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## Creating Accessible Videos: Captions and Transcripts

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# Creating Accessible Videos: Captions and Transcripts

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## Abstract:

The rapid shift to online teaching due to the coronavirus disease of 2019 (COVID-19) exponentially increased the extent to which faculty use videoconferencing/virtual classroom tools such as Zoom, Google Meet, and Microsoft Teams. It also exposed the challenge of ensuring that all students could access all video content. Faculty may need to implement captions or transcripts in videos to not only address certain student accommodations but also fulfill an institution's legal responsibilities, under accessibility laws, to conform to the W3C's Web Content Accessibility Guidelines (WCAG). Faculty can create captions and transcripts manually, use a third-party service to create them, or generate them with some recording tools. As faculty have quickly needed to adapt course materials from in-person to online instruction, they need to learn best practices for technology use in order to help all students succeed. In this paper, I share some personal experiences and lessons I have learned about creating and using accessible video content for online courses.

**Keywords:** Accessible Video, Closed Captions, WCAG, Captioning, Video Transcripts.

# 1    Introduction

The extent to which faculty use videoconferencing/virtual classroom tools such as Zoom, Google Meet, and Microsoft Teams has increased exponentially since the coronavirus disease of 2019 (COVID-19) pandemic forced people into isolation. Faculty can use these tools for synchronous classes/meetings or to create videos for asynchronous learning. The rapid shift to online teaching due to the COVID-19 pandemic exposed the challenge of ensuring that all students could access all published content. Whether posting videos of lectures, programming tutorials, or application demonstrations, faculty not skilled in online teaching may not have had the time or the knowledge to address accessibility. However, we need to remember that faculty may need to implement captions or transcripts in videos to not only address certain student accommodations but also to fulfill institutional legal responsibilities.  In this paper, I share some personal experiences and lessons I have learned about creating and using accessible video content for online courses.

# 2    Summary of Relevant Literature

Research supports that video technology can be an effective tool for learning (Allen & Smith, 2012; Hsin & Cignas, 2013; Kay, 2012; Lloyd & Robertson, 2012; Thomson, Bridgstock, & Willems, 2014). As our most dominant sense, sight accounts for half of the brain's resources (Medina, 2014). For both recognition and working memory, "the more visual the input becomes, the more likely it is to be recognized and recalled" (Medina, 2014, p. 191). Our brain is optimized to readily engage visual learning, especially in the form of video versus static images (Medina, 2014).

Accordingly, students can learn more effectively when videos include multiple types of media and/or appear alongside other types of media. The strength of multiple modality learning relies on "dual coding"—using both the verbal and visual channels in the brain simultaneously—which helps people understand and remember learning material (Bruff, 2019).

As faculty have quickly needed to adapt course materials from in-person to online instruction, they have needed to learn best practices for technology use in order to help all students succeed.

# 3    Description of the Problem

Video constitutes a fundamental component of online education. Faculty may record synchronous classes and post videos for students who cannot participate synchronously due to constraints such as time zone differences, technology limitations, and health issues. Faculty may post videos found online or create their own video content using screen capture or video conferencing software to post for asynchronous viewing. Whatever strategies faculty choose, they need to ensure that all students have access to all video content.

## 3.1    Students with (and without) Accommodations

If faculty do not design video content with accessibility in mind, students with accommodations may not have access to it. Deaf students and those with partial hearing loss require captions or transcripts to allow them to read content simultaneously while viewing video. Blind students and those with limited vision need audio descriptions to enhance the visual images.

While faculty need to add captions, transcripts, and/or audio descriptions for students with specific sensory impairments, they benefit other students as well. Students whose primary language differs from the language spoken in the video can use captions to increase comprehension. Students with learning disabilities can read transcripts at their own pace, use rewind and fast-forward controls to review a concept multiple times, and/or pause the video if they need a break. Other students can turn the volume off and read captions if they must watch videos in a quiet environment and not disturb others or in a loud environment and cannot hear the audio.

Faculty may assume that no students need accommodations if they have not received any accommodation forms. According to the U.S. Government's Digest of Education Statistics for 2018, in 2015 to 2016, 19.4 percent of undergraduate and 11.9 percent of graduate students reported having a disability (Snyder, de Brey, & Dillow, 2019). Many more students may not know they have a disability because they have never been tested. Even when students know about their need for accommodations, they may be hesitant to disclose a disability because they want to see how well they can manage without them. Research shows that only one in four students who received accommodations in high school

request accommodations in college (Newman & Madaus, 2015; Cortiella & Horowitz, 2014). When faculty make all course videos accessible, it supports learner variability and helps ensure that all students have equal access to the information they contain. Proactively captioning videos is more productive and inclusive than waiting for an accommodation request (Tobin & Behling, 2018, p. 39).

## 3.2   Accessibility Laws

Many countries and organizations such as the United Nations have developed accessibility laws or guidelines that partly focus on ensuring that everyone can consume digital content. These laws and guidelines mostly build on the World Wide Web Consortium (W3C) Web Content Accessibility Guidelines (WCAG), which focus on "providing a single shared standard for web content accessibility that meets the needs of individuals, organizations, and governments internationally" (Web Accessibility Initiative, 2020).

Two U.S. federal laws address accessibility of video for colleges and universities: the Americans with Disabilities Act (ADA) and Section 508 of the Rehabilitation Act. The ADA states that public entities, including colleges and universities, must provide "auxiliary aids" to anyone with a disability, which includes providing closed captioning for videos to aid the deaf and those with partial hearing loss (Enamorado, 2019).

Regarding accessibility, Section 508 of the Rehabilitation Act as amended states that "electronic content shall conform to Level A and Level AA Success Criteria and Conformance Requirements in WCAG 2.0" (Federal Register, 2017)). To comply with WCAG 2.0, one must caption all pre-recorded video and provide an audio description for it, and one must caption live video.

## 3.3   Issues with Non-compliance

If laws and/or regulations legally mandate compliance (as in the US) and students cannot fully access online videos, one's institution faces ramifications. Several U.S. universities have faced legal consequences for failing to properly caption videos. In 2017, The University of California at Berkeley decided to remove thousands of videos from public view when the U.S. Justice Department ordered the university to provide captions. Since 2015, Harvard and MIT have been embroiled in civil rights lawsuits due to lack of appropriate video captioning. The courts denied both their second requests to dismiss the charges. In December, 2019, Harvard settled the class action lawsuit and agreed to caption videos (Binkley, 2019); MIT settled in February, 2020, and agreed to provide captions for more of its publicly available online videos (Durkin Richer, 2020). By proactively adding captions and transcripts to videos, schools can avoid being accused of violating their students' civil rights and can save the time and expense of litigation.

# 4   Describing the Practice

Students who cannot see video or hear audio need alternative ways to access the information. According to WCAG 2.0 standards:

> *Depending on the content of your media, it might need* captions/subtitles *(a text version of the audio that is shown synchronized in the media player), a* transcript *(a separate text version of the audio),* audio description of visual information *(usually an additional audio stream that describes important visual content),* or other *accessibility functionality/features* (Web Accessibility Initiative, 2019, emphasis in original).

Faculty have two options in ensuring that everyone can access their videos: they can 1) caption them and/or 2) provide transcripts of the content.

## 4.1   Captioning Video

Faculty can add captions to videos in four basic ways:

- Use a tool that automatically creates them (live or post-recording)
- Enter your own (live)
- Pay someone else to do it (live or post-recording)
- Create automatic captions yourself (post-recording)

### 4.1.1 Automatically Creating Captions

Several videoconferencing tools automatically generate captions post-recording. For example, if one records Zoom sessions to the Zoom Cloud, one can automatically generate transcripts (in English only) by setting the audio transcript option. The transcript is a separate .vtt file that one can display as closed captions in the video post-recording. Microsoft Teams generates VTT format transcripts for close captioning as well but only if one records it to the cloud storage in Microsoft Stream.

Microsoft Teams uses automatic speech recognition (ASR) technology to generate live captions during meetings as a "preview feature" (not available to everyone). Attendees can view live captions in up to six languages that meeting organizers choose from a list of over 50 (Microsoft Support, n.d.). Microsoft Teams permanently deletes caption data when the meeting ends but one can download transcripts. Google Meet also provides live captioning (English only), but it does not record captions and they do not appear in the video.

### 4.1.2 Entering Your Own Captions (Live)

Zoom's closed captioning functionality allows a selected attendee to add live closed captioning during a meeting. First, enable closed captioning in the settings for the meeting. Then, select the CC icon and choose an attendee to type. If your institution uses a third-party closed captioning service, you can select that option, which requires a representational state transfer (REST) API.
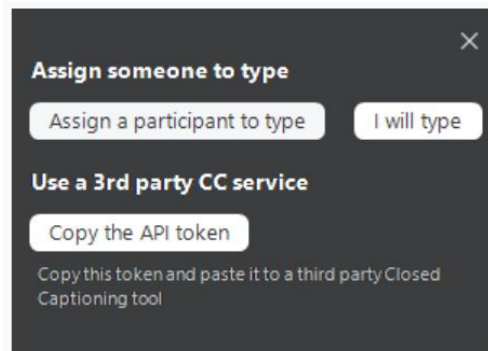


**Figure 1. Screen Capture of Zoom Closed Caption Options**

The selected typist enters the captions as the meeting progresses. This option is not a good one if you use breakout rooms since only one person in one breakout room can enter captions; Zoom suggests using a third-party closed captioning service if you want breakout rooms captioned.

### 4.1.3 Paying for Captions

As previously mentioned, an institution can pay for live closed captioning services. In addition, if you have to caption many saved videos and have sufficient time and money, you can pay someone to create the captions. Your institution may already have a contract or a preferred vendor, or some schools train work study students to caption videos. Contact your disability services or academic technology department for information on institution practices.

### 4.1.4 Creating Auto-captions

You can create captions yourself relatively easily using YouTube's auto captioning service, and then editing as needed for accuracy. This option will work for Zoom recordings and for most videos created using screen-capture ("screencasting") software. Regardless of what language one used to create captions, viewers can choose from over a hundred different languages to view them (which Google Translate provides) by selecting settings, subtitles, and auto-translate.

To automatically close caption videos in YouTube, first upload the video, then review and edit captions.

To upload the video:

- Create and log into a YouTube account.
- Go to YouTube Studio.

- Click the blue "upload videos" button.
- Select the file to upload or drag and drop the file in to the upload videos window.
- Edit or add any details about the video. You must select whether or not the video is meant for children.
- When it has finished processing, click the "next" button twice.
- Select "save" and "unlisted" unless you want to show the video on your YouTube channel.
- The video will be uploaded with automatic closed captions.

To review and edit captions:

- In the YouTube Studio dashboard, click "subtitles" from the left menu.
- Click on the video.
- Under subtitles, click the three buttons for the "more" dropdown menu.
- Select "edit on classic studio", then click the edit button at the top right.
- Click "play" to start the video and edit any captions as necessary.
- Click "save changes" when you are through.
- Click "return to YouTube Studio".
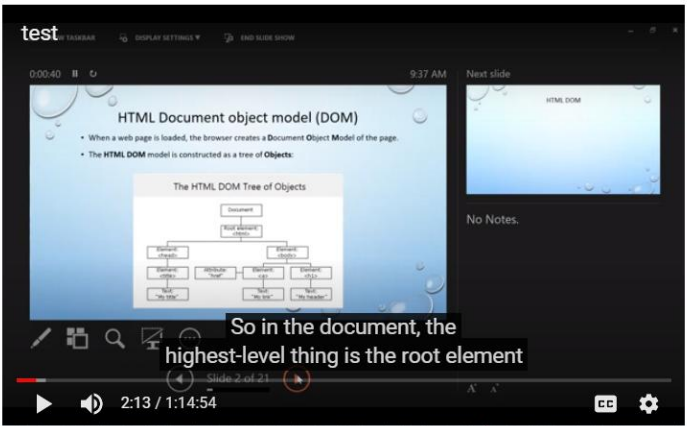


**Figure 2. Screen Capture of Editing Captions that YouTube Automatically Creates**

You can now copy the video link and paste it into your learning management system (LMS) or make the video public and share the YouTube link.

## 4.2    Providing Transcripts

Transcripts come in two types: 1) basic, which comprises the speech and non-speech audio information from a video in text, and 2) descriptive, which also include visual information necessary to understand the content (Web Accessibility Initiative, 2019). Basic transcripts can help deaf individuals and people who have difficulty processing auditory information. Descriptive transcripts help deaf-blind individuals via screen readers and braille printers.

For YouTube videos, one can create transcripts by downloading and editing YouTube caption text to add any necessary information such as "[birds chirping]" or "[cell phone ringing]". After completing captions in YouTube, you can download them in subviewer (.sbv) format, open them in a text editor, and edit them as necessary. You can then save them in Microsoft Word or PDF format for posting in a LMS; students can search these formats to find specific phrases or words.

As I mention in Section 4, Zoom recordings saved to the cloud and Microsoft Teams' recordings saved to Microsoft Stream automatically generate editable VTT transcripts that one can download, edit, and upload again.

## 5 Discussion of Experience

In my teaching practice, I use Zoom to record formal lectures and Kaltura Capture to create short application demos. My institution provides these tools and the university's LMS, Blackboard, incorporates them. The quick screen-capture videos that I record in Kaltura outside class allow me to answer specific student questions by showing rather than telling. I then post the videos for all students, which means I have to explain something only once. I occasionally use videos that others create and only select ones that include closed captioning. I always turn the captions on when showing a video during class.

While using Zoom to record my classes, I do not want to include time spent taking attendance or periods where students take quizzes or work in breakout rooms. Therefore, I do not set Zoom to automatically start recording when a session starts. Instead I need to remember to start and stop recording at appropriate times. I now ask for a volunteer "producer" in each class to remind me to record and let me know if anyone has asked questions in the chat. I also ask the producer to tell me when I forget to share a screen since I switch back and forth between PowerPoint, browser windows, and applications a lot.

The sudden move to online teaching last spring necessitated that I record class lectures in Zoom, the tool my institution chose. The institution asked faculty not to record to the cloud, so I needed to caption them by hand; I chose YouTube as the tool to do so. It took a great deal of time and effort to make the flip from face-to-face to online, and I was unable to provide captions on my lecture videos in the January-May semester. While no student had requested captioned/transcribed videos, that does not mean that students could not have benefitted from having captions available.

In the September-December semester, I taught two online sections of a Web programming class that mostly included students who minored in computer information systems. My institution now allows recording to the cloud, so I can automatically generate captions and transcripts. I integrate captioned videos from Zoom and Kaltura Capture with Blackboard and they appear in the "my media" section when processing finishes. Short Kaltura videos process in less than 15 minutes; the hour-long Zoom videos usually process within two hours after class ends.

I receive student emails if I am slow in posting videos to Blackboard courses possibly because they want to review the material, did not/could not pay attention or keep up during the class, or a little bit of both. Providing these captioned videos reflects universal design for learning (UDL) principles (CAST, 2018); all students have multiple ways to engage with the material. I recently anonymously surveyed students regarding course videos; 51 of 53 students responded (96%). Forty-three out of 51 students (84.31%) have watched a video, while 19 students (37.25%) have viewed captions. In the September-December semester, I received three accommodation forms, none of which required captioning, so I believe that captions benefitted my students.

## 6 Lessons Learned

I am grateful for my institution's push for accessibility. Recording class videos to the Zoom cloud is easy and relatively quick. Having Zoom and Kaltura incorporated into our LMS makes it easy to post captioned videos to course sites.

If you must create captions yourself, YouTube's auto captioning represents an easy option to do so but it can consume much time if you have many videos to caption. For example, it took three minutes to upload and 15 minutes to process a 75-minute video over residential broadband at 9 p.m. To upload videos more than 15 minutes long, you must verify your YouTube account. I discovered this the hard way after waiting two and a half hours for processing to end while the website displayed a "99% completed" message. Editing long video files into smaller segments before uploading will result in faster processing times. Limiting videos or video segments to no longer than ten minutes also helps with student engagement and learning (Medina, 2014). Guo, Kim, and Rubin (2014) agree that shorter videos increase student engagement and suggest that people chunk videos into segments no more than six minutes long. Posting one long video of an entire class session requires students to fast forward to find a particular segment they want to review. Students who cannot attend the "live" course session may inadvertently fast forward over important material. Shorter videos can also help students who view content on mobile phones and do

not have unlimited minutes and/or data. I do not practice what I preach, however, and have been posting my unedited hour-long class videos to Blackboard.

If you use YouTube for captioning, it may take several minutes to an hour (or longer) for it to generate automatic captions. A video will have captions when the "CC" symbol appears when one views the video in YouTube. If captions do not appear after 24 hours, try deleting the video and uploading again.

Laws may protect the privacy of students under 18 years old (like the U.S. Family Educational Rights and Privacy Act (FERPA)). Underage students should turn off cameras and microphones before recording begins.

## 7    Summary

Video constitutes a fundamental component of online education. Accordingly, all students require access to it. Providing accessible video content helps all students regardless of accommodations. While converting face-to-face content to online content, adding captions and/or transcripts to videos represents a best practice that allows all students to engage with the material in ways that work best for their learning style.

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**Elizabeth McCarron** is a Senior Lecturer in CIS at Bentley University. She teaches courses in programming for the web and designing and using databases. Her research interests include student retention, accessibility, self-advocacy skills, and the student/faculty relationship, especially in students with hidden disabilities.