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Captioned Recorded Lectures as a Mainstream Learning Tool
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Abstract

In Australian universities, many courses provide lecture notes as a standard learning resource; however, captions and transcripts of these lectures are not usually provided unless requested by a student through dedicated disability support officers (Worthington). As a result, to date their use has been limited. However, while the requirement for—and benefits of—captioned online lectures for students with disabilities is widely recognised, these captions or transcripts might also represent further opportunity for a personalised approach to learning for the mainstream student population (Podszebka et al.; Griffin). This article reports findings of research assessing the usefulness of captioned recorded lectures as a mainstream learning tool to determine their usefulness in enhancing inclusivity and learning outcomes for the disabled, international, and broader student population.

Literature Review

Captions have been found to be of benefit for a number of different groups considered at-risk. These include people who are D/deaf or hard of hearing, those with other learning difficulties, and those from a non-English speaking background (NESB).

For students who are D/deaf or hard of hearing, captions play a vital role in providing access to otherwise inaccessible audio content. Captions have been found to be superior to sign language interpreters, note takers, and lip reading (Stinson et al.; Maiorana-Basas and Pagliaro; Marschark et al.).

The use of captions for students with a range of cognitive disabilities has also been shown to help with student comprehension of video-based instruction in a higher education context (Evmenova; Evmenova and Behrmann). This includes students with autism spectrum disorder (ASD) (Knight et al.; Reagon et al.) and students with dyslexia (Alty et al.; Beacham and Alty). While, anecdotally, captions are also seen as of benefit for students with attention deficit hyperactivity disorder (ADHD) (Kent et al.), studies have proved inconclusive (Lewis and Brown).

The third group of at-risk students identified as benefiting from captioning recorded lecture content are those from a NESB. The use of captions has been shown to increase vocabulary learning (Montero Perez, Peters, Clarebout, and Desmet; Montero Perez, Van Den Noortgate, and Desmet) and to assist with comprehension of presenters with accents or rapid speech (Borgaonkar, 2013).

In addition to these three main groups of at-risk students, captions have also been demonstrated to increase the learning outcomes for older students (Pachman and Ke, 2012; Schmidt and Haydu, 1992). Captions also have demonstrable benefits for the broader student cohort beyond these at-risk groups (Podszebka et al.; Griffin). For example, a recent study found that the broader student population utilised lecture captions and transcripts in order to focus, retain information, and overcome poor audio quality (Linder). However, the same study revealed that students were largely unaware about the availability of captions and transcripts, nor how to access them.

Methodology

In 2016 students in the Curtin University unit Web Communications (an introductory unit for the Internet Communications major) and its complementary first year unit, Internet and Everyday Life, along with a second year unit, Web Media, were provided with access to closed captions for their online recorded lectures. The latter unit was added to the study serendipitously when its lectures were required to be captioned through a request from the Curtin Disability Office during the study period. Recordings and captions were created using the existing captioning system available through Curtin's lecture recording platform—Echo360. As well as providing a written caption of what is being said during the lectures, this system also offers a sophisticated search functionality, as well as access to a total transcript of the lecture. The students were provided access to an online training module, developed specifically for this study, to explain the use of this system.

Enrolled Curtin students, both on-campus and online, Open Universities Australia (OUA) students studying through Curtin online, teaching staff, and disability officers were then invited to participate in a survey and interviews. The study sought to gain insights into students' use of both recorded lectures and captioned video at the time of the survey, and their anticipated future usage of these services (see Kent et al.).

A total of 50 students—of 539 enrolled across the different instances of the three units—completed the survey. In addition, five follow-up interviews with students, teaching staff, and disability support staff were conducted once the surveys had been completed. Staff interviewed included tutors and unit coordinators who taught and supervised units in which the lecture captions were provided. The interviews assessed the awareness, use, and perceived validity of the captions system in the context of both learning and teaching.

Results

A number of different questions were asked regarding students' demographics, their engagement with online unit materials, including recorded lectures, their awareness of Echo360's lecture captions, as well as its additional features, their perceived value of online captions for their studies, and the future significance of captions in a university context.

Of the 50 participants in the survey, only six identified themselves as a person with a disability—almost 90 per cent did not identify as disabled. Additionally, 45 of the 50 participants identified English as their primary language. Only one student identified as a person with both a disability and coming from a NESB.

Engagement with Online Unit Materials and Recorded Lectures

The survey results provide insight into the ways in which participants interact with the Echo360 lecture system. Over 90 per cent of students had accessed the recorded lectures via the Echo360 system. While this might not seem notable at first, given such materials are essential elements of the units surveyed, the level of *repeated* engagement seen in these results is important because it indicates the extent to which students are revising the same material multiple times—a practice that captions are designed to facilitate and assist. For instance, one lecture was recorded per week for each unit surveyed, and most respondents (70 per cent) were viewing these lectures at least once or twice a week, while 10 per cent were viewing the lectures multiple times a week. Over half of the students surveyed reported viewing the same lecture more than once. Out these participants, 19 (or 73 per cent) had viewed a lecture twice and 23 per cent had viewed it three times or more. This illustrates that frequent revision is taking place, as students watch the same lecture repeatedly to absorb and clarify its contents. This frequency of repeated engagement with recorded unit materials—lectures in particular—indicates that students were making online engagement and revision a key element of their learning process.

Awareness of the Echo360 Lecture Captions and Additional Features

However, while students were highly engaged with both the online learning material and the recorded lectures, there was less awareness of the availability of the captioning system—only 34 per cent of students indicated they were aware of having access to captions. The survey also asked students whether or not they had used additional features of the Echo360 captioning system such as the search function and downloadable lecture transcripts. Survey results confirm that these features were being used; however, responses indicated that only a minority of students using the captions system used these features, with 28 per cent using the search function and 33 per cent making use of the transcripts. These results can be seen as an indication that additional features were useful for revision, albeit for the minority of students who used them. A Curtin disability advisor noted in their interview that:

> transcripts are particularly useful in addition to captions as they allow the user to quickly skim the material rather than sit through a whole lecture. Transcripts also allow translation into other languages, highlighting text and other features that make the content more accessible.

Teaching staff were positive about these features and suggested that providing transcripts saved time for tutors who are often approached to provide these to individual students:

> I typically receive requests for lecture transcripts at the commencement of each study period. In SP3 [during this study] I did not receive any requests.

> I feel that lecture transcripts would be particularly useful as this is the most common request I receive from students, especially those

with disabilities.

I think transcripts and keyword searching would likely be useful to many students who access lectures through recordings (or who access recordings even after attending the lecture in person).

However, the one student who was interviewed preferred the keyword search feature, although they expressed interest in transcripts as well:

I used the captions keyword search. I think I would like to use the lecture transcript as well but I did not use that in this unit.

In summary, while not all students made use of Echo360's additional features for captions, those who did access them did so frequently, indicating that these are potentially useful learning tools.

Value of Captions

Of the students who were aware of the captions, 63 per cent found them useful for engaging with the lecture material. According to one of the students:

[captions] made a big difference to me in terms on understanding and retaining what was said in the lectures. I am not sure that many students would realise this unless they actually used the captions...I found it much easier to follow what was being said in the recorded lectures and I also found that they helped stay focussed and not become distracted from the lecture.

It is notable that the improvements described above do not involve assistance with hearing or language issues, but the extent to which captions improve a more general learning experience. This participant identified themselves as a native English speaker with no disabilities, yet the captions still made a "big difference" in their ability to follow, understand, focus on, and retain information drawn from the lectures.

However, while over 60 per cent of students who used the captions reported they found them useful, it was difficult to get more detailed feedback on precisely how and why. Only 52.6 per cent reported actually using them when accessing the lectures, and a relatively small number reported taking advantage of the search and transcripts features available through the Echo360 system. Exactly how they were being used and what role they play in student learning is therefore an area to pursue in future research, as it will assist in breaking down the benefits of captions for all learners.

Teaching staff also reported the difficulty in assessing the full value of captions—one teacher interviewed explained that the impact of captions was hard to monitor quantitatively during regular teaching:

it is difficult enough to track who listens to lectures at all, let alone who might be using the captions, or have found these helpful. I would like to think that not only those with hearing impairments, but also ESL students and even people who find listening to and taking in the recording difficult for other reasons, might have benefitted.

Some teaching staff, however, did note positive feedback from students:

one student has given me positive feedback via comments on the [discussion board].

one has reported that it helps with retention and with times when speech is soft or garbled. I suspect it helps mediate my accent and pitch!

While 60 per cent claiming captions were useful is a solid majority, it is notable that some participants skipped this question. As discussed above, survey answers indicate that this was because these 37 students did not think they had access to captions in their units.

Future Significance

Overall, these results indicate that while captions can provide a benefit to students' engagement with online lecture learning material, there is a need for more direct and ongoing information sharing to ensure both students and teaching staff are fully aware of captions and how to use them. Technical issues—such as the time delay in captions being uploaded—potentially dissuade students from using this facility, so improving the speed and reliability of this tool could increase the number of learners keen to use it. All staff interviewed agreed that implementing captions for all lectures would be beneficial for everyone:

any technology that can assist in making lectures more accessible is useful, particularly in OUA [online] courses.

it would be a good example of Universal Design as it would make the lecture content more accessible for students with disabilities as well as students with other equity needs.

YES—it benefits all students. I personally find that I understand and my attention is held more by captioned content.

it certainly makes my role easier as it allows effective access to recorded lectures. Captioning allows full access as every word is accessible as opposed to note taking which is not verbatim.

Discussion

The results of this research indicate that captions—and their additional features—available through the Echo360 captions system are an aid to student learning. However, there are significant challenges to be addressed to make students aware of these features and their potential benefits.

This study has shown that in a cohort of primarily English speaking students without disabilities, over 60 per cent found captions a useful addition to recorded lectures. This suggests that the implementation of captions for all recorded lectures would have widespread benefits for all learners, not only those with hearing or language difficulties. However, at present, only "eligible" students who approach the disability office would be considered for this service, usually students who are D/deaf or hard of hearing. Yet it can be argued that these benefits—and challenges—could also extend to other groups that are might traditionally have been seen to benefit from the use of captions such as students with other disabilities or those from a NESB.

However, again, a lack of awareness of the training module meant that this potential cohort did not benefit from this trial. In this study, none of the students who identified as having a disability or coming from a NESB indicated that they had access to the training module. Further, five of the six students with disabilities reported that they did not have access to the captions system and, similarly, only two of the five NESB students. Despite these low numbers, all the students who were part of these two groups and who did access the captions system did find it useful.

It can therefore be seen that the main challenge for teaching staff is to ensure all students are aware of captions and can access them easily. One option for reducing the need for training or further instructions might be having captions always ON by default. This means students could incorporate them into their study experience without having to take direct action or, equally, could simply choose to switch them off.

There are also a few potential teething issues with implementing captions universally that need to be noted, as staff expressed some concerns regarding how this might alter the teaching and learning experience. For example:

> because the captioning is once-off, it means I can't re-record the lectures where there was a failure in technology as the new versions would not be captioned.

> a bit cautious about the transcript as there may be problems with students copying that content and also with not viewing the lectures thinking the transcripts are sufficient.

Despite these concerns, the survey results and interviews support the previous findings showing that lecture captions have the potential to benefit all learners, enhancing each student's existing capabilities. As one staff member put it:

> in the main I just feel [captions are] important for accessibility and equity in general. Why should people have to request captions? Recorded lecture content should be available to all students, in whatever way they find it most easy (or possible) to engage.

Follow-up from students at the end of the study further supported this. As one student noted in an email at the start of 2017:

> hi all, in one of my units last semester we were lucky enough to have captions on the recorded lectures. They were immensely helpful for a number of reasons. I really hope they might become available to us in this unit.

Conclusions

When this project set out to investigate the ways diverse groups of students could utilise captioned lectures if they were offered it as a mainstream learning tool rather than a feature only disabled students could request, existing research suggested that many accommodations designed to assist students with disabilities actually benefit the entire cohort. The results of the survey confirmed this was also the case for captioning.

However, currently, lecture captions are typically utilised in Australian higher education settings—including Curtin—only as an assistive technology for students with disabilities, particularly students who are D/deaf or hard of hearing. In these circumstances, the student must undertake a lengthy process months in advance to ensure timely access to essential captioned material. Mainstreaming the provision of captions and transcripts for online lectures would greatly increase the accessibility of online learning—removing these barriers allows education providers to harness the broad potential of captioning technology. Indeed, ensuring that captions were available "by default" would benefit the educational outcomes and self-determination of the wide range of students who could benefit from this technology.

Lecture captioning and transcription is increasingly cost-effective, given technological developments in speech-to-text or automatic speech recognition software, and the increasing re-use of content across different iterations of a unit in online higher education courses. At the same time, international trends in online education—not least the rapidly evolving interpretations of international legislation—provide new incentives for educational providers to begin addressing accessibility shortcomings by incorporating captions and transcripts into the basic materials of a course.

Finally, an understanding of the diverse benefits of lecture captions and transcripts needs to be shared widely amongst higher education providers, researchers, teaching staff, and students to ensure the potential of this technology is accessed and used effectively. Understanding who can benefit from captions, and how they benefit, is a necessary step in encouraging greater use of such technology, and thereby enhancing students' learning opportunities.

Acknowledgements

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