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Creating Accessible Videos: Captions and Transcripts

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Abstract:

The rapid shift to online teaching due to COVID-19 exponentially increased the use of videoconferencing/virtual classroom tools like Zoom, Google Meet, and Microsoft Teams. It also exposed the challenge of ensuring that all video content is accessible for all students. Captions or transcripts may be required not only to address certain student accommodations but also to fulfill an institution's legal responsibilities, under accessibility laws, to conform to the W3C's Web Content Accessibility Guidelines (WCAG). Captions and transcripts can be created manually, created off-site by a third-party service, or generated automatically by some recording tools. As faculty are quickly being required to adapt course materials from in-person to online, it is important to learn best practices for technology use in order to help all students succeed. This paper shares experiences and lessons learned regarding the creation and use of accessible video content for use in online courses.

Keywords: Accessible video, Closed captions, WCAG, Captioning, Video transcripts.

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1   Introduction

The use of videoconferencing/virtual classroom tools like Zoom, Google Meet, and Microsoft Teams has increased exponentially since COVID-19 forced people into isolation. These tools can be used for synchronous classes/meetings or to create videos for asynchronous learning with various levels of pricing and features. The rapid shift to online teaching due to COVID-19 exposed the challenge of ensuring that all video content published for student consumption was accessible for all students. 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, it is important to remember that captions or transcripts may be required not only to address certain student accommodations but also to fulfill the institution's legal responsibilities.

The purpose of this paper is to share experiences and lessons learned regarding the creation and use of accessible video content for use in 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 & Robin, 2012; Lloyd & Robertson, 2012; Thomson, Bridgstock, & Willems, 2014). Sight is our most dominant sense, accounting 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 vs. static images (Medina, 2014).

When videos include multiple types of media and/or are used in conjunction with other types of media, student learning is enhanced. The strength of multiple modality learning relies on the use of "dual coding" – using both the verbal and visual channels in the brain simultaneously – which helps us understand and remember what is being taught (Bruff, 2019).

As faculty are quickly being required to adapt course materials from in-person to online, it is important to learn best practices for technology use in order to help all students succeed.

3   Description of the Problem

Video is a fundamental component of online education. Faculty may record synchronous classes and post videos for students unable to participate synchronously due to any number of constraints, including time zone differences, technology limitations, or 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, it is imperative to ensure that all students have access to all video content.

3.1   Students with (and without) Accommodations

If video content is not designed with accessibility in mind, students with accommodations may not have access to it. Students with hearing impairments require captions or transcripts to allow them to read content simultaneously with viewing. Students with vision impairments need audio descriptions to enhance the visual images.

While adding captions, transcripts, and/or audio descriptions is essential for students with specific sensory impairments, it benefits other students as well. Students whose primary language is different than 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 if they have not received any accommodation forms that no students need accommodations. According to the US government's Digest of Education Statistics for 2018, in 2015-16, 19.4% of undergraduates and 11.9% of graduate students reported having a disability (Snyder, T.D., de Brey, C., and Dillow, S.A., 2019). Many more students may not know they have a disability because they

have never been tested. Even when students are aware of their need for accommodations, they may be hesitant to disclose a disability because they want to see how well they can manage without accommodation(s). 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

The United States, the United Nations, and many countries have developed accessibility laws or guidelines that in part were designed to ensure that digital content is fully available for everyone. Most of these laws and guidelines are based on the World Wide Web Consortium (W3C) Web Content Accessibility Guidelines (WCAG) which have the goal of "providing a single shared standard for web content accessibility that meets the needs of individuals, organizations, and governments internationally" (Web Accessibility Initiative, 2020). Appendix A provides a chart of several countries and their laws regarding accessibility.

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; this includes providing closed captioning for videos to aid the deaf and hard of hearing (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" (United States Access Board, 2017). To comply with WCAG 2.0, all pre-recorded video must be captioned and provide an audio description; live video must be live captioned.

3.3 Issues with Non-Compliance

If compliance is legally mandated (as in the US) and students cannot fully access online videos, there are ramifications for your institution. Several US universities have faced legal consequences for failing to properly caption videos. In 2017, The University of California, 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. They were both denied 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, agreeing 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 the civil rights of their students and can save the time and expense of litigation.

4 Description of the Practice

Students who cannot see video or hear audio need alternative ways to access the information According to WCAG 2.0 standards (emphasis in original):

> 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).*

There are two options for ensuring your videos are accessible to everyone. You can caption them and/or provide transcripts of the content.

4.1 Captioning Video

There are four basic ways to add captions to your videos:

- 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 Zoom sessions are recorded to the Cloud, transcripts can be automatically generated (in English only) by setting the Audio Transcript option. The transcript is a separate .vtt file which can be displayed as closed captions within the video post-recording. Microsoft Teams generates VTT format transcripts for close captioning as well, but only if recorded to the cloud in Microsoft Stream.

Microsoft Teams uses their 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 chosen by meeting organizers from a list of over 50 (Microsoft Support, n.d.). Caption data is permanently deleted when the meeting ends but transcripts can be downloaded. Google Meet also provides live captioning (English only) but captions are not recorded and don't 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 REST (REpresentational State Transfer) API.
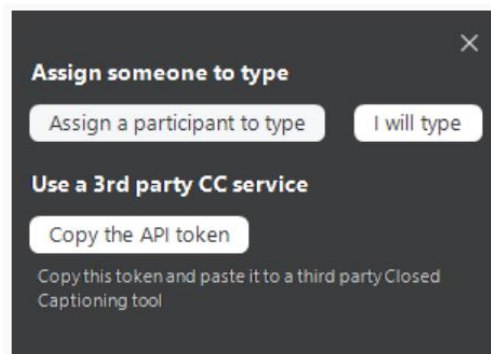

Figure 1. Screen Capture of Zoom Closed Caption Options

The selected typist enters the captions as the meeting progresses. This is not a good option 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 many saved videos to be captioned 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

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

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

There are two types of transcripts: *basic*, which are a text version of speech and non-speech audio information from a video, and *descriptive*, which also include visual information necessary to understand the content (Web Accessibility Initiative, 2019). Basic transcripts are useful for deaf individuals and people who have **difficulty processing auditory information.** Descriptive transcripts are used by deaf-blind individuals via screen readers and braille printers.

For YouTube videos, transcripts can be created by downloading and editing YouTube caption text to add any necessary information like [birds chirping] or [cell phone ringing]. After completing captions in YouTube, download them in subviewer (.sbv) format, open them in a text editor, and edit as necessary. They can then be saved in Word or PDF format for posting in a LMS; these Word and PDF transcripts are searchable so students can find specific phrases or words.

As previously mentioned, Zoom recordings saved to the Cloud and Microsoft Teams' recordings saved to Stream automatically generate editable VTT transcripts which can be downloaded, edited, and uploaded 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 they are incorporated into our LMS, Blackboard. The quick screen-capture videos recorded in Kaltura outside of class allow me to answer specific student questions by showing instead of telling. I then post the videos for all students resulting in only having to explain something once. I occasionally use videos created by others, 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 did not set Zoom to automatically start recording when the session started. 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 there are questions in the chat. I also asked them to tell me when I forget to share a screen since there is a lot of switching back and forth between PowerPoint, browser windows, and applications.

The sudden move to online teaching last spring necessitated recording of class lectures in Zoom, the tool my institution chose. We were asked not to record to the cloud, so captioning needed to be done by hand; I chose YouTube as the tool. 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 spring. While none of my students had requested captioned/transcribed videos that does not mean that students could not have benefitted from having captions available.

This semester I am teaching two online sections of a web programming class; most students are CIS minors. My institution now allows recording to the Cloud so captions and transcripts are automatically generated. Captioned videos from Zoom and Kaltura Capture are integrated with Blackboard and appear in the "My Media" section when processing is complete. Short Kaltura videos process in less than 15 minutes; the hour-long Zoom videos are usually processed within two hours of class ending.

I receive student emails if I am slow in posting videos to Blackboard courses. This may be because they want to review the material, or because they did not/could not pay attention or keep up during the class, or a little bit of both. This reflects Universal Design for Learning (UDL) principles (CAST, 2018); by providing a video recording of an online class, 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; 19 students (37.25%) have viewed captions. I received three accommodation forms this semester, none of which requires captioning, so I believe that captions are benefitting my students.

6   Lessons Learned

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

If you must create captions yourself, YouTube's auto captioning is easy but can be time consuming 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 9pm. 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 "99% completed" message was displayed. 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 is also better for student engagement and learning (Medina, 2014). Guo, Kim, and Rubin (2014) agree that shorter videos are more engaging, suggesting chunking videos into segments no more than 6 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 unable to attend the "live" course session may inadvertently fast forward over important material. Shorter videos are also more mobile-friendly for students viewing content on cell phones that 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 vides to Blackboard.

If you use YouTube for captioning, be aware that It may take several minutes to an hour (or longer) of waiting for automatic captions to be generated. They are complete when the CC symbol appears when viewing the video in YouTube. If captions do not appear after 24 hours, try deleting the video and uploading again.

The privacy of students under 18 years old may be protected by law (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 is a fundamental component of online education and it is imperative that all students have access. 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 is 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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About the Author

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.