

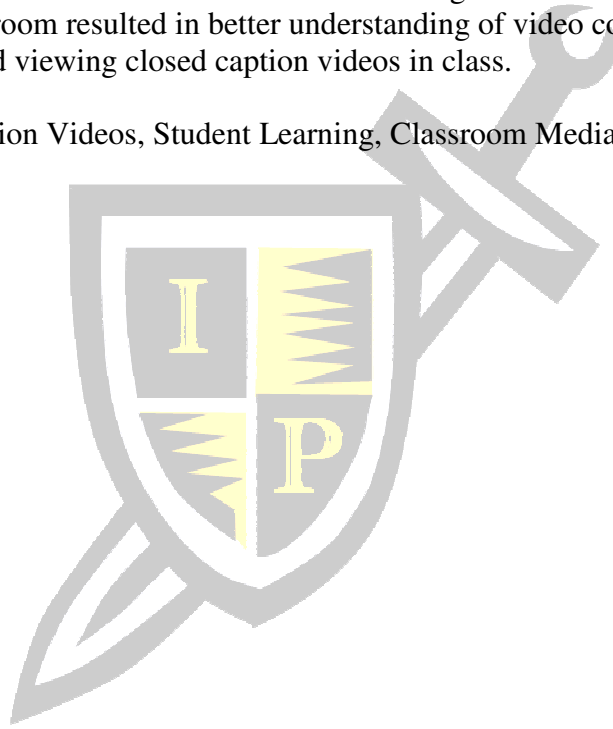
## The effectiveness of closed caption videos in classrooms: objective versus subjective assessments

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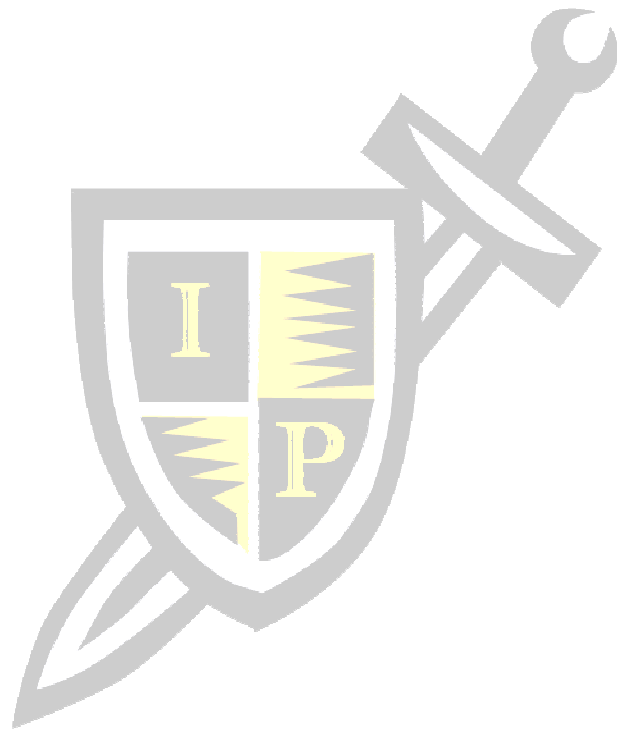
### ABSTRACT

The extant research has focused on investigating the effectiveness of the use of closed caption videos for hearing impaired or English as second language learners. Yet, the research about whether such usage can be beneficial for other students is limited. This paper explores the effectiveness of closed caption videos (same-language subtitles) in a college classroom. Results from objective and subjective assessments find that showing a closed caption video versus non-caption video in a classroom resulted in better understanding of video contents and higher positive attitudes toward viewing closed caption videos in class.

Keywords: Closed Caption Videos, Student Learning, Classroom Media, Student Attitudes



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## INTRODUCTION

The use of videos in higher education classrooms is a common multimedia teaching tool and is known to enhance students' understanding and learning of class materials (Berk, 2009; Mayor, 2001). While researchers find that video usage is proven successful in college classrooms, there is still skepticism over whether the use of multimedia in classrooms indeed significantly increases student's learning (Strauss & Frost, 1999). Yet, video usage in classrooms is critical in aiding students' learning process because videos can help students to acquire simple to complex levels of knowledge in various class topics (Lunenberg, 2011). However, the information provided by videos (audio and visual) in a classroom setting can be abstract, complex, or even distracting. Because of increased cognitive load, students may not be able to utilize video materials effectively to result in successful learning (Chandler & Sweller, 1991). Thus, there is a need for a better teaching method to manage students' cognitive load when classroom instruction involves video viewing.

The extant research tends to focus on investigating the effectiveness of the use of close caption for hearing impaired or English as second language students, whereas the research about whether such usage is beneficial for other students is limited. This paper explores the effectiveness of closed caption videos (same-language subtitles) in a class for students who are not hearing impaired or do not have limited English skills. The concept of closed caption video is not new. Yet, most instructors in higher education institutions are not aware of the benefits of closed captions for university students despite the legal mandate of close captioned videos or video transcripts in university settings by the American Disability Act of 1990 (Gernsbacher, 2015). Up to now, there have been limited studies on the use of videos with closed captions, on the effectiveness of closed caption videos, or on students' attitude toward closed caption videos in college classrooms.

This paper presents, first, the use and the effectiveness of closed caption videos in the classroom, second, the preparation of closed caption videos, third, the results from objective and subjective assessments conducted in college classrooms and lastly, discussion and conclusion.

## CLOSED CAPTION VIDEOS IN THE CLASSROOM

Closed captions were originally developed to help the hearing impaired. In addition, closed captioned videos were also widely used to benefit English as second language learners (Zamoon, 1996). Prior research finds that closed captions improves English language learners' listening and reading comprehension skills (Markham & Peter, 2003), students' attention and motivation, and reduces students' anxiety (Vanderplank, 1988). Language learners performed significantly better in objective vocabulary testing when they watched closed caption videos versus no caption videos and reported that they were able to integrate previous knowledge and process presented information much more effectively with closed caption videos (Winke, Gass, & Sydorenko, 2010).

Various empirical research studies reveal that closed captions also benefits children, college students, and adults who don't have hearing impairment or limited English skills in their comprehension and memorization of video contents via increased attention (Gernsbacher, 2015). The studies showed that closed captions improved research participants' ability to recall brand information about television advertisements (Brasel & Gips, 2014) and film dialogue (Hinkin, Harris, & Miranda 2014), and enhanced their reading comprehension (Griffin &

Dumestre, 1992-1993). Eye tracking studies find that participants attended to closed captions and were able to read closed captions with ease (d'Ydewalle, Praet, Verfaillie, & van Rensbergen, 1991; d'Ydewalle & de Bruycker, 2007). Many believe that close captioned videos are intended to help the hearing impaired or non-native English speakers, but the extant research demonstrates that closed captioned videos also benefit literate capable adults with no hearing impairment (Gernsbacher, 2015). This study proposes that the use of closed caption videos in college classes can enhance students' learning experience.

## PREPARING CLOSED CAPTION VIDEOS IN CLASS

The American Disability Act of 1990 mandates that closed captioning or video transcripts are required for public entities such as state and local governments when they use internal and external communications, and closed captions are also required for places of public accommodation (e.g. hotels, museums, and libraries), public transportation, or educational institutions such as colleges and universities (American Disability Act, 1990). Therefore, even though instructors do not have hearing impaired students in their current classes, when instructors include videos in their curriculum, the videos should have a closed caption capability to serve hearing impaired students or students with other types of disabilities. This section explains how instructors can prepare closed captioned videos for their curriculum.

1. *Secure videos with a closed captions option*: Most education purpose videos are equipped with the option of closed captions so that instructors can simply turn on the closed caption option.
2. *Caption videos that do not come with closed captions*: When instructors opt to play video clips with no closed captions available, instructors should consider two options to caption the video contents:
  - a. The use of software programs; the first option is for instructors to use commercially available software programs such as Adobe Premier Pro, or iMovie (Winke, Gass, & Sydorenko, 2010). Each software package comes with detailed tutorials showing or illustrating how to create a closed caption video. However, instructors need to spend considerable time and effort to learn the closed caption capability of the software and there is a cost involved with purchasing the software or hardware (e.g. Adobe Premier Pro \$150 per year subscription for education institutions, iMovie comes with Apple computer products).
  - b. University student support systems: the second option is to utilize university student support systems (including those for disabled students). Universities have different policies on closed captioning service but depending on the universities, the service is typically available at the department, school, or university levels. Instructors can request closed caption service for videos to be played in classrooms prior to the scheduled lecture dates. Normal turnaround time for a student support center to return captioned videos will vary by the length of videos and available resources each university.

## ASSESSING EFFECTIVENESS OF CLOSED CAPTION VIDEOS

This section reports the results from objective and subjective assessments conducted to investigate the effectiveness of closed caption videos used in college classes.

### Objective Assessment (control versus intervention conditions)

Objective assessment of the effectiveness of closed caption videos was conducted in two International Marketing Classes. The students from the control class were not exposed to the closed caption video in class. The students from the intervention class were exposed to the closed caption video. The two classes were identical courses offered in the identical class time- period (4pm to 5:15pm) and same class size (120 students) with the identical instructor over the two consecutive semesters. The students from the two classes took an exam containing two multiple choice questions specific to the video watched (Consumerism in India, 60 minutes). Due to the length of the video, the video was watched over two class time periods. One question involved surface level knowledge asking a simple recognition test of the name of the store presented in the video. The surface level question states: From the India video we watched, what was the name of the supermarket chain that utilizes the growing consumerism in India? The other question involved deeper level processing requiring identification of the overall theme of the video (Craik & Lockhart, 1972). The deeper level question states: From the India video we watched, which is an incorrect observation?

The total of 240 students' scores were initially examined but the usable sample size was 195 after eliminating the students who were absent when the video was played and international students whose native language was not English. The number of international students was less than five percent in each class. The ANOVA results reveal that there was an overall main effect of closed captions on exams scores that closed caption videos viewers performed significantly better ( $F(1, 194) = 27.78, p < .000$ ). In addition, a more interesting finding emerged showing that there is a significant interaction between the closed caption option and the type of questions ( $F(1, 194) = 9.51, p < .05$ ). The score for the surface level recall question (name of the store) was not significantly improved with a closed caption video ( $M_{cc} = .97$  versus  $M_{nc} = .96, t(194) = -.051, p > .9$ ), yet, the score for the deeper level processing question (overall theme of the video) was significantly improved with a closed caption video ( $M_{cc} = .91, M_{nc} = .74, t(194) = .33, p < .05$ ). This finding suggests that closed captioning was much more effective at delivering complex and abstract knowledge to students in this class. Figure 1 describes the interaction effect.

"as indicated in Figure 1 (Appendix)"

### Subjective Assessment (control versus intervention conditions)

The attitudes toward closed captions were assessed by asking students from the two classes (control versus intervention conditions) ( $n = 194$ , Female = 48%, Mean Age = 22.5). The students were asked to rate whether they strongly disagree/ strongly agree (1 to 7 points scale) to a series of six statements ( $\alpha = .89$ ). Two sample  $t$ -tests were employed to examine the difference between the two conditions. The students who watched a closed caption video displayed significantly more positive attitudes toward closed caption videos in class (all  $ps < .05$ ). For instance, students had more favorable views toward watching closed caption videos in class and toward the beliefs that closed caption videos would help them remember video contents and learn about class materials. Table 1 includes the statements and results.

"as indicated in Table 1 (Appendix)."

This study finds that students significantly improved their knowledge about the video after they watched a closed caption version of the video versus a no closed caption one. This effect was more evident when the question required students to engage in a deeper level of processing of the video content. The simple recall of the brand name of the store did not seem to

find any statistical difference between closed caption versus no closed caption videos while the deeper level processing question found significant differences. Overall, students had a more favorable view toward the closed caption videos after they were exposed to the closed caption videos. Interestingly, students who were not exposed to the closed caption videos performed significantly poorer in answering the deeper level question and had less positive attitudes toward the use of closed caption videos in class.

## DISCUSSION

The proposed method can be an effective teaching tool because closed caption videos in college classrooms can foster students' positive attitudes toward viewing videos and can improve their learning. Implementation of closed caption videos in classrooms will promote positive classroom experiences not only for students but also for instructors through students' heightened engagement with their classroom materials. Implementation of closed caption videos in a college classroom does not pose any significant challenges for instructors or students.

Several limitations of the current study should be addressed. This study's sample focused on students whose first language was English due to the limited number of international and hearing disabled students in the two selected classes. Therefore, the current study did not have any direct comparison result between students whose first language was English and students whose first language was not English or students with hearing impairment. Future research can include more diverse student groups as a sample to compare how improved learning may be attributed to the use of closed caption videos for varying student groups. Even though, the study's findings are noteworthy, the result should be interpreted with caution. To obtain objective assessment data, this study used a limited number of questions applied one long video. Using more videos with varying lengths and a greater number of objective questions is recommended for the future research.

## CONCLUSION

Closed caption technology itself is not new but the usage of closed captions in college classes may be considered a distinct teaching aid because most university faculty and administrators are not aware of the benefits of closed captioning in a university classroom setting (Gernsbacher 2015). The use of closed caption videos should be adaptable to any college courses that include video viewing as a part of their curriculum. When instructors decide to use videos in class, they should make sure to select videos with closed captions or should convert uncaptioned videos to closed caption videos. Instructors should be careful not to rely on the closed caption option when they play video clips from YouTube because the automatic closed caption function does not transcribe video messages accurately thus instructors should prepare closed captions via a university service or software programs in advance of their lecture dates. This process of converting videos to closed caption videos takes some preparation due to the time it takes for conversion (e.g. two weeks advance preparation time is recommended). However, such a time investment should be worth pursuing. The use of closed caption videos in college education can effectively aid instructors in transferring knowledge to students.

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## APPENDIX

Figure 1  
Objective Assessment of Closed Caption Video

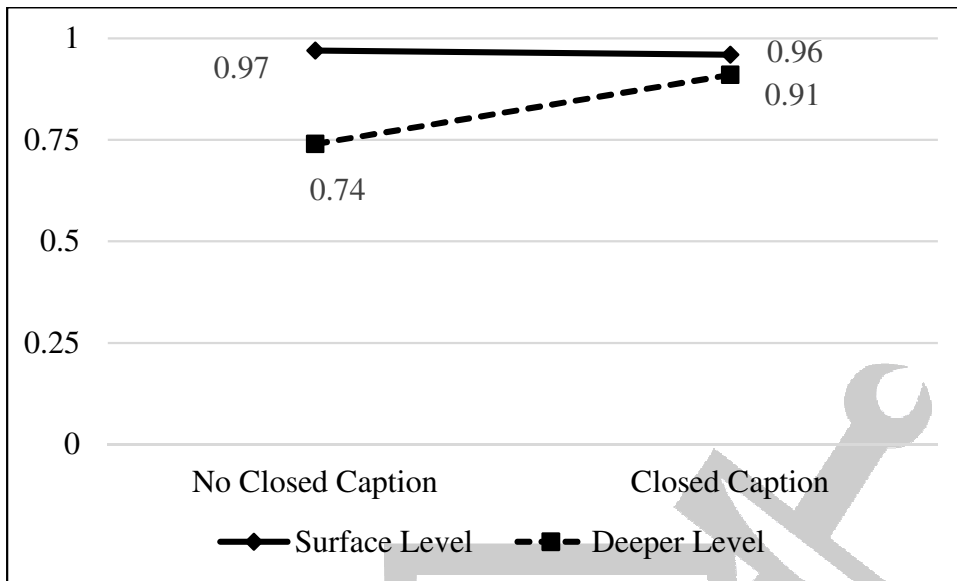


Table 1  
Subjective Assessment of Closed Caption Videos

Survey Statements*	Mean Scores (No Caption)	Mean Scores (Closed Caption)	Two Sample T-Tests
Watching closed caption videos in class will be distracting (reverse scored).	5.26	6.11	$t(3.845), p = .000$
Watching closed caption videos in class will help me to understand the video contents.	5.14	5.81	$t(3.205), p = .002$
Watching closed caption videos in class will help me to remember the video contents in class.	4.95	5.63	$t(3.148), p = .002$
I prefer to watch videos with closed captions to videos with no closed captions in class.	4.36	4.93	$t(2.268), p = .024$
I will like watching videos with close captions in class.	5.04	5.51	$t(2.119), p = .035$
Watching close captioned videos in class will help me to learn better about the class materials.	5.10	5.61	$t(2.518), p = .013$

\*strongly disagree /strongly agree (1-7 points scale)