Online Distance Education Materials and Accessibility: Case Study of University College of Estate Management

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Abstract. Distance education is accessible to those who have restricted access to more traditional forms of education due to their geographical location, employment, caring duties or disabilities. Therefore, it is important that online distance education providers seriously consider the accessibility of their materials. However, accessibility measures may limit the scope of interactive learning resources and may result in less dynamic and eye-catching materials, unless alternative accessible content is offered. If the content is not designed with accessibility in mind, there is also the financial cost of additional time and resources required to make reasonable adjustments. This case study examines the development of a comprehensive approach by University College of Estate Management to make its materials more accessible. Awareness-raising amongst staff and gaining senior management support are important factors that determine the success of accessibility initiatives. Weaving accessibility into an institutional culture is a long-term project that requires dedication and thorough planning.

Keywords: accessibility · distance education · online education

1 Introduction

Distance education caters for a diverse range of needs in different settings and is widely considered to be a more accessible form of higher education than traditional routes. UNESCO identifies distance education as being more accessible for indigenous people and communities based in rural, remote locations without convenient access to higher educational institutions [1]. Furthermore, it is accessible to armed forces personnel, prison inmates, carers and people with disabilities (including but not limited to motor, visual, hearing, cognitive/learning impairments) who may find it difficult or impossible to travel to attend lectures. This form of education also helps working professionals to keep up with the fast pace of change in this knowledge economy by providing an opportunity for lifelong learning alongside full-time employment.

A variety of technologies can be used to provide learning materials and facilitate communication between students and educators and based on the technologies used at the time, various phases of distance education have been identified in the literature [2]. However, the important fact is that the phases of distance education are associated with

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global technology changes [3]. Today, education providers increasingly use internet technologies for content delivery (e.g. virtual learning environments (VLEs), streaming audio and video, web content, and e-books) and facilitation of both synchronous and asynchronous communications (online chat, webinars and discussion forums). While the majority of students are able to take advantage of the new and exciting learning activities these technologies offer, some, especially disabled learners, will not be able to access the material unless accessibility and good design practices (such as universal design principles [4]) are adhered to.

1.1 Accessibility

The term "accessibility" may be perceived differently depending on the context. For example, in the context of low bandwidth internet connectivity, accessibility could be attributed to the bandwidth usage of the service/application. Accessibility can also refer to access across time zones to participate in synchronous activities; or it can refer to access to a physical space (e.g. a building) or to a digital space (e.g. a website).

The World Wide Web Consortium (W3C) uses "web accessibility" to mean "people with disabilities can perceive, understand, navigate, and interact with the Web, and that they can contribute to the Web" [5]. In this paper, we use the term "accessibility" to describe equal access to the *content* of learning materials by students regardless of their disability or impairment. This may not necessarily mean that they are able to access the full multi-sensory experience of materials, but that they can access the content in some way; in many cases this will involve the use of assistive technologies. We also consider accessibility in relation to: device, platform and browser used by students to access materials; accessibility of content from geographical location of students (e.g. some websites are not accessible from certain countries); and anytime access to materials (e.g. synchronous activities such as webinars are recorded and uploaded).

Disabilities can pose huge challenges to learners, especially in a technology-mediated distance education setting. For example, videos (unless supplemented by an audio description of on-screen actions) can make content inaccessible to visually impaired learners. Similarly, unless accompanied by a transcript, a podcast is inaccessible to a hearing impaired learner; and colour-blind learners will be unable to recognise information differentiated solely by colour. While some assistive technologies such as screen-readers can provide support to disabled learners, unless the electronic materials are designed with accessibility in mind it is not easy, or pleasant, to navigate the content with these technologies.

1.2 Accessibility Standards

The Web Accessibility Initiative (WAI) of the W3C has published a series of web accessibility guidelines, which are widely adopted. These are known as the Web Content Accessibility Guidelines (WCAG). The current version, WCAG 2.0, published in 2008, later became an ISO standard. WCAG 2.0 defines three levels of accessibility conformance: Level A (the minimum level of conformance), Level AA and Level AAA. There are other standards such as the British Standard BS 8878:2010, which provides a framework for developing policies and procedures for accessibility.

1.3 Legal Obligation

Governments around the world have legislations to ensure the rights of disabled citizens are upheld. In the US, "The Americans with Disabilities Act of 1990" (or ADA) [6]; in Canada, "Ontarians with Disabilities Act of 2001" [7] prohibits discrimination and ensures equal opportunities for disabled people. In the UK, the "Equality Act 2010" [8] is the piece of legislation that protects people with disabilities against discrimination.

Disability rights groups and individuals have held North American universities accountable for inaccessible content and technologies used in teaching and learning. There are many higher education institutions that have faced lawsuits, complaints and settlements due to inaccessible content [9]. For example, in 2015, EdX, an online course platform co-founded by MIT and Harvard, entered into a settlement with the Department of Justice to address the violations of the ADA over their video lectures not containing captions [10]. In the UK, the Equality Act imposes a duty on service providers to make "reasonable adjustments" to enable disabled users to access their services, though these are open to interpretation and do not seem to be enforced as rigorously as in North America. There are charities such as AbilityNet [11] that provide accessibility testing services for businesses in the UK, helping them to comply with the legislation.

The next section of the paper presents University College of Estate Management (UCEM) case study; its investigations into what is required to meet the accessibility needs of disabled students; and how it plans to implement accessibility across its range of learning materials.

2 University College of Estate Management (UCEM)

UCEM, previously known as the College of Estate Management (CEM), has been a distance education provider since its inception in 1919. UCEM is the leading provider of supported online learning for the built environment, offering a range of distance learning programmes, from certificate courses to postgraduate programmes. Historically, the learning materials provided to students were predominately print-based, but more recently the learning materials in most UCEM courses are offered fully online using a variety of learning technologies. For example, UCEM's VLE is based on the Moodle platform and interactive eLearning materials are created using Articulate Storyline software. Regular webinars and chat sessions are used in almost every course to provide an engaging and varied experience for the learner.

UCEM uses a similar learning material production process to the Open University where subject experts, learning designers and editors work together as a team. Templates are used to provide a similar look and feel across the range of materials, while at the same time leaving room for creativity in content creation.

The materials with embedded audio/video (with sound) are almost always accompanied by a transcript. Generally accepted best practices, such as appropriate font, font sizes, colour schemes and layouts, to improve accessibility are used in all materials. However, these practices are largely individual efforts and not part of a wider and consistent institutional accessibility initiative.

2.1 Why Accessibility?

Part of the core purpose of UCEM, as described in its vision statement, is to "provide truly accessible, relevant and cost-effective education". UCEM, as a distance education provider, caters for students in various circumstances by providing them with the opportunity to gain professional recognition. Many students would not, due to their circumstances, have had this opportunity in a more traditional university setting. The institution has an international student body and offers exam centres in over 100 countries around the world.

UCEM does its best to support students regardless of disability or impairment. At present, 10.2% of students have registered with the disability and wellbeing service at UCEM. If any student has difficulties accessing materials, they can raise their concerns with the UCEM disability and wellbeing office, and UCEM can then make reasonable adjustments as appropriate. For example, in the past, large print versions of exam papers have been offered to visually impaired learners. More recently, UCEM negotiated with an e-book provider to offer higher resolution versions of diagrams within the e-book platform for a visually impaired student.

As well as its ambition to become the leading online vocational provider of programmes for the built environment, UCEM also aspires to become a leader in offering "accessible" education. Universal design principles and accessibility practices improve the experience for all users. For example, providing closed captions and/or a transcript is necessary for hearing impaired learners to understand the content of a video/audio resource. At the same time, international students, who in most instances are learning in a second (or subsequent) language, may find closed captions on videos or transcripts for audios to be an additional help. Students, irrespective of disability, will find closed captions to be useful in a noisy environment such as on trains when accessing materials during the commute to work.

The institution was recognised as a University College in November 2015, which meant that all learning material templates needed to be rebranded and updated. This was identified as an ideal opportunity to ensure that accessibility was incorporated into all UCEM learning material templates.

2.2 The Process

At the start of 2016, an exercise was undertaken to audit the accessibility of UCEM learning materials. The internal report revealed good practices at the University College, but also highlighted areas in which UCEM could improve the accessibility of its materials. The report's recommendations were divided into three broad areas: accessibility awareness, enhancing capability and a system for checking accessibility.

In order to update the learning material templates to reflect the new University College status of UCEM, a project team was assembled from the Online Learning Team within the Education department. Within this team, an instructional designer and a media designer (the authors) were appointed as the leads on the accessibility initiative. Both had a prior knowledge of, and interest in, accessibility, and had already completed online courses on the topic and conducted extensive desk research.

During the eight-week part-time project to redesign the templates, the authors further researched and identified best accessibility practices, and how these would translate to UCEM learning material templates and subsequent content that would be created from the templates. However, the authors soon realised that accessibility is a vast subject with many 'grey' areas which are open to interpretation. The authors had followed online courses on accessibility and, of these, the three noteworthy courses that helped them with this project were:

- Accessibility: Designing and Teaching Courses for All Learners – SUNY Empire State College and SUNY Buffalo State College
- Professional Web Accessibility Auditing Made Easy – The Chang School of Continuing Education, Ryerson University, Canada
- Digital Accessibility: Web Essentials – Equality and Human Rights Commission, AbilityNet and BCS, the Chartered Institute for IT.

These courses compiled and presented useful resources for accessibility in a concise format. After reviewing the desk research presented by the authors, the project team agreed that the WCAG 2.0 Level A was the appropriate standard for UCEM to adopt.

With practical guidance from the authors, the project team created accessible Microsoft Word and Microsoft PowerPoint templates. Furthermore, a decision was made to purchase Adobe Captivate software to create new eLearning materials as it supports the creation of accessible and responsive design across mobile devices. A set of mobile devices were purchased so that content could be tested on these.

Using the guidelines from WCAG 2.0, the authors created a list of practical 'accessibility enhancements' where each item of accessibility enhancement can be filtered according to the type of learning material it applies to (e.g. Microsoft Word, Microsoft PowerPoint, video, audio) and the user groups that it supports (e.g. visually impaired, colour-blind). Each item also includes a brief explanation of how it supports these user groups. This allows the user of the list (e.g. tutor, instructional designer) to understand how each action supports disabled students so that these actions are not just seen as a series of processes but as meaningful ways to help students access and engage with the content of learning materials. The authors also classified these items according to the timescale required to implement each enhancement: immediate (building into templates), ongoing (material creation from templates) and longer term (items which require technology upgrade and/or institutional IT support). An extract from the accessibility enhancement list is shown in Table 1.

After creating this list, the authors invited the Online Learning Team to comment on it. This feedback exercise identified items that needed further clarification.

The next step will be to decide which of these accessibility enhancements is to be adopted by UCEM. In this process, the impact of the proposed enhancement and cost/benefit associated with it will have to be taken into account. Some of the considerations are:

- the additional time/resource requirements to perform the enhancement, including additional technology, processes, staff, subcontractors, etc.

Table 1. Partial extract of the entry on alternative text from authors' 'accessibility enhancements' document.

Action	Use alternative text for simple images/diagrams (and also for buttons). If the image is only for decorative purpose, set the alt text to "" (null) so that the image will be ignored by assistive technologies
Guideline	WCAG 1.1.1
User types supported	Blind, visually impaired, all users - if for some reason images fail to load the alternative text will be shown
How this support users	Without a text alternative, images would not be perceived by users with visual impairments. These users rely on assistive technologies to access information. If an image is published without an alt tag then a screen reader would inform the user that there is an image present, but would not be able to give them any information about it, or it may read the image file name (if this is automatically attached as the alt tag), which will not adequately describe the image. Complex images may not be adequately explained by an alt tag so would require a more detailed description. If for some reason, the image fails to load in a web page or email, the alternative text will provide a description of the image for the user
Resource types this applies to	Any resource with images – Word/ PowerPoint/ Web pages/ eLearning

- any subsequent loss of interactive and engaging content which may come about as a result of the accessibility enhancement, and alternative solutions that could be offered to a student.

There was also the question of identifying which of these actions should be performed routinely to enable accessibility and which of these actions could be offered as "reasonable adjustments". For example, if a YouTube video published by a third party is used in a course and does not have closed captions, should a transcript be offered routinely; or if a student with a disability is registered on the course; or should it only be offered if requested?

Once these decisions have been made, accessibility checklists for different resource types will be derived from this list, i.e. a checklist for Microsoft PowerPoint content and a checklist for video resources. Newly created and completed resources can then be reviewed against these checklists as appropriate in the quality assurance process to ensure they meet the institution's standards for accessibility.

3 Discussion - Challenges

Implementing changes in an organisation is always challenging, especially when it involves changing established practices. Furthermore, it is more likely to be resisted if the changes make processes more time-consuming or more difficult than they used to be, or if the changes are seen to be imposed on employees by the management. To promote change, the following actions were taken:

- the authors were in continuous dialogue with the project team responsible for updating the templates, the Online Learning Team and the Online Learning Research Centre, presenting their findings and welcoming feedback;
- an organisational awareness presentation was given and the content was also shared with all employees via email. Staff from other departments of the organisation also volunteered their help with specific aspects of the research.

As a result, the authors were welcomed as accessibility champions within the organisation. It is also worth noting that the authors were in contact with, and benefited from advice and guidance provided by UCEM's Disability and Wellbeing Adviser.

Another challenge was to identify the appropriate standard to be followed and interpreting the WCAG 2.0 guidelines. While some guidelines (for example, using alternative text for non-text content) are clear, others are not so clear and are open to interpretation. This challenge involved researching how other institutions have interpreted these guidelines.

Furthermore, there is the task of defining what should be done when third party content is not as accessible as content created by UCEM. This can be tricky, especially where third-party content such as a YouTube video is seen as necessary to reinforce a learning point. But these videos may not have closed captions, transcripts or audio descriptions of any on-screen actions. Some ways of tackling this could be: removing all inaccessible content and finding or creating alternatives; providing transcripts and/or alternatives for inaccessible content as a standard (though this could be a waste of effort if, for example, the video then disappeared from YouTube); or using a disclaimer to acknowledge that the content has accessibility issues and the organisation would provide alternatives for students with special needs (reasonable accommodation).

Another decision was whether to recreate learning materials that are already in use but which do not comply with the accessibility standards. If it were to be applied retrospectively, it would mean the recreation of old content which may become obsolete within a short time frame compared with newer content.

There are likely to be practical difficulties that have to be considered on a day-to-day basis. For example, tutors create weekly summary videos for their students to provide feedback and such videos are embraced by students. These videos are generally created using webcams and smart phones and can be instantly uploaded to the VLE by tutors. In order to be fully accessible, these videos require a text-based alternative. However, the transcripts cannot be processed in the short time frame it would require. Thus, more creative ways of implementing accessibility need to be explored; for example, giving access to speech-to-text software so that tutors can instantly create transcripts along with the videos (these can then be checked for accuracy); writing a script to record the video; or summarising important points in a text document that accompanies the video. Making tutors aware of any disabled students registered on their modules and how to support their accessibility needs will create a better learning experience for students.

4 Conclusion

Designing for accessibility is a way to support universal access to learning materials. Accessibility is even more important in distance education as it generally caters for a range of learners who are unable to take up more traditional forms of learning. Accessible learning materials benefit not only the students with disabilities but also provide a better and more consistent user experience for all students. This can benefit the institution indirectly by contributing to student retention, as students who have a positive learning experience are more likely to continue with their studies. UCEM has taken its first step towards identifying accessibility standards and making a commitment to adhere to them. However, implementing accessibility is a long-term project that requires buy-in and commitment from both the institution and its employees.

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