that captions are also impactful for learning across a wide range of student populations. However, little empirical research supports the benefits of closed captioning for a wide variety of college-level learners, particularly in fully online environments. This research is among the first to explore how closed captions might impact student learning outcomes in a fully online classroom environment.

Methods

This study addressed two research questions through an experimental study.

Research questions guiding the experimental study included:

1. To what extent do video closed captions help students learn in fully online environments?
2. To what extent are student sub-groups differentially impacted by video closed caption use?

A convenience population of 60 students in a 300-level biology course section were randomly assigned into one of two groups at the beginning of the term. A pre-course survey targeting learner characteristics was administered to determine the extent of baseline differences between the groups.

At ten times during the term, each student group viewed a short video related to particular learning objectives for the course. Each group viewed each video in either the *captioned* condition or the *un-captioned* condition. Students who view the *captioned* condition for the first video then viewed the *un-captioned* video for the second video, and vice-versa, alternating for all ten videos.

Following each video, students were asked to take a short quiz and, at the end of the term, a final assessment of all of the learning objectives from all ten videos was conducted in order to measure longer-term retention.

Mann-Whitney *U* tests were conducted to determine the statistical significance of learning differences between the captioned and uncaptioned groups.

Results

Of the original 60 student sample, 26 students consented to be included in the study. Of those consenting, three left the course, leaving 23 participants.

Learning outcomes were measured through quiz grades, a final assessment of all learning outcomes associated with all ten videos, and the overall course grades of the 23 participants. Given the sample size, subgroup analysis was only possible with adult learners and first-generation students in the participant group.

No statistically significant ($p\geq.05$) differences existed in baseline characteristics between the groups for either the groups as a whole or for the subgroups of adult learners or students of first-generation status.

Of the 23 students for whom responses to individual quiz items were available, 12 students were in the group that received captioned videos in weeks, 1, 3, 5, 7, and 9 (Group 1), and there were 11 students in the group that received captioned videos in weeks 2, 4, 6, 8, and 10 (Group 2).

Mann Whitney U-tests were used to explore differences between the groups for percentage of correct items across the following: all quiz items that were relevant to the concepts covered in all of the videos, quiz items for which the concepts were relevant to videos that included captions, quiz items for which the concepts were relevant to videos that did not include captions. Across all video-relevant quiz items, the average score for both groups was 90%. Across quiz items for which the concepts were relevant to videos that included captions, the average score for Group 1 was 92% and the average score for Group 2 was 90%. Across quiz items for which the concepts were relevant to videos that did not include

captions, the average score for Group 1 was 87% and the average score for Group 2 was 91%. Results of Mann Whitney U-tests revealed no statistically significant differences between the groups for any of these comparisons ($p>.05$).

Additional analyses were conducted looking within each group to see how the percentage of correct items aggregated across all videos that included captions compared with the percentage of correct items aggregated across all videos that did not include captions. For Group 1, the average percentage of correct items aggregated across all videos that included captions was 92% while the average percentage of correct items aggregated across all videos that did not include captions was 87%. For Group 2 the average percentage of correct items aggregated across all videos that included captions was 90% while the average percentage of correct items aggregated across all videos that did not include captions was 91%. Within each group, results of Wilcoxon Matched Pairs tests were not statistically significant ($p>.05$).

Regarding specific measures associated with learning outcomes, for the groups as a whole and for the adult learner and first-generation status subgroups, there were no statistically significant ($p\geq.05$) differences in any of the following: quiz grades, grades on the final assessment of all learning objectives, or overall course grades.

Conclusion

Findings of this small study indicate that students performed comparably in fully online environments whether or not video closed captions were used.

Given the small sample of this study, additional research is needed to learn more about whether the use of closed captions impacts learning outcomes for different groups of students, in different learning environments, and with different forms of closed captioning.

More specifically, additional research is needed across disciplines and course types, across institutional types, for different forms of closed captioning (such as interactive transcripts), and for additional subgroups of students

including those with sensory and other disabilities, students who speak English as a second language, and students who identify as Pell-eligible.

Further Reading

Although this study found no statistically significant difference, other research suggests that closed captions are a helpful component of student learning. For more information, please see a second project funded by DETA and completed by the Ecampus Research Unit at Oregon State University called "Student Use and Perceptions of Closed Captions in the Fully Online Classroom," which provides additional data on the subject of closed caption use among college students.

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