

Lecture Captioning Disproportionate Burden Assessment

University of Northampton

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Executive Summary

Under the Public Sector Bodies (Websites and Mobile Applications) Accessibility Regulations 2018, the University of Northampton is required to undertake an assessment for disproportionate burden where compliance with the regulations may not be feasible to achieve.

This report outlines the University's assessment of disproportionate burden for the requirement of capturing, captioning, transcribing, and providing audio descriptions for all lecture content produced and published by the University for student use.

The University of Northampton (UON) provides captioned content for recorded material. This may be through either automated or human caption generation. Whilst the University will provide automated caption tools for recordings these will only be human checked where there has been an identified benefit for the student (such as those receiving ASSIST support) or where particular students outside of ASSIST have identified a specific need. Human checks of every recording will use up significant budget for the year and leave Northampton with reduced capability to support those who have the greatest need. Human captions will only improve accessibility for a proportion of users and have been shown to not be 100% accurate in all cases.

Current Practice

Video recordings which have been stored for longer than two weeks (falls within the definition of pre-recorded for regulation purposes) need to be captioned in line with UON policy ([Section 4.4 of the Lecture Capture Policy](#)).

The captions may be automatically generated (as happens in the current video storage system "Kaltura") but then should be checked to ensure they are accurate. Alternatively, videos may be sent for professional captioning (for an additional cost) which both generates the captions and checks the accuracy. Students have a moral and legal right to an accessible course experience.

Recordings are normally being generated either using Kaltura directly or through a synchronous session in a tool such as Collaborate. Blackboard is currently working on adding automated captions to Collaborate but recordings (at present) need to be imported into Kaltura for this process to happen. Chrome live captioning has been used as a stop gap solution for Collaborate.

UON records thousands of hours of lecture material every year.

Blackboard Collaborate stats

Between 1 August 2020 and 31 July 2021 35,615 recordings were made totalling more than **1,105 hours**.

Kaltura stats

Between 1 August 2020 and 31 July 2021 3647 contributors added 21,605 videos totalling **5,272 hours**. All the videos would have had automated captioning.

This content was then viewed a total of 189,580 times, covering approximately 21,515 hours. Meaning that the return on views per recording was approximately **4:1**.

In the 2020-21 academic year **881 minutes** of videos were also sent to [REV](#) (outsourced) for professional (human) captioning at a total **cost of £804**. There is currently no annual budget for captioning although the Rev credit purchased on setup was \$5000 as of January 2018. There is currently \$1,215.59 credit remaining.

One of the core reasons for capturing lecture recordings and then providing captioning, transcripts and descriptions, is to address the need of students with additional access needs. When we refer to students with additional access needs this means student that have differing requirements in the ways in which they consume the educational content UON provides such as those receiving ASSIST support or where particular students outside of ASSIST have identified a specific need. This for example could be students with disabilities that prevent them from perceiving content in traditional ways.

The current way in which this is achieved:

- **ASSIST Support** - Students with additional access requirements are worked with to create individual ILPs that include workarounds, support and adjustments to provide them with an equal learning experience.

In 2020-2021, there are approximately 800 students who have declared an additional need/disability. Out of this, 20 students currently require ASSIST support which makes use of captioning, description or transcription of lecture recordings (Appendix 2).

- **Manual note taking** - Some students receive help through ASSIST support assistant with note taking during lectures.
- **Mix of manual and automated transcription service** - Used to create captions and transcriptions of lecture content. Students are made aware through ASSIST that there is the option for more accurate pro captioning.

Changes to Responsibilities

UON have a requirement under the Equality Act 2010 to provide alternate formats as reasonable adjustments for lecture material to support some students with additional access requirements so that they may have an equal learning experience.

Under the [Public Sector Bodies \(Websites and Mobile Applications\) Accessibility Regulations 2018 \(PSBAR\)](#) our obligations have changed. From September 23rd 2020 all audio/video content that is published by the University on either external or internal platforms is required to meet Web Content Accessibility Guidelines (WCAG) 2.1 AA by law, which demands captions, transcript and audio descriptions on all content.

Jisc has provided guidance on being fully compliant with the legislation. It notes that 'The Central Digital and Data Office (CDDO) monitors public sector body web content for compliance with PSBAR. CDDO interprets WCAG as requiring captions that accurately capture the meaning of the audio. Captions that are accurate are compliant. Captions that have not been checked and that contain mistakes are not.'

By the definitions of the regulations UON understands this to extend to the Virtual Learning Environments that UON uses to store all course related information and hosts lecture recordings. This means that once UON "publishes" any lecture recordings on the VLE for student use, the recordings should conform to the WCAG standards and regulation standards.

Because of this change to UON's responsibilities the output would now not only be the captioning / transcription / audio descriptions of lecture content specifically used by identified students with relevant access needs but would require UON to ensure that all lecture content was fully and accurately captioned / transcribed / audio described.

Challenges

Increase in scale

As discussed above, Between 1 August 2020 and 31 July 2021 than **6,377 hours** of content was recorded. The breakdown for this is:

- 1,105 hours in Collaborate
- 5,272 hours in Kaltura

The total number of 'lecture hours' over the period was 123,463 all of which would need to be fully captioned and manually reviewed for 100% accuracy under the new requirements.

Based on figures obtained regarding number of students receiving ASSIST support that require captioning, transcription or audio descriptions, UON processed **881 minutes** of videos were also sent for professional (human) captioning through REV at a total **cost of £804**.

Professional captioning with REV is currently costing \$1.25 (£0.94) per minute. The rate does not change if UON purchase more. There is currently no annual budget for captioning although the REV credit purchased on setup was \$5000 as of January 2018. There is currently \$1,215.59 credit remaining.

To caption the total number of 'lecture hours' 123,463, at a cost of \$1.25 (£0.94) per minute, this would cost UON approximately **\$9,259,725** or **£6,963,313.20** per year which in comparison to the \$1,215.59 REV credit remaining encapsulates the scale of the problem.

2020-21 Costs

To calculate the approximate costs for the 2020-21 academic year we are using the following formula:

$$(\text{Minutes processed}) \times (\text{Cost per minute}) = \text{Cost for service } (\$)$$

$$\begin{aligned} & 881 \text{ minutes processed} \times 1.25 \text{ cost per minute} = \\ & \text{Approx } \mathbf{\$1072.74} \text{ spent in 2020-2021 on captioning} \\ & \mathbf{\pounds 804} \end{aligned}$$

Expected Costs

The new requirement is to caption all expected content requiring recording. To calculate the approximate expected costs to deliver full captioning, transcription, audio descriptions in compliance with UON's understood responsibilities under the regulations utilising the existing captioning process, we are using the following formula:

$$(\text{Total expected minutes of content}) \times (\text{Cost per minute}) = \text{Expected cost for service}$$

123,463 lecture hours is 7,407,780 lecture minutes

$$\begin{aligned} & (7,407,780 \text{ (lecture minutes) of content} \times 1.25 \text{ cost per minute}) = \\ & \text{approximately } \mathbf{\pounds 6,963,313.20} \text{ required to deliver a legally compliant service} \end{aligned}$$

This increase in costs reflects the additional REV related costs to deliver automated captioning.

Options for Cost Reduction

The current automated transcription cost would increase by an additional **£6,963,313.20**. The challenge associated with attempting to reduce costs by greater reliance on automated captioning is in the accuracy of current auto captioning technology.

In the example below, of a recording made in an arguably optimal environment for automated captioning, even with a clear, consistent voice, and with little background noise, an automated caption service can still significantly misinterpret what is being said.

The automated output from the recording reads:

“...profit of one. two million. I'm in London a long winded way if you do it quickly.”

With manual clean up the segment should read:

“...profit of 1.2 million. I mean, I'm doing it a long winded way. If you do it quickly...”

Aqua - PURP – Margin

Selling price £6m =	100%
Profit of the SP=	<u>20%</u> (given in note 5 of Q)
Cost price =	80 % = ?

80% of SP £6m = 4.8m
Profit = £1.2m (6 - 4.8m)
x ½ still in stock @ y/e = 600k x 40% = £240k

N.B. just account for P's % of PURP still in stock @ y/e regardless of who the seller is.

profit of one. two million. I'm in London a long winded way if you do it quickly.

Figure1. Snapshot of lecture recording and automated captioning output.

In this particular example it highlights the danger of misinterpretation as from the captioning or transcript only a student could receive the wrong outcome to the sums presented.

In particular, automated captioning struggles more with high jargon content, complex academic terms, and STEM descriptions, equations etc.

Automated captioning misinterpreting recorded information creates a danger of factual inaccuracy that can have a significant knock-on impact on the student's understanding of the topic and ability to utilise that information in assessments and examinations.

As an alternative to the current standard output from Kaltura, the University could look to invest in alternate automatic transcription services. Moving to these will incur additional one-off setup charges and involve ongoing processing costs.

Current Kaltura contract

Kaltura - REACH: Unlimited Machine ASR is included in the whole Kaltura contract and is not individually itemised.

The Kaltura contract expires 31st July 2022 and a tender is current ongoing to assess whether we maintain or replace the product and due to be completed by May 2022.

Automatic captioning is unlimited in Kaltura.

We are currently tendering to see whether to keep or replace Kaltura. ASSIST are currently looking to procure Caption.Ed as a local solution for a number of students (approx 25) in their remit.

Amazon Web Services

As an alternative to Kaltura, UON could look at Amazon Web Services automatic transcription service. The current offer for this service is **£1.15 per hour**.

Based on this pricing it would instead cost UON **£7,333.55 per year** for automatic transcriptions of **6,377 hours** of content, not including setup fees and additional staff time costs involved with the move and training users.

AI Media

AI Media is a live captioning service. They offer connection to an individual who will manually transcribe or caption, live or recorded media.

From consultation with other Universities using the service, AI media has an indicative cost of **£150 per hour**.

Speech-I

Speech-I provides automated captions. Work can be divided across a range of editors (ESAs or students).

The recording is broken into subsections and shared with the editors, the length of each subsection is set by the 'administrator' or academic.

Automated caption costs **£0.96 per hour** which would instead cost UON **£6121.92 per year**.

Based on these figures, known current levels of performance by automatic transcription services and risks to delivery introduced by misinterpretation, UON feels it is appropriate to continue using Kaltura but does not currently feel that the technology can be used to deliver a compliant service without ongoing significant use of manual processing for providing captions, transcriptions and audio descriptions.

University Resourcing

With an expected significant cost increase to deliver a compliant service, this document will now outline the current financial situation of the Departments within the University and the resources available that could be utilised to meet this increased requirement.

The current actions taken to deliver reasonable adjustments and support services for disabled students of UON are undertaken by ASSIST. Assist covers reasonable adjustments, of which the alternate formats service and some digital accessibility support are included. **There is no existing contingency budget for ASSIST, all funds are allocated to the delivery of current required support.**

With this in mind, ASSIST would then be required to request additional funding from UON Leadership to address this issue. UON does not currently have unallocated funds equal to addressing the additional cost identified for this increased requirement.

Find and implementing an alternative automated transcription service of higher accuracy than those currently used, to reduce UON's requirements on manual transcription would take significant procurement effort and staff setup time.

In addition, significant staff training would need to be undertaken in the remaining period to address the existing gap in lectures being recorded and to upskill staff to ensure optimal recording conditions.

Further to this, UON currently does not have enough in house resourcing to deliver finished transcripts in a timely manner at the new required scale. UON would need to recruit further staff to do manual captioning/transcription and with the team growth would also need supervision / business management to co-ordinate the delivery were the function to be delivered without external support.

All of these actions will have unidentified knock-on cost implications.

Cost / Benefit Analysis

All actions outlined in the Cost / Benefit Analysis are taken with the assumption of attempting to meet the increased requirements of PSBAR and the effects any given action would have on attempting to meet those requirements.

Action	Benefit	Cost	Available Budget	Outcome
Continue using existing process for captioning and transcription including manual processing. Expanded to meet regulation need	High accuracy captions and transcriptions available to all students for all lectures	£6,963,313.20 + manual processing costs not considered here.	£0	Not financially viable
Move to auto captioning only	No additional costs for manual processing. Utilises existing systems and workflows (However, will see a drop in accuracy which poses other risks)	£0	£0	Financially viable, but does not deliver standard required for PSBAR or for accurate student learning experience.
Move to auto captioning using an alternative provider	Cost effective compared to manual service, however alternate services are of greater cost than existing solution and do not necessarily remove accuracy issues.	At cheapest alternate offer £6121.92 per year more than current solution.	£0	Not financially viable and still does not solve the underlying problem of 100% perfected captions as is required.

Results

Based on the expected increase figures, the outcomes of the cost/benefit analysis, known current levels of performance by automatic captioning/transcription services, UON does not feel that the current technology can be used to deliver a compliant service without ongoing significant use of manual processing for providing captions, transcriptions, and audio descriptions.

Therefore, UON would need to continue to use its existing method of providing captioning/transcription services which would introduce a significant additional cost that UON is financially unable to meet at this time.

UON have deemed that to provide full and accurate closed captions for all recorded lecture material constitutes a disproportionate burden under the requirements of the Public Sector Bodies (Websites and Mobile Applications) Accessibility Regulations 2018, and the Equality Act 2010.

Remedial Action

Although UON has identified a disproportionate burden in meeting PSBAR requirements for full captioning, transcription and audio-descriptions of all lecture material, UON is still committed to improving its services and working towards compliance when it is able to do so.

UON is committed to the following remedial actions to continue improving its service and working towards PSBAR compliance. This disproportionate burden assessment is a time sensitive assessment carried out based on UON's current situation. This may change and fluctuate as time progresses and UON will regularly reassess this claim as and when situations change.

1. Staff Training.
 - a. There should not be a need to overlay lecture recordings with additional audio of someone explaining visual elements, as UON believes that this should be provided by the lecturers as part of their standard delivery. Staff training will be conducted to support academics in creating more accessible recordings at source.
 - b. Training staff to increase numbers of lecture recordings for greater availability of raw recordings. Leaving the only barrier as captioning, not the initial availability of the recording.

2. Working with existing suppliers to test advancements in functionality including;
 - a. Auto-captioning accuracy improvements
 - b. Optimal room setups for improved recording quality
 - c. Improved options for manual corrections and integration with other formats.
3. Investing in recording equipment to improve the quality of raw recordings for better auto-captioning recognition.
4. Increasing use of REV on recorded lectures, making better use of the existing capacity of paid for services.

Disclaimer

The Disproportionate Burden Assessment described in this document represents a view of the requesting party's likely ability to meet specific in scope accessibility requirements at the time of writing. Any change to the circumstances of the requesting party that would impact the ability to meet the in-scope requirements going forward should require a reassessment of disproportionate burden.

While every effort has been made to ensure the accuracy of this assessment and its recommendations at time of writing, this report is for general information only and is not legal advice. If legal advice is required on how this impacts the requesting party please consult with appropriate legal advisors. All Able Consulting Ltd will not accept liability for any loss, damage or inconvenience arising as a consequence of any use of or the inability to use any information contained within this document.

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Appendices

Appendix 1 - Assessment Framework

To undertake this assessment we based our approach on the [Disproportionate Burden guidance available on LexDis](#) which has been widely communicated as good practice by Universities UK.

Specifically we utilised the [Disproportionate Burden Cheat Sheet](#) which provides collated guidance from the UK regulations and additional suggestions from the EU Accessibility Act 2019.

Appendix 2 - Disclosed disability statistics affecting lecture recording requirements

From a preliminary search we currently have 20 enrolled students who have declared having a hearing impairment; not all are registered with ASSIST as yet and from their code it is not possible to know what level of hearing loss the individual has.

As of the most recent applicant report we have approximately **800** students who have declared an additional need/disability.

Of those:

Approx. 40 have declared multiple conditions

Approx. 300 have an SpLD

Approx. 50 have an ASD

Approx. 230 have a MH difficulty

Appendix 3 – Lecture session figures

Length of session (hrs)	Number of sessions	Total time (hrs)
0.5	248	124
1	4264	4264
1.5	5299	7948.5
2	30276	60552
2.5	3622	9055
3	5382	16146
3.5	282	987
4	1259	5036
4.5	35	140
5	300	1500
5.5	41	225.5
6	1006	6036
6.5	87	565.5
7	675	4725
7.5	65	487.5
8	676	5408
8.5	14	119
9	16	144

Total hours across all session: 123,463