



THE UNIVERSITY
of EDINBURGH

Subtitling for Media Pilot Project Report

August 2019

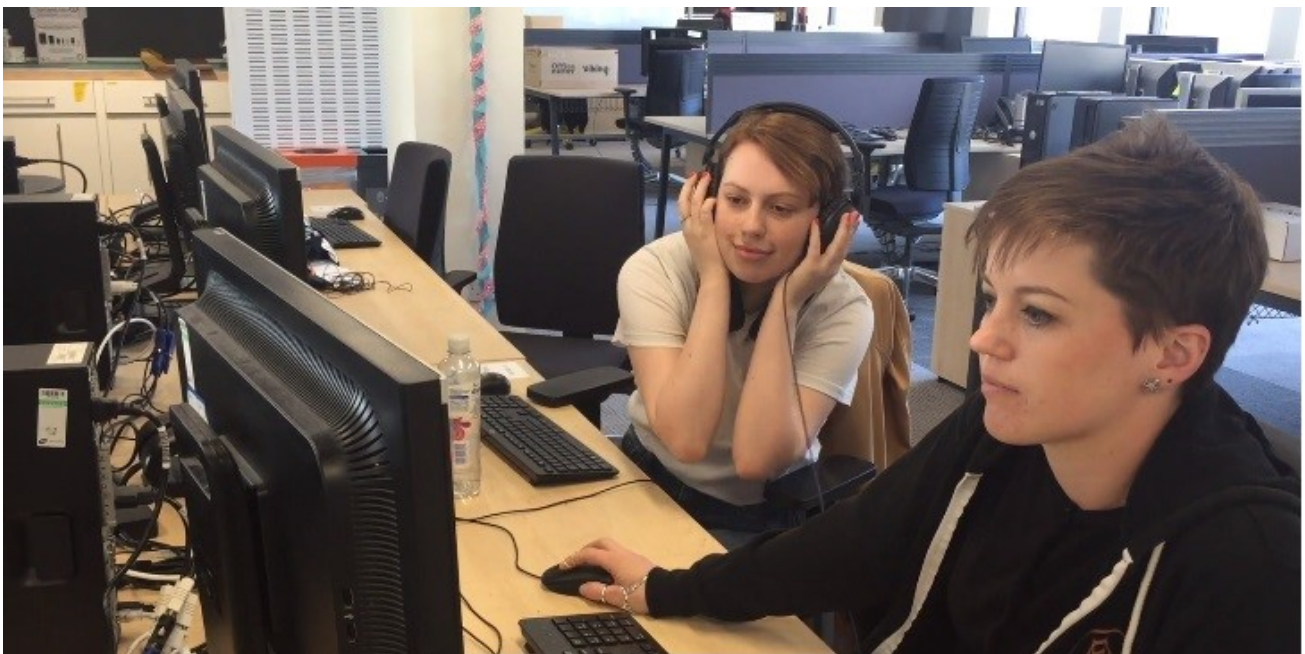


Figure 1- Student Subtitling Editors at work

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Executive Summary



Figure 2- Our ten student Subtitling Editors

Overview

The University of Edinburgh is striving to be a leader in the provision of accessible content for the benefit of all our audiences.

In support of this ambition Edinburgh ran a Subtitling for Media pilot project that:

- Investigated the feasibility, viability and cost of a student-led transcription service;
- Improved the digital skills of staff and promoted culture change;
- Carried out research and development activities.

The Subtitling for Media pilot ran for 12 weeks to mid-June 2019.

Our Approach

As new legislation is implemented on content accessibility, the pilot evaluated different approaches to the provision of media subtitling, including a student-led service and self-help through training. The project also explored research in this area and engaged colleagues across Schools and Colleges on what long-term solutions might be feasible.

The student-led service was run on an ethical basis with students working around their study and other commitments, and paid a living wage fair rate. This approach was very well received by students who felt safe, secure and valued working at the University and enjoyed the flexibility to work around their study commitments. For many of the students, the subtitling task itself was of

interest and this work complemented their area of study (for example, language, phonetics, English).

The pilot service explored a new way of working, blending automation with human intervention. Automated subtitling services are notoriously inaccurate and require checking. In the pilot service, subtitles were automatically generated and the student team acted as human mediators, checking and correcting the subtitles, drawing on their own knowledge and expertise of the HE sector in the process. Automation is effective at quickly processing large amounts of content; people are good at ensuring the right meaning is conveyed and that accurate sector-specific terminology is used.

Outputs

- We confirmed that employing students is a feasible and effective model for a subtitling service
- We subtitled 228 media [a total of 53 hours, 07 minutes play time] during the 12-week pilot
- We established average times to subtitle, and identified things that will impact the time taken (accents, technical/scientific words, sound quality)
- We produced an instructional video for staff and a Style Guide that can be used as a subtitling aid
- We ran four 2-hour workshops to develop University staff skills in subtitling, developing a successful format for ongoing training provision
- We published two videos and five blogs to disseminate information about the pilot

Key Findings

- We were able to recruit motivated and competent students, and the work pattern complemented study commitments
- Students valued the work, which they found to be meaningful and purposeful, and were able to produce high quality subtitles for varied media
- Students gained valuable experience in a positive and dynamic working environment
- Subtitling requires an investment of time, particularly if the media contains strong accents, scientific or technical content, or inconsistent sound quality
- The quality of automated subtitles continues to improve with advances in speech-to-text technology enabled by the availability of large data sets
- Staff welcomed the opportunity to attend training to improve their own subtitling capability



Figure 3- Student Subtitling Editors at work

Part 1 - What did we do?

As the use of technology in learning and teaching grows and expands, the challenges for supporting digital skills and the diversity of our University community also increase. The Subtitling for Media Project piloted a short-term service to establish whether employing students was a feasible way to improve subtitling provision for our most popular public-facing media content. The Project also aimed to support digital skills development for accessibility and inclusion, ensuring that practices become embedded into the University as core digital skills, transforming the discourse around accessibility and subtitling from a culture of disability compliance to one of digital empowerment, equality, diversity and inclusion.

The Subtitling for Media Project set out to:-

- Establish and evaluate an initial pilot service of a student-led subtitling service
- Develop a costed plan for an ongoing service including support and service management
- Make recommendations for future sustainability and resourcing, to tie into the University Planning Round
- Ensure student Subtitling Editors are trained to deliver a pilot subtitling service
- Create an ethical model for student piecework in this area
- Deliver training and guidance to enable best practice in media creation
- Develop an understanding of current and future technology to support accessibility and ensure our developing service remains in broad alignment
- Have a communication and engagement plan which will include: disseminating deliverables on this project via Teaching Matters Blog; papers to Senate Learning & Teaching Committee; Web Governance Group and presenting to the wider learning technology sector via case studies and presentations at national conferences.
- Run a small number of engagement events to understand opportunities in this area and raise awareness of the subtitling for media pilot and future service
- Demonstrate how student satisfaction, disabled access and staff capability are being addressed
- Demonstrate and document that the University is moving towards compliance with legislation

Watch our video interview with Anne-Marie Scott (Business Owner) and Karen Beggs (Project Manager) introducing the Subtitling for Media Project at <https://edin.ac/introduce-subtitling>

The video was produced, filmed, edited and subtitled by one of our Subtitling Editors, Alison Lacey. Alison is an MSc taught student studying Film Exhibition and Curation. She has an undergraduate degree in Film & Media and English Language & Literature. At Edinburgh, Alison supplemented her studies with part-time work to enable her to engage with the wider University community.

The project benefitted from input and support from the Learning, Teaching and Web (LTW) Communications Manager during the pilot phase, and a stakeholder analysis exercise helped to shape agreed key messages for the project. Senior staff were able to use these key messages to raise awareness of the work internally, resulting in an increase in nominated media for subtitling and good attendance at workshops and events. Externally, Anne-Marie Scott presented at the national Kaltura User Group which resulted in the supplier offering support for the new version of the editor (Reach2) at no cost.

Our external accessibility consultant (Pete Quinn) works with Higher Education Institutions in the UK and overseas and has confirmed this pilot is unique and puts Edinburgh at the forefront of work in this area across the sector. We should continue to promote our work and approach to others, and a poster has been accepted at the September 2019 ALT (Association for Learning Technology) Annual Conference as part of this broader communication plan. We are now well placed to build a communications plan for the next phase.

The Subtitling for Media Project ran for ten months from October 2018 and has delivered three strands of work:

[Test the feasibility, viability and cost of a student-led transcription service](#)

Ten students were each employed for 12 hours per week to subtitle public-facing media on the University's Media Hopper Create platform for three months between 25th March and 14th June 2019. Student Interns are employed across ISG (Information Services Group), and support around the recruitment process was provided by the ISG Employment Officer, Student Experience.



Figure 4- Shared workspace within Information Services

Machine-generated subtitles were applied to 228 public-facing media files and reviewed by Subtitling Editors who were tasked with correcting grammar, word errors, punctuation and

synchronisation of the subtitle track and audio. The students gained paid work experience and new digital skills, adding to the existing thriving market in the local region of students who offer proofreading, transcription, audio typing, subtitling and translation services. This pilot had a specific aim to help us understand what would be needed to establish a sustainable, ethical programme of work.

Student recruitment, training and workload management

The ten Grade 03 student experience posts were advertised on the University's internal job board (MyCareerHub), open to any current University of Edinburgh student with strong English language and accurate word processing skills. Thirty-four applications were received and 14 were invited to interview. All students had a specific interest in subtitles and language, and all but two had a relevant previous degree or were currently studying a language-related subject (e.g. Linguistics, Phonetics, Literature or Journalism).

Subtitling Editors attended two days of face to face training in Argyle House, delivered by the Digital Skills Team. This included a deaf awareness session, delivered by a lecturer in Deaf Education from Moray House and two deaf or hard of hearing students who shared their own experience. The training included a large practical element, giving the Subtitling Editors an opportunity to use the editing software and become familiar with the Style Guide developed by the Project Team.

Desk space with dual monitors was available in a bank of hotdesks on floor H-West of Argyle House near the Digital Learning Applications and Media team where a number of members of the Project Team are based. The Project Team included a number of staff within the Learning, Teaching & Web Directorate (see Appendix 1 for information about membership and responsibilities of the Project Team and Steering Group). Home working was available if required but students chose to work from the office for the vast majority of the time. Students were given a pair of good quality noise-cancelling headphones when they started their contract.

It was anticipated that a proportion of work would be done from home, and so Microsoft Teams was used to manage team communication. A shared calendar was added to Outlook and shifts were added by the Project Manager. This was important to keep up to date, as the Media Team (the Media Hopper Create Service Team) had to manually update Kaltura permissions every morning for Subtitling Editors working that day. Students were able to choose their working hours (12 hours per week, Monday to Friday 0800-1800) to suit studies and other commitments.

In total, the Subtitling Editors worked for 1,312 hours over 12 weeks. Argyle House was a good location in terms of proximity to LTW colleagues and ready access to the Project Team. Three or four students worked from home from week six, but all continued to work from the office for at least part of the week and all students stayed for the whole pilot.

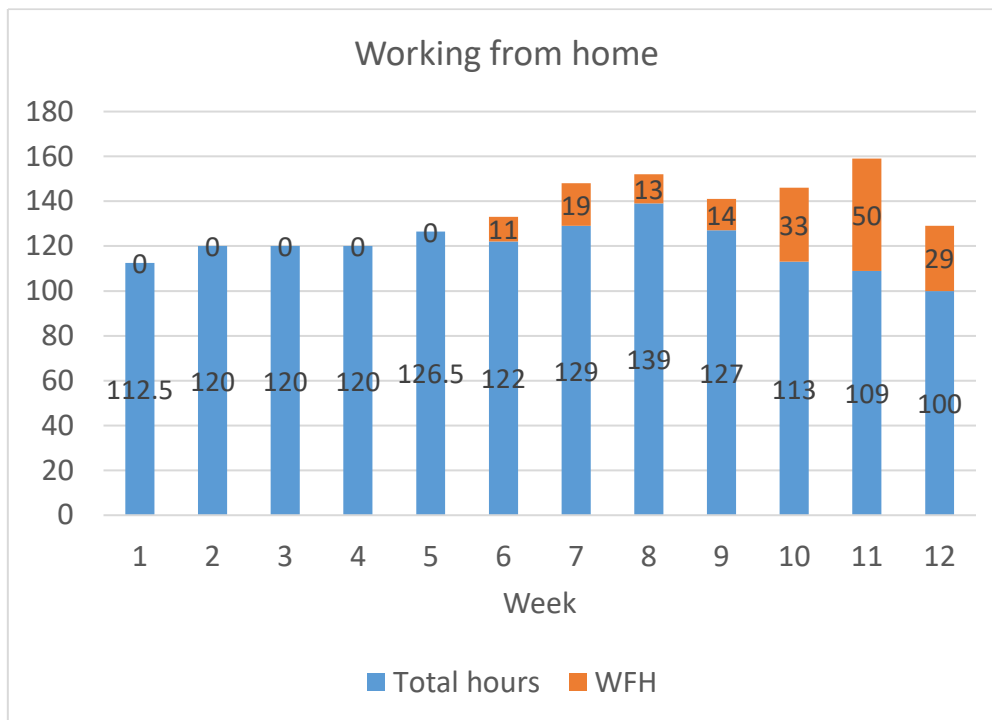


Figure 5 - Working from home

A Planner (a workflow visualisation tool) was added to the Teams site which was used to manage and capture workflow, status and allocation of tasks. Every media file included in the pilot was added as a 'card' on the planner and visible to all team members. Cards were allocated to Subtitling Editors so everyone could see who was working on what media. 'Buckets' (e.g. Captions Requested, Ready for Peer Review, Query, Done) were used to give a visual record of progress. All team members could edit and move cards and were encouraged to add comments to cards to give regular status updates or indicate if a card was available for someone else to pick up. Initially the Project Manager allocated tasks to specific team members, but after the first few weeks the Subtitling Editors began to manage their own and others' workflow a little more independently.

Teams has a phone app, and notifications can be managed by the user. A number of Channels were added for instant message communication on various topics. This enabled Subtitling Editors to catch up on messages they had missed when they were next working.

Face to face team meetings were arranged every two weeks for an informal catch up with the Subtitling Editors and Project Team members. Two meetings had to be arranged each week so that all Subtitling Editors had the opportunity to attend while on shift. Notes of meetings were kept in a shared Notebook which was stored in Teams.

The subtitled media

We began by identifying the 50 most viewed media on Media Hopper Create, of which six were already subtitled. We then contacted the web publishing community across the University to request additional public-facing audio or video media on Media Hopper Create to be subtitled during the pilot. One hundred and twenty-two media (54%) were nominated by colleagues for subtitling. The nominated media tended to be longer (total media play time of 16 hours and 09

mins with a mean length of 19.35 mins) than media identified by the Project Team (total play time of 9 hours and 5 mins with a mean length of 9.06 mins).

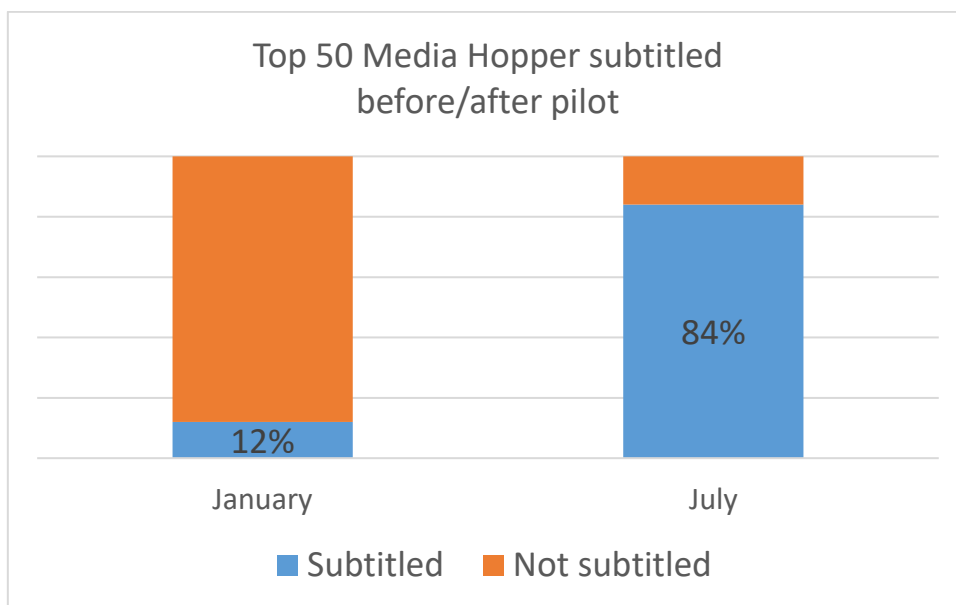


Figure 6- Top 50 subtitled before/after pilot

Just under half of the media subtitled were information videos for students, for example how to apply for a visa, information for offer holders or how to access university services. Around a third were course materials from Massive Open Online Courses (MOOCs) or other open access courses, and the remainder were guest lectures, information for staff and a small number of podcasts.

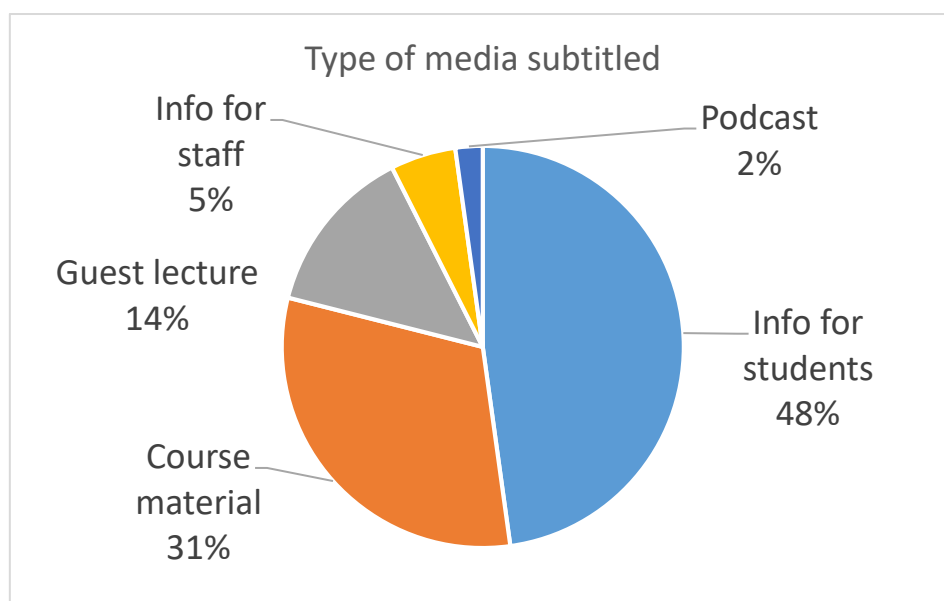


Figure 7- Type of media subtitled

Subtitling Editors recorded details of subtitled media to capture any issues and the time taken on a web form, capturing details that had been added to the cards in Teams. In total, 228 media were subtitled, with data captured for 224 of these.

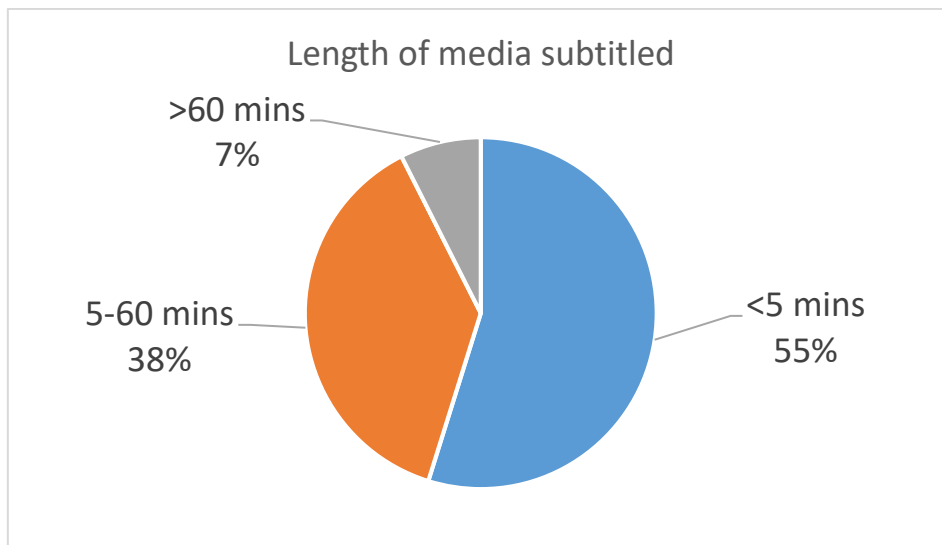


Figure 8- Length of media subtitled

Only a handful of the files we chose to subtitle had transcripts, but where these did exist, they were very helpful as a quality check for the Subtitling Editors. A transcript can be an invaluable aid in checking names or uncommon terms.

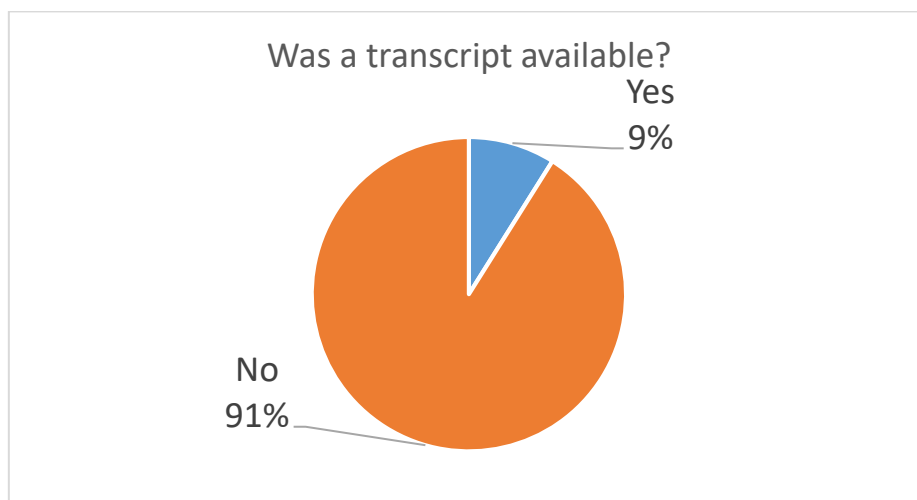


Figure 9- Was a transcript available?

The majority of media files were straightforward to subtitle, but accents, non-standard words and audio quality affected the time it took for 40% of media files. Of these, 62% had scientific/technical words (not surprising in a Higher Education institution), 13% non-English words and 25% had variable audio quality.

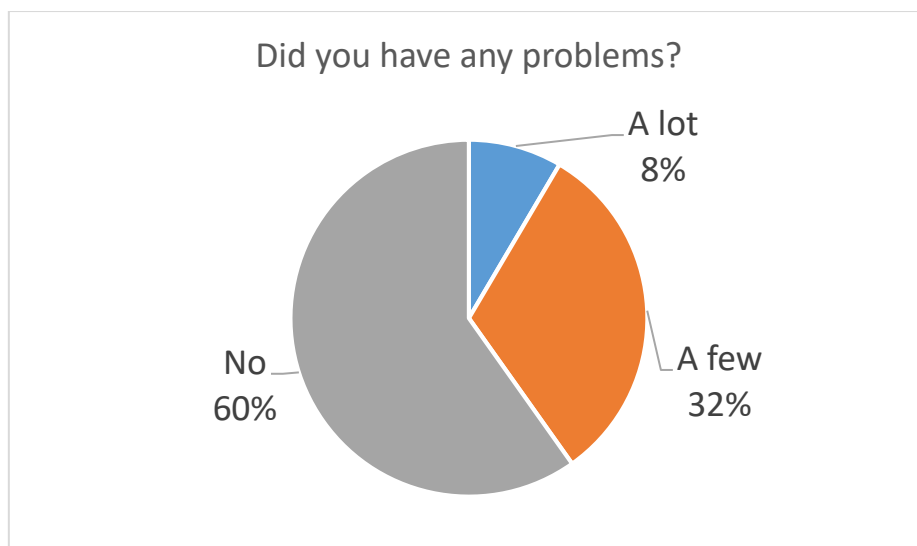


Figure 10- Did you have any problems?

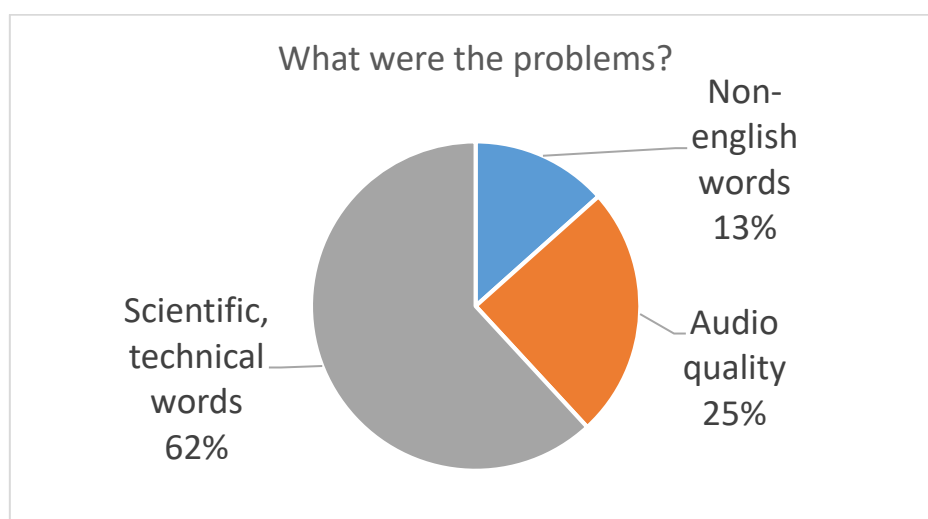


Figure 11- What were the problems?

Automated captions were requested by the Media Team from Ceilo24, via Kaltura, the Media Hopper Create provider. These were applied to the media within hours and visible to anyone viewing the video. An additional level of permission was added by the Media team every day to ensure the Subtitling Editors were able to edit captions (this permission is usually restricted to media owners / co-editors). Timing of caption requests was managed carefully to ensure there was a Subtitling Editor available to begin the editing process as soon as possible.

Subtitling Editors used the Cielo24 editor within Media Hopper Create website to correct and adjust subtitles, aiming for 100% accuracy. The quality of the automated captions and the length of the video determined how long this took. Subtitling Editors used internet search and asked colleagues to identify or confirm medical, scientific, technical or other unfamiliar terms or names. Corrections were applied as the Subtitling Editors worked through the captions and a final full review of the corrected captions was completed by a second Editor. The content owner was contacted once the editing process was finished and any [INAUDIBLE] words or sections were identified to allow them

to make further corrections. A basic instruction sheet was included to show them how to use the editor.

Research and development

The accuracy of machine-generated subtitles is influenced by many factors such as sound quality, speech characteristics (accent, hesitation, and volume), content (abbreviations, scientific or technical language) or poor synchronisation of the subtitle track and audio. Speech recognition technology is an emerging field, already influencing our engagement with technology at home and at work through devices that respond to spoken commands and virtual assistants. As speech-to-text technologies develop, the need for human correction of subtitles should reduce over time as the accuracy of automated outputs improves.

To ensure the University has sight of technology trends in this area to understand how they might influence service development over time, the Project Team ran an event for staff (“I’m sorry, could you repeat that?”) with guest speakers from the University’s Institute for Language, Computation, and Cognition (ILCC) and Quorate Technology. The Project Team had a number of meetings with Professor Steve Renals (Chair of Speech Technology, ILCC) and with Quorate Technology to begin to understand technology developments and how we might take advantage of opportunities for funding or partnerships in this area.

Students with adjustments for subtitling

The Student Disability Service runs an annual survey for all students with Adjustments, and this year a number of questions relating to subtitling were added, to gather feedback directly from students with adjustments for subtitling about their experience.

Improve digital skills and promote culture change

The University continues to aim to move towards a culture where subtitling our media is standard practice at the point of creation, not only because of changing legislation but because it promotes engagement with our media for the benefit of our whole audience, whilst promoting digital literacy and digital skills. To achieve this, the Project Team ran a series of training workshops for staff facilitated by the Digital Skills Team to increase awareness of good practice in subtitling and to improve practical subtitling skills using the software available through Media Hopper Create and other platforms. These workshops have been scheduled to run several more times beyond the end of the pilot as feedback suggested they were very useful as an ongoing offering.


Subtitling workshops for staff

Four two-hour long workshops were held in Argyle House for staff, designed and run by the Digital Skills Team. One of the Subtitling Editors attended each workshop to give a demonstration of using the Cielo24 editor and answer questions about the process. The workshop included a practical session where attendees were able to edit subtitles themselves using the Cielo24 editor. They were also shown how to use YouTube to generate an SRT (caption) file by uploading a transcript, then applying this to a video in Media Hopper Create. Pros and cons of various tools were discussed.

Part 2 - What did we learn?

What did we learn about employing students as Subtitling Editors?

A number of colleagues had questioned whether students would be interested in the work and whether it would be a satisfying job. The number of applications we received, the quality of the applicants and the 100% retention would suggest it is a suitable and fulfilling role. Subtitling Editors were treated as staff members throughout, which reflected in the positive feedback they provided.



“Pay, hours and holidays are very reasonable for a student part-time worker. I especially appreciate the flexibility in working hours...the job fits well in my studies”

“Feel like a professional, like a working employee, not a student / being spoon-fed”

“Responsible and accountable ourselves”

“I really liked that towards the end we got more autonomy in being able to request our own subtitles etc”

The Subtitling Editors co-wrote a blog introducing the team, outlining their reasons for applying and expectations of the role <https://edin.ac/subtitling-team>



“Work environment is casual and dynamic as well.”


“Being able to make up and think through solutions to problems was definitely the most fun!”

“Like the open area and all the board games, sticky notes, brainstorming tools that help us engage in discussion.”

“I like the way this pilot scheme keeps exploring / experimenting new ways to improve the subtitling service and SOP. Every colleague is open-minded and ready to try new things.”

The Subtitling Editors commented that they liked the open plan office environment, although it could sometimes be noisy, and they appreciated the provision of large dual monitors and headphones.

Some students wanted more hours and there were adjustments to hours every week to enable the students to fit work around studies and other commitments.



“Teams/Planner - worked really well; easy to use, quick to use and communicate or post any issues.”

“Check-in meetings contributed to the feeling of being part of a team working towards a common goal.”

“Meetings were great for bringing everyone together and sharing experiences, also for developing solutions and structures that we needed for the process.”

The use of Microsoft Teams worked well and face to face team meetings provided an opportunity to discuss issues or queries and develop relationships. This was an important aspect of developing a team as the work was very isolated and focussed.

Read more about the Subtitling Editors’ experience of working on the Subtitling for Media Project in this blog post - <https://edin.ac/subtitling-day>

We encouraged the Subtitling Editors to discuss and agree solutions to queries about subtitling style and other issues and used the team meetings to trigger this discussion. We used creative approaches to problem solving, in line with the general Learning, Teaching and Web Directorate culture.

The Subtitling Editors had a sense of satisfaction from the work itself, and their particular interest in language and subtitling probably contributed to this. Some of the longer videos took a long time but the variety of topics sustained interest.

We had anticipated subject knowledge might be an advantage in providing good quality subtitles and sustaining interest. Although it was helpful to be able to identify specific terms e.g. medical or mathematical, the students were resourceful in seeking out information on the internet or with colleagues, which meant unfamiliar topics were not a problem. The quality of their grammar, spelling and understanding of the English language and cadence of subtitles far outweighed the need for them to be subject experts. Some Subtitling Editors told us that they particularly enjoyed learning about unfamiliar topics.



“Satisfied when video is finished editing after a shift.”

“Work was usually not too easy and not too difficult.”

“The work itself could range from entertaining to slightly tedious, if you worked on a tricky video.”

“Loved the diversity of video topics.”

The Subtitling Editors found the work interesting, satisfying and flexible around University commitments. One of the students blogged about the experience - <https://edin.ac/intern-expectations>

Find out more about the Subtitling Editors and what they enjoyed about the subtitling work by watching the second video by Alison Lacey who interviewed the team of Subtitling Editors about their experience - <https://edin.ac/subtitler-interviews>



“Enough desk space, good computers, nice view from office.”

“I didn’t enjoy working from home – isolating and I missed the big monitor.”

“Being surrounded by people in the open plan office was great. A good, focussed atmosphere.”

What did we learn about subtitling?

Just over half of the media subtitled were under five minutes in length, with seven percent over an hour in length. How long subtitling took varied depending on the length of the file and how difficult the content was to subtitle. Automated captions were of variable quality and, although English words were always inserted, sometimes the nuances of meaning were missed by the algorithm.

The accuracy of automated subtitles was affected by accents and other voice characteristics, non-standard terms (e.g. non-English, technical or scientific words or names) and sound quality. It is important to note that automated captions are visible on the media as soon as they are returned from the supplier, so timely editing is important if media are available on a public channel.



Figure 12- Automatic captions not always accurate

"I must admit, it gave me a bit of a giggle and I was just wondering your thoughts on how you could be in that situation yourself"



Figure 13- Automatic captions not always accurate

"the more I've looked at subtitling platforms, the more I've looked at subtitling services"

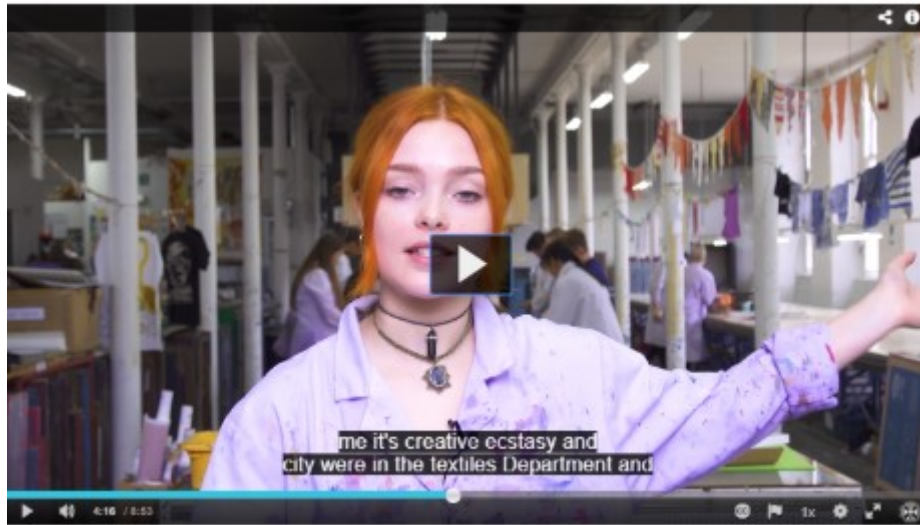


Figure 14- Automatic captions not always accurate

"...for LEAPS creative extras week, and we're in the textiles department and..."

The number of days taken to complete editing and peer review varied greatly, with an overall average (mean) of eight days from the initial request to completed editing and peer review. For media with no issues (i.e. standard words, good quality automated subtitles) the average turnaround was three days and for media with multiple issues the average turnaround was 24 days. We tried to avoid multiple people working on a file to maintain internal consistency of style, so this lengthened the turnaround time for long media.

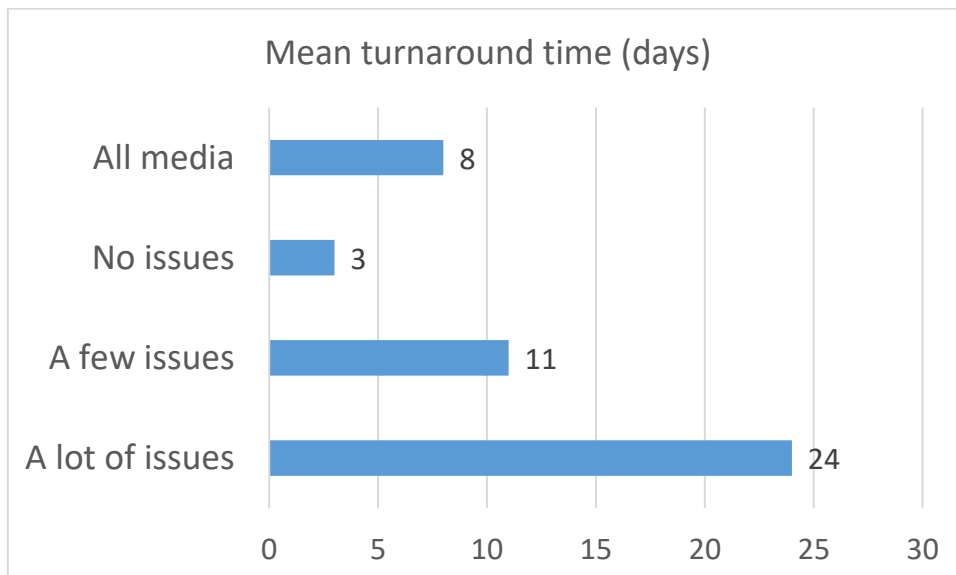


Figure 15- Mean turnaround time (days)



SUBTITLING TOOK AN AVERAGE OF 15 MINUTES PER MINUTE OF CONTENT

For all 224 media files:

- The mean time from start to finish **per minute of content** was 14 minutes 55 seconds (median 13 minutes 27 seconds)
- The quickest file was completed in only 1 minute 35 seconds per minute
- The slowest took 1 hour 6 minutes per minute of content.

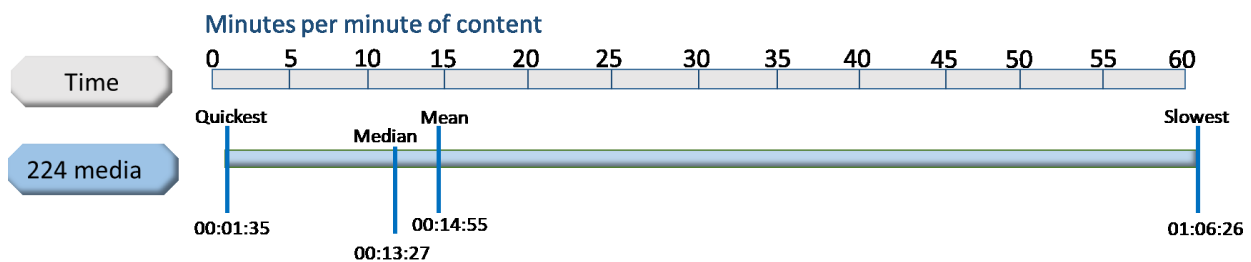


Figure 16- Minutes taken per minute of content

Media owners did not expect immediate turnaround of subtitled media, although we received one request to produce accurate subtitles for a high-profile, 90-minute public lecture with no transcript within six working hours. Even our limited high-priority, paid service with Kaltura offers a turnaround of 48 hours. A test run of a similar video from the same speaker indicated we could complete around 42 minutes of content within ten working hours with a Subtitling Editor working on nothing else and with limited breaks.

Adjusting timings was the most time-consuming part of editing. Subtitling Editors tried to align the caption with the speaker as accurately as possible, as poorly aligned captions had been highlighted as a particular frustration of the two students who helped deliver the initial training.

Perhaps not surprisingly, the accuracy of the automated subtitles impacted the time it took to edit and correct subtitles. Although the majority (60%) of the files subtitled were categorised as straightforward, the files that had a lot or a few 'issues' took significantly longer to edit and perfect.

“Very clear audio, but speaker’s accent/inflections were tricky to decipher”

“A very, very strong non-native accent made it necessary for the video to be almost hand transcribed”

“Lecturer stutters a lot, also bad mic. management”

The 'issues' were broadly categorised as scientific or technical words (62%), audio quality (25%) and non-English words (13%). To try to identify scientific/technical/non-English words, the Subtitling Editors searched the internet or asked a colleague, but for 38 media there were still words that could not be identified. These were highlighted to content owners along with instructions on further editing.

Subtitling editors tested transcribing by hand instead of using the automated captions, but this was extremely time consuming as time stamps then had to be added from scratch by hand. All agreed that even when the automated captions were poor quality, they were still quicker to correct than starting from scratch.



WE FOUND THE AVERAGE TIME TO COMPLETE SUBTITLING DOUBLED TO 24 MINUTES PER MINUTE OF CONTENT FOR THE MOST DIFFICULT MEDIA

Media quality greatly affected how long subtitling/editing took

Minutes taken per minute of content (minimum, mean & maximum) to correct words and punctuation, adjust timings and complete a full review by a second person

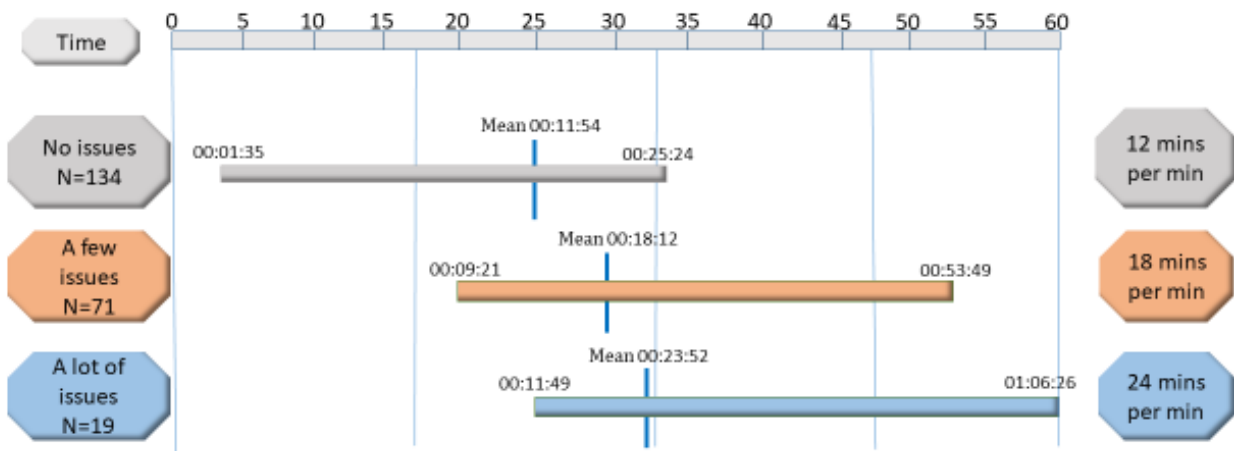


Figure 17- How did media 'quality' affect time to subtitle?

How long will it take me?


How long is it likely to take?

	No issues	Average	Accents, technical words, sound issues
1 minute	2 – 25 mins	15 mins	12 – 66 mins
5 mins	10 mins – 2 hours	75 mins	60 mins – 15 hours
30 mins	1 – 12.5 hours	7.5 hours	6 – 33 hours
60 mins	2 – 25 hours	15 hours	12 – 66 hours

Figure 18- How long will it take me to subtitle?

Demand for subtitling

There is clearly a demand for support with subtitling, and a recognition that producing good quality subtitles is time-consuming. Staff attending the subtitling workshops were keen to take the bulk of this work on themselves, however it was noted that there seems to be a general increase in the volume of video content being produced. The expectation is that the proportion of teaching and informational materials using video format will continue to increase. Making sure these are accessible to meet the legislative requirements and to improve accessibility for non-native English speakers and people who use subtitles for other reasons, was a general principle discussed by staff we spoke to.



“Very helpful to know that there is capacity for us to subtitle content ourselves - though can't say strongly enough how much of a burden the subtitling team has eased for me, mostly in terms of time needed to edit!”

“I think the point to make here is how brilliant it has been to have content a) automatically subtitled and b) checked and amended by student editors. It has been such a huge time saver for me. I would never be in this position of having so much content subtitled without this support.”

“I only expected two or three of my videos to be actioned. What a terrific surprise to be told that all 19 of my videos in my project were actioned. This makes the entire online Offer Holder Resource more accessible. Thank you so much!”

“This was absolutely fantastic and made extremely easy. Even being led to edit the minor word correction in your email was great. Thank you.”

“I really value the time and the effort of the subtitling pilot team with regard to this – the service has been a huge help to me.”

A central service would help ensure high-profile, public-facing video content is accessible and would support staff who have a high volume of content to subtitle.

Technical considerations

We tested the accuracy of Kaltura's automated captions on short (under four minute) extracts from two videos of around 500 words in length. Accuracy was calculated as follows:

$$(Number\ of\ words - number\ of\ errors) \times 100 = accuracy\ (\%)$$

Errors included number of deletions (words not in the transcripts but audible), substitutions (words that are wrong in the transcripts) and spelling errors (American spellings, numbers or capitalisations). The accuracy rate for the first video was 71.8% and the second video was 90.5%.

We did experience some technical problems during the pilot that affected around 24 media files. These were either unable to be played, unable to be edited or unable to be saved. This was escalated to the supplier and the issues persisted for a number of weeks for some files. This undoubtedly skewed the turnaround time for some media. The issues have now been resolved by the supplier.

The supplier applied a profanity censor to the automated captions as is standard practice, showing the word as ***** on screen. Although only a small number of words were censored, the editing software did not allow the filter to be over-written manually. The University does not wish a profanity filter to be applied and this has been raised with the supplier to ensure the organisation is able to control this.

Only content owners and co-editors are able to edit captions on their media files. For the duration of the pilot, manual adjustments to permissions had to be made every morning for all Subtitling Editors working that day. This was done by the Media Team before 8am and would not be sustainable over the long term. The supplier has confirmed that the new version of the subtitling provisioning service (REACH version 2) has the option for assigning persistent full access to the tool, which would allow permissions to be managed more readily.



Figure 19 - Panel discussion at Showcase Event

Digital skills – subtitling workshops for staff

We wanted to support staff in being able to subtitle their own media and held four two-hour Subtitling workshops open to all staff in June 2019. Workshops were designed and delivered by the Digital Skills team and one of the Subtitling Editors was on hand to provide a practical demonstration and answer questions. Almost 50 staff attended from across the University. Some had experience of subtitling and many noted that they are increasingly being asked to produce or support video content. Awareness of accessibility regulations was high amongst the staff who attended.

The workshops included a demonstration of the Cielo24 editor by one of the Subtitling Editors, a demonstration of using YouTube to upload a transcript then applying the transcript to a video on Media Hopper Create, and a practical element where participants were able to use the Cielo24 editor to edit captions on a test video. Information about optimising the quality of automated captions was given, with practical tips around microphone use, the use of music and multiple speakers and the importance of transcripts in making the subtitle checking process easier. Extracts from videos from deaf / hard of hearing students at Edinburgh and Oxford Universities provided a first-hand perspective on the importance of getting subtitles right.

“I liked the video from the lecturer and deaf students that was very insightful, and also useful to watch a practical demonstration of the actual process of subtitling by a very capable student!”

“I thought it was one of the best IS training courses I've attended, in terms of use and interest.”

“It would be good to have this course mainstreamed into provision, as I would like to tell others about it!”

“It was great, having multiple presenters and including a student who had worked on the pilot to speak first-hand about their experiences.

Some concerns were raised about using external platforms to host University content, particularly YouTube, where ownership and copyright can be complex. The University's own media platform (Media Hopper Create) is integrated with Learn and other University systems (e.g. EASE authentication) and allows the content owner to control access and edit rights easily. Its built-in editor allows the owner to create and edit subtitles, and to add a transcript if there is one. However, some staff were comfortable with using YouTube and other platforms for non-sensitive media. Feedback from the staff workshops was overwhelmingly positive. Based on the positive feedback and the demand for places, the Digital Skills team has scheduled an ongoing programme of workshops for staff and an instructional video is also available - <https://edin.ac/subtitle-media-hopper>

Research, development and events

As technology continues to improve the accuracy of speech to text recognition, the quality of automated subtitles should also improve, reducing and perhaps removing the need for human intervention over the long term. This means whatever we set up as a service to support subtitling in the short term is unlikely to be a long-term solution.

To raise awareness of current technology and research work, we ran an event in May 2019 attended by around 45 University staff called “I’m sorry, could you repeat that?” We held a series of meetings with Prof Steve Renals, Professor of Speech Technology in Edinburgh University’s own Institute for Language, Computation and Cognition (ILCC) and Prof Renals spoke at our event in May, sharing useful information about some of the barriers to high quality speech recognition.



Figure 20 - Information sharing at the Showcase event

We also worked with Quorate, a University spin-off company specialising in speech technology and automated solutions to captioning. They develop custom speech models, building up language engines that match and learn from the language context of their customers. Building these custom models requires large data sets but after the models are developed they produce extremely accurate captions, both live and post-event, with little or no need for human intervention. Quorate shared their experience at the May event, providing attendees with an insight into the practical application of automated speech engines.

To find out more about the event, read the blog - <https://edin.ac/subtitle-benefits>

In July 2019, we ran a Project Showcase event attended by over 40 University staff, sharing the work of the pilot and continuing the dialogue around subtitling. Staff expressed an interest in an ongoing service for subtitling, but recognised that subtitling was a shared responsibility that anyone producing or using content should be aware of and working towards.

Professor Tina Harrison and Anne-Marie Scott contributed to the Teaching Matters Accessibility mini-series with this blog titled “Student subtitling project to improve accessibility of online media materials” - <https://edin.ac/subtitling-miniseries>

Part 3 - What's next?

There is still a large volume of public-facing content on Media Hopper Create that is not subtitled. New content is being added regularly, and staff attending the subtitling workshops noted a general increase in new video content. There is a general awareness amongst staff of the legislative requirements to provide subtitles, and a willingness to do this. However, there are capacity and time barriers; the pilot confirmed that high quality subtitles can be time consuming to produce, and technology is not sufficiently mature that we could afford to subtitle all content we might produce. Dedicated time and a quiet environment with high quality noise-cancelling headphones can also be difficult to secure for support staff who are often asked to edit subtitles.

Students with a Schedule of Adjustments including subtitles have reported that there is room for improvement in the provision and quality of subtitles in the teaching material they use. Again, although staff may be willing to do this, time and confidence in using the editing tools available may be limited.

Recommendations

- The pilot demonstrated grade UoE3 attracted high quality candidates, and student Subtitling Editor posts should be advertised at this grade for a future service
- It is important to offer flexibility in scheduling student workers to enable them to work around study commitments. This requires a modest weekly management overhead
- Regular team meetings should be scheduled to sustain student buy-in and enable creative problem solving
- Dedicated desk space in Argyle House is important for providing a supportive work culture
- Subtitling Editors should be supplied with mid-range (~£60) noise-cancelling headphones that they are allowed to keep at the end of their contract
- Dual monitors are required for efficient subtitling editing
- Kaltura's updated Reach 2 editor should be in place to prevent the need for manual, daily setting of permissions required with Cielo24
- Time should be invested in looking for ways to reduce the effort required in alignment for a "quick win"
- Permission should be sought for all subtitling work
- Investigate commercial opportunities with Quorate
- Communication and service definitions will be very important for any follow-on service to manage expectations

Establishing a follow-on Service

To take forward the recommendations and learnings from this pilot, a project will run in Semester 1 2019/20 to establish a centrally supported subtitling service. The project will deliver the following:

- ISG support for subtitling high priority media content (high-use public facing or required for students with adjustments). This will be staffed by a small number of student Subtitling Editors as per the pilot project and have a clear service definition outlining the scope and constraints of the service.
- A training programme to support any School who wants to employ their own student Subtitling Editor. Students would use the same technologies and working practices as ISG, and be included within a network of student Subtitling Editors for support.
- An ongoing Digital Skills offering to support anyone who needs to learn how to create their own subtitles.
- Exploration of a commercial opportunity with Quorate for more accurate automated subtitling. If something could be made to work for us, there may be opportunities for the sector as a whole.



Figure 21- Staff at our Showcase event

Appendix 1

Survey results from students with adjustments for subtitling June 2019

Background

A survey was sent to 2,400 students registered with the Student Disability Service (SDS) in May 2019 and a number of questions relating to subtitling provision were included to inform the Subtitling for Media Project.

The results below are from 16 students who completed the survey and who have a Schedule of Adjustments that includes "when using audio visual presentations, subtitles must be provided". It has been noted that there are students who have a hearing impairment who have not identified themselves with the Student Disability Service, so we do not know how representative the result are.

Free text comments

It is worth bearing these comments in mind when interpreting the data below.

- I did not observe that there were any subtitles, however they would not have helped as I am sight impaired as well. Reading subtitles would have been difficult.
- There were no audio clips at all, lectures were not recorded
- Short video clips but no subtitles

Responses by School

Responses were received from 11 of 21 Schools, with a single response from most, and four schools with two students completing the survey.

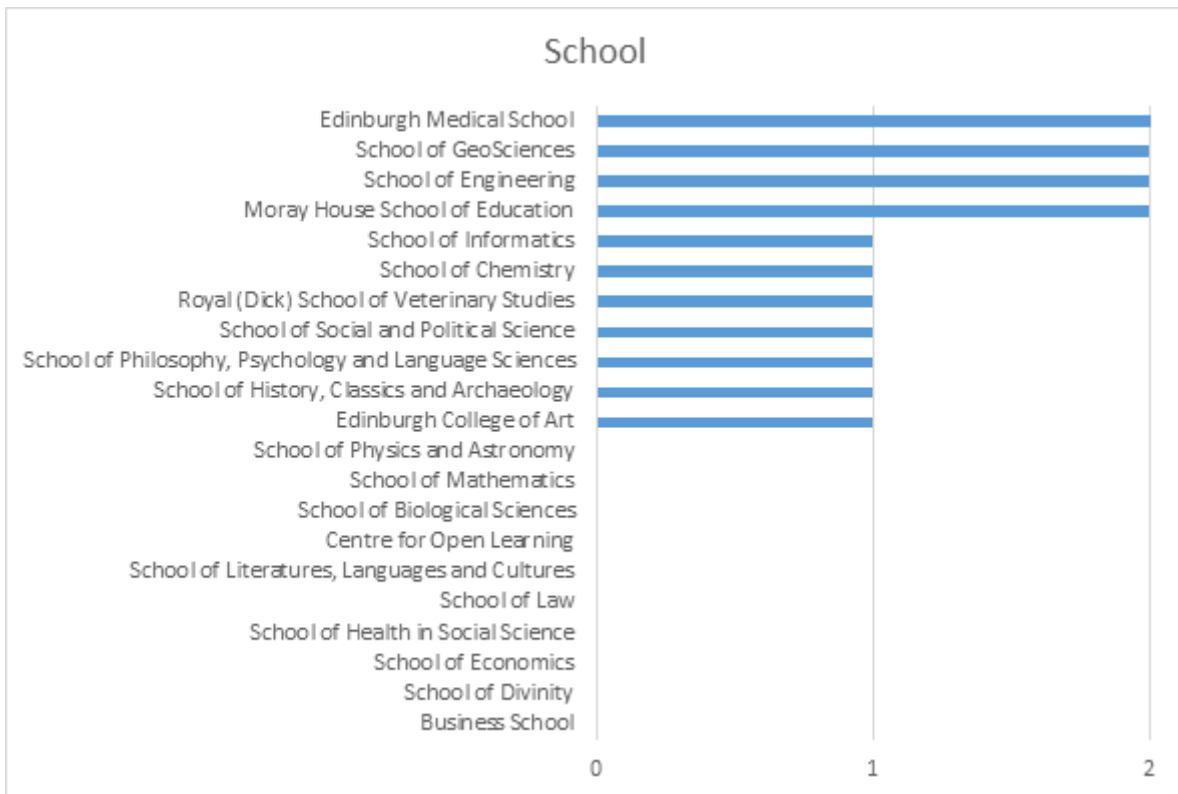


Figure 22- Responses by School

Responses by stage of study, showing 81% of responses (13) from undergraduate students.

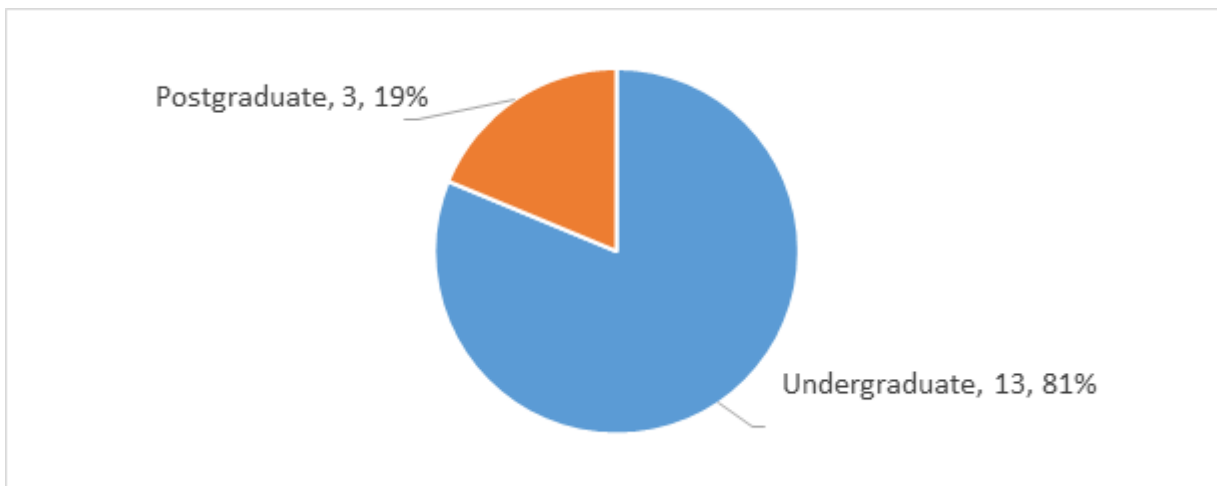


Figure 23- Stage of study

Eighty-one percent (13) of students reported video or audio clips were used in their courses this year.

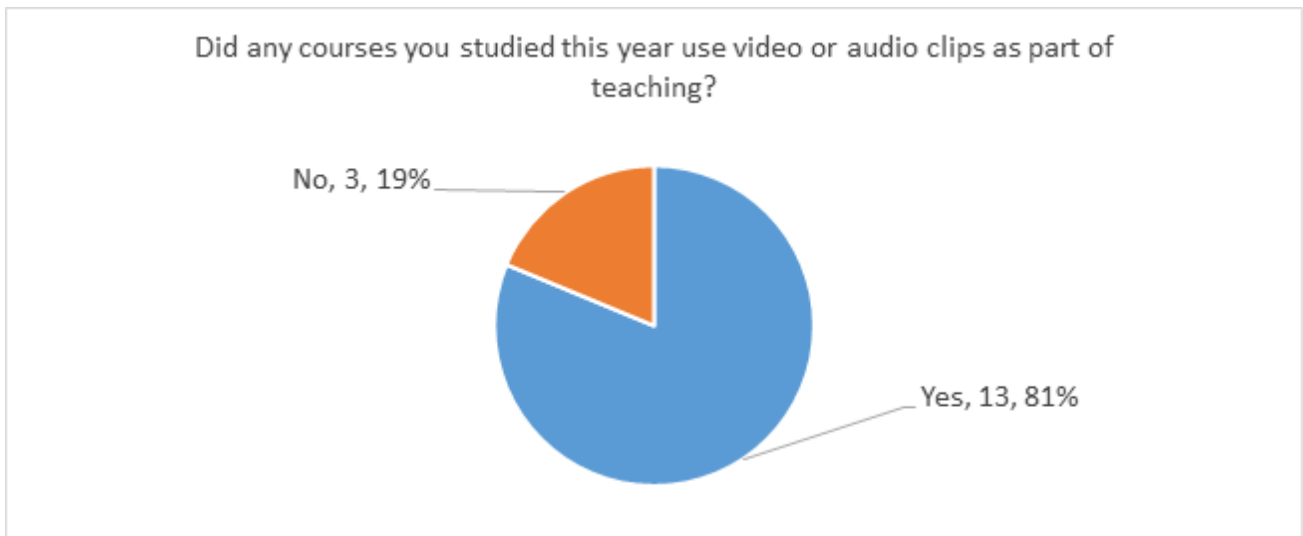


Figure 24- Did courses use video or audio clips?

Of the 13 students whose courses included video/audio clips, 69% (9) reported that these did not have subtitles.

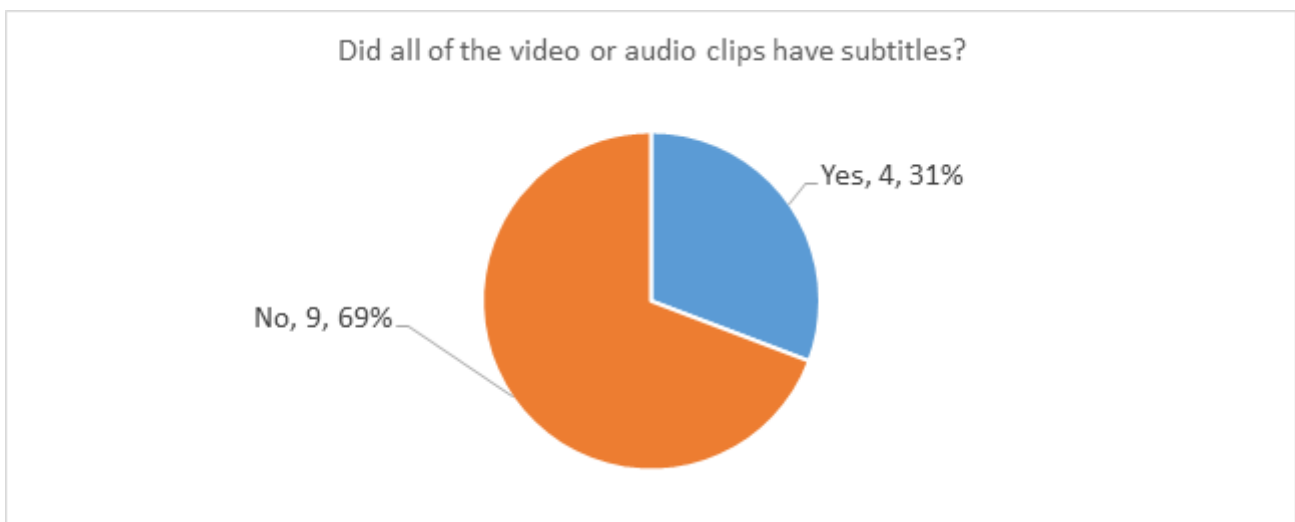


Figure 25- Did all of the clips have subtitles?

Only three (27%) of these students reported that there was a process for requesting subtitles.

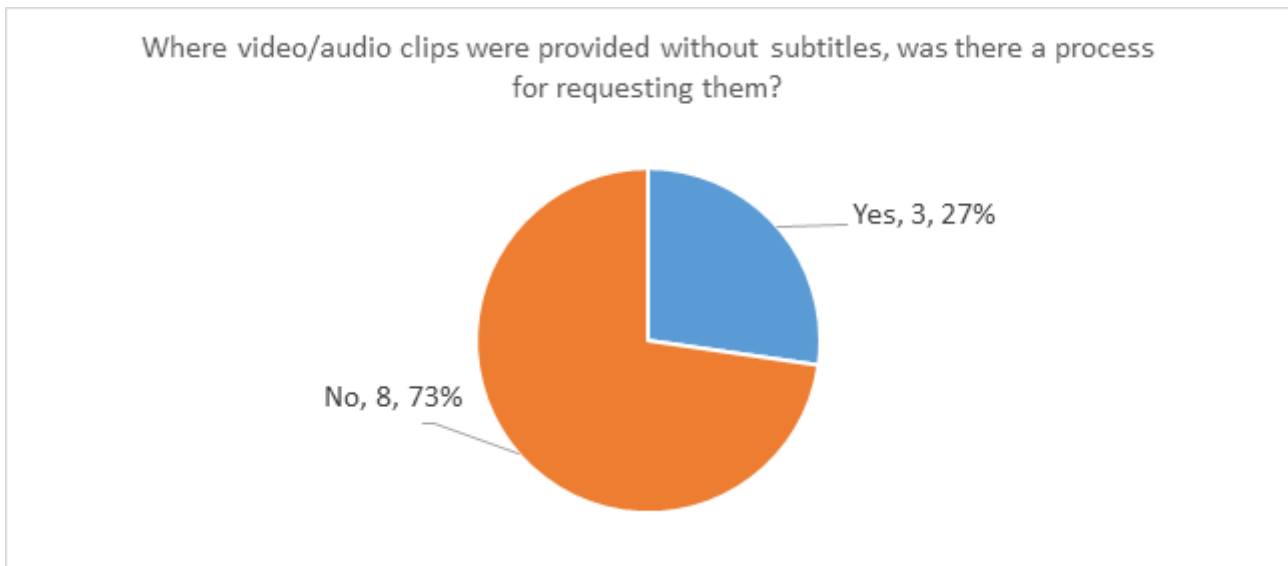


Figure 26- Was there a process for requesting subtitles?

Less than half of students who requested subtitles for media (2 students) reported that they were satisfied with how this was done.

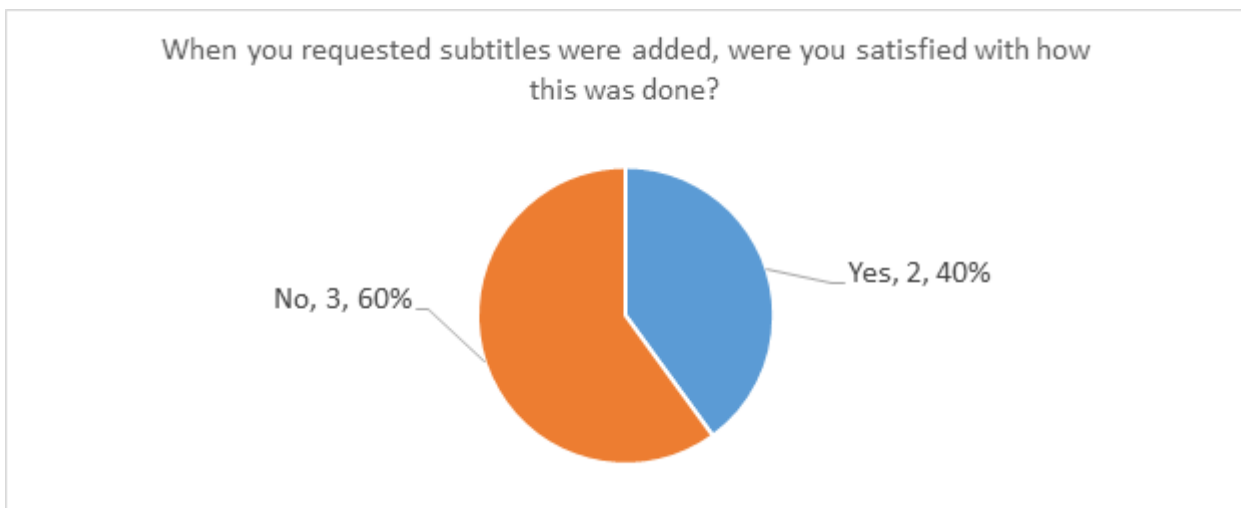


Figure 27 - Were you satisfied with how subtitles were provided?

Summary

Given the very low response rate it is clearly difficult to draw any conclusions or recommend actions from these results. However, the feedback provided by the small group of students who took the time to complete the survey should not be dismissed entirely. Their responses suggest that there are ongoing issues as follows:

- Despite heavy use of audio/visual materials in teaching, subtitles are frequently omitted
- Where subtitles are not present there is often no obvious process for requesting them
- There is a high level of dissatisfaction with how issues around subtitling provision requests are managed.

Under these circumstances, it is recommended that greater publicity is given to both the requirement for subtitles when utilising audio/visual materials in teaching, along with advice and guidance on the process for adding subtitles. Raising awareness of both of these elements could be undertaken through a variety of means:

- Learning and Teaching Committee – could this aspect of inclusivity be promoted by the Committee, following on from its recent work on “Using the curriculum to promote inclusion, equality and diversity?”
- Disability Committee – while not exclusively a disability issue, there is particular need for disabled students to be able to access all aspects of their teaching and learning
- Communications to schools using existing appropriate networks – reminding teaching staff of the importance of ensuring the accessibility of their teaching, and the legal requirement for this, and how students request the provision (via registration with SDS). Ideally, such a communication should come from a high-level member of University staff with appropriate level of influence to emphasise the importance of these actions.
- Working with the Students’ Association – enlisting the support of relevant Vice Presidents to help promote the wider use of subtitling, and ensuring that students know how to report when subtitles are unavailable.
- Identifying a Champion for subtitling – a senior staff member who can speak about the importance of subtitling, reassuring staff of the assistance available to implement subtitling, and promoting the wider usage of subtitling in teaching and learning.

It is recognised that it may not be possible to implement all of these actions, but consideration of some measures to educate teaching staff in the use of subtitles is strongly recommended.

Terms of Reference

Steering Group

The Subtitling for Media Project **Steering Group** will oversee an initial pilot of a Subtitling for Media Service and ensure the Project Team is supported to deliver the project within the agreed constraints. Steering Group members will review project progress and make decisions to make sure that:

- Project scope, timelines, tolerances and milestones are agreed and approved
- The communication plan is supported
- Project risks are assessed and managed
- Time and resources to support the project are available
- Project delivery is completed on time and within agreed scope
- Any issues escalated by the Project team are resolved
- Priorities for delivery are agreed as well as any changes to scope or timelines if significant constraints are identified
- Project closure and lessons learned reports are signed off

Project Team

The Subtitling for Media **Project Team** will be responsible for delivering the work by:

- Understanding the purpose of the Project and the work to be done
- Planning work in line with the Project Plan
- Achieving the project objectives by providing expertise, collaborating and working independently
- Carrying out tasks within budget, timeline and quality expectations
- Communicating the status of tasks and maintaining good records of project work
- Reporting any issues, changes or risks that may arise to the Project Manager, and assisting in the management of these

Membership of Project Steering Group and Project Team

		Steering Group	Project Team
Professor Tina Harrison (Chair)	Assistant Principal, Academic Standards & Quality Assurance	Y	
Melissa Highton	Director, Learning Teaching & Web	Y	
Megan Brown	Edinburgh University Students Association	Y	
Jenni Houston	Head of Digital Skills and Training	Y	
Jan Gardiner	Student Disability Service	Y	
Pete Quinn	External Consultant (Pete Quinn Consulting)	Y	
Jessie Paterson	Chair of Disability Computing Sub Group	Y	
Jean Tennant	Staff Disability Officer	Y	
Zoe Fiddes	Kaltura (Media Hopper supplier)	Y	
Lorna Campbell	Learning Technology Team Manager (OER)	Y	
Rachel O'Neill	Moray House Lecturer in Deaf Education	Y	
Anne-Marie Scott	Deputy Director, Learning Teaching & Web	Y	Y
Viki Galt	Disability Information Officer	Y	Y
Karen Beggs	Project Manager	Y	Y
Andres Ordorica	Digital Learning at Scale		Y
Stephen Donnelly / Marc Jennings / Liam Duffy	Media Team		Y
Stratos Filalithis / Bruce Darby / Lizzie Cass-Maran	Website & Communications		Y
Andrew Kirk	Digital Skills		Y
Tracey Madden	Educational Design & Engagement		Y
Laura Richardson	Employment Officer, Student Experience (IS)	HR advisory	

Meetings

- Steering Group Meetings will be held approximately 6-weekly
- Steering Group Meetings will be chaired by Professor Tina Harrison
- The Project Manager will be responsible for the creation, maintenance and distribution of meeting papers including agenda, discussion papers and minutes
- Project documents will be stored in the [Project SharePoint site](#) and distributed via links
- The Project Team will meet weekly or fortnightly throughout the project
- Project Team meeting notes will be kept on a project notebook on the Project SharePoint site