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# Accessible by Design? Exploring How Barriers faced by Disabled Students are Resolved in Online and Distance Learning

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## Abstract

Common policies and models for enhancing the inclusion of disabled students promote a trajectory of moving from adjustments and provision in response to individual requests and assessment of needs, towards an inclusive educational experience that is accessible by design. It is possible to see partial successes in this regard, particularly in the space of online and distance learning (ODL). However, there remain prominent conceptual and practical challenges and a lack of clear data on what is working. This paper reports research conducted with students via a survey (n=50) and interviews (n=4) at an ODL higher education institution: The Open University UK. These aimed to better understand the extent to which study was experienced as accessible by design, where and how adjustments were effective, where further efforts should be focused to enhance provision. Students report barriers across types of materials, activities and assessments, however they were often able to resolve barriers related to study materials independently, and most of those related to assessments were resolved with support. Barriers in communicative activities such as tutorials and online forums were more often reported as unresolved. A range of features that represent an accessible by design approach were reported as useful, and students used various sources to gain guidance around accessibility. We discuss how the findings and further data collection processes could enable accessibility by design to be enhanced.

## Introduction

Across the education sector and beyond, policies, models and strategies around disability argue for accessibility to be achieved by design to reduce reliance on complex processes of adjustment and support. Terms like inclusive design and universal design essentially focus on supporting the widest group of people to make use of something without barriers [1] but there is limited data on the extent to which this is currently achieved or how it can be further enabled.

A common lens through which to view accessibility in education is the need to avoid discrimination and support inclusion in mainstream contexts. In practice, this is achieved through several avenues. Firstly, efforts to design systems, curricula, environments, and processes to effectively serve the widest range of students from the outset. Secondly, anticipating barriers that would be faced by individuals in standard designs and being proactive in devising solutions in advance. Finally, responding when barriers are recognised to devise and put in place solutions in an ad hoc manner.

If much of what causes inequity for disabled students is predictable and avoidable through better design of teaching, activities, materials and systems, then it should be feasible to create mainstream provision of learning without barriers and reduce the need for responsive adjustments which can require substantial time and effort by students and staff and may not constitute ideal solutions.

This notion has a particular relevance and potential in online and distanced learning (ODL) where:

- Web-based systems and content are central and accessibility by design for these is relatively well defined through Web Content Accessibility Guidelines (WCAG).
- A larger proportion of ODL materials and activities are designed upfront prior to delivery when compared to in person teaching.

- Assistive technologies can be directly connected with digital platforms and content.
- For many disabled people ODL is the preferred or only suitable mode of study because of challenges around mobility, and greater flexibility in timing, formats, and communication.

Although WCAG is clearly important to making online teaching and learning accessible by design, research highlights that many barriers experienced by disabled students both in ODL and in broader tertiary education sit outside of the scope of this, relating to areas such as pedagogy, assessments, communications, and administrative processes [2].

There is a substantial literature around concepts of inclusive education and universal design for learning, but gaps remain in our understanding of the nature and prevalence of barriers students face, or how these barriers are resolved. In response, we developed a new survey method for students to report these and report here the results of a pilot of this. These findings help us understand what it can mean for study to be more accessible by design, and where we need to focus attention to enhance this.

## State of the art

While greater accessibility by design would be positive, we do not fully understand how to proceed or the value of existing efforts. Reviewing the evidence base, the key actions known to reduce gaps in success for disabled students are employing anticipatory approaches to adjustments, ensuring the provision of assistive technologies, and developing student's self-advocacy and self-regulation skills [3]. While training and inclusive learning strategies could be impactful our understanding of the efficacy and best approach for these is limited.

Much has been written about universal or inclusive design in education, particularly Universal Design for Learning (UDL) [4], which focuses on accommodating diversity through embedding choice and flexibility from the outset. Meta reviews of research suggest training in UDL can have a positive impact on teaching practices, enhance choice for students, and reduce the need for interventions by disability services. However, there is limited evidence of implementations enhancing outcomes in higher education, or how best to implement these approaches to maximise benefit to students [5,6]. Research often focuses on training staff and evaluating the impact of this, rather than the extent to which specific barriers have been removed for learners [7]. Here we respond to a need for more usable data on the barriers students are facing and whether and how these are being removed across features of study.

Research with disabled students gives different perspectives on what needs to change. For example, a survey of over 300 students by Disabled Students UK concludes that the lack of resourcing for staff to focus time on accessibility, and the administrative burden placed on students to get support in place, are key causes of barriers, and that changes to culture and leadership are needed [8]. An inquiry including many disabled student voices found that students face barriers not only due to inaccessible learning materials but also from staff not fulfilling agreed adjustments, lack of information sharing, and bureaucratic and financial burdens [2].

Many stakeholders make decisions that impact on the accessibility of higher education for students [9]. Furthermore, what we mean by an inclusive process of design is complex and underdetermined, reaching into questions of who's perspectives are privileged, and how diverse audiences are involved in decisions [10]. While guidelines can enhance accessibility by design by drawing on understanding of common barriers, accessibility exists in relation to individuals and the activities they aim to complete. Because of the complexity of this in education, it is argued that accessibility needs to be viewed as an ongoing process of improvement [11,12], and to do more by design, we need data to act on.

## Methodology

To better understand what accessibility by design could entail and how current provision can be enhanced we conducted research with students and staff. Here we focus on data from a survey with students, containing quantitative and qualitative questions in the following sections:

'Disabilities and Your Study' asked students to describe their disabilities in open text and according to the categories used in university declaration and reporting. It then asks about their study environment and their usage of information and guidance sources about disability and accessibility.

'Your Experience of the Module' asks the student to identify if they faced barriers in relation to elements of studying a specific module (see figure 1 for the elements included), and whether these were resolved independently, with support from others, or if the barriers were not resolved.

'Accessibility Features and Module Design': asks students about their experience of using features of their module that represent an accessible by design approach, such as flexible study, tutorial recordings, alternative text or figure descriptions and others.

'Adjustments' checks whether students requested or received individual adjustments, what this was for and their experiences around this.

'Other Comments' is an opportunity to share further thoughts and ideas for improvements.

The survey was advertised to a total of 4,688 students who had disclosed disabilities and had previously studied one of a representative set of modules selected, including modules from each faculty and all levels of undergraduate study. The research was reviewed and given a favourable opinion by the Human Research Ethics Committee of The Open University (HREC/4725/Coughlan).

## Results

50 responses to the survey were received and four participants also took part in follow up interviews, providing richer information based on the issues they raised in their survey responses. Table 1 shows the disability categories that participants declared in the survey.

*Table 1: Disability categories declared by participants. Each participant identifies all relevant categories.*

<b>Disability Category</b>	<b>Total</b>
Mental health issue (depression, anxiety, bipolar, PTSD)	21
Fatigue	15
Unseen disability (diabetes, epilepsy, asthma)	15
Mobility restriction	13
Specific learning difficulty (dyslexia, dyspraxia, ADHD)	12
Blind or partially sighted	5
Autism	4
Unsure/undiagnosed	4
Manual skills difficulty	4
Deaf or hard of hearing	3
Other disability	3

The open comment descriptions of disabilities provided by participants contain much more depth about individual circumstances. These highlight the limitations of these categories as the people declaring them can face different barriers, as well as having disabilities across multiple categories.

Survey results show how participants experienced barriers and resolution of these across elements of the study experience. Figure 1 shows the most common area where barriers were not resolved as online tutorials, with issues including audio quality and pedagogy. Forum activities raised barriers through distressing conversations and difficulty with instructions. Unresolved barriers were also reported with rich media including in captions. Barriers were relatively more likely in other forms of materials and tools, but were usually resolved independently or through adjustments.

We also evaluated elements of study that represent an accessible by design approach. The elements most often used and found helpful were flexibility to study at any time (42 agreed), recordings of tutorials (33), and the availability of extensions to assignment deadlines (28). While 24 participants found downloadable versions of web-based materials helpful, a further 11 found these less helpful than they could be, pointing to potential to improve.

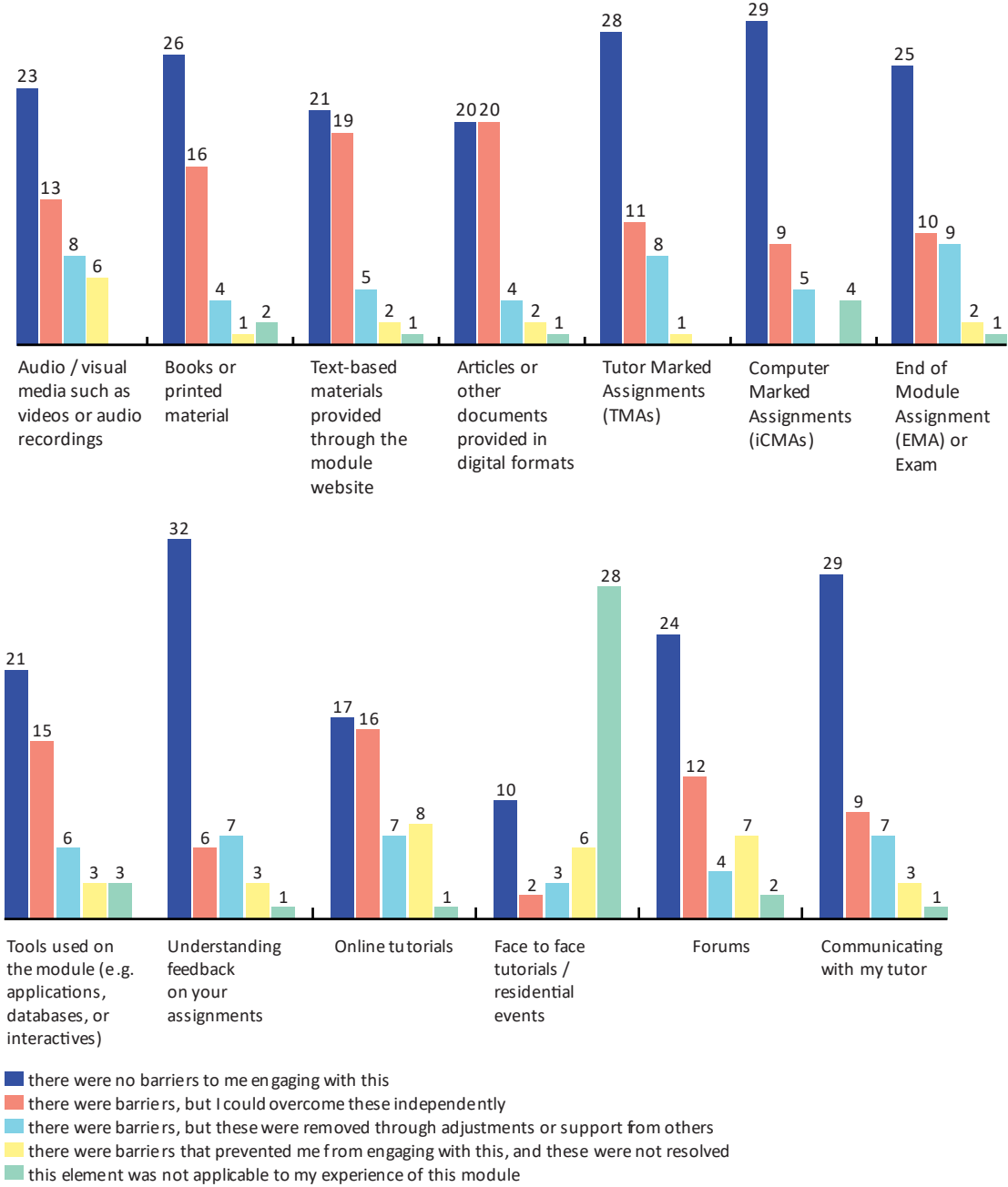


Figure 1: Responses to “For each of the following elements of your Module, we would like to know whether you experienced any barriers that impacted on your study. In each case, please select the one statement that best reflects your experience.”

We asked where students got guidance around accessibility and most common was contact with their Tutor, reading the Accessibility Guides for information about the features of their module, or contact Disability and Student Support Advisors. Further sources used included the Library, university webpages, and peer support groups.

17 of 50 participants reported that they had individual adjustments made for them, so these were only requested by a minority (though a substantial one). 14 of these participants agreed that the adjustments made for them overcame the barriers they faced, and 13 agreed that the adjustments had been made in a timely manner. Table 2 indicates where these individual adjustments were made across the elements of study. This shows that such adjustments were common across both in-course and end of course assessments (most commonly allowing additional time), module materials (providing bespoke alternative printed or digital versions of materials), and for engagement with tutors (additional assistance or flexibility in how and when communication happened).

*Table 2: Frequency of individual adjustments made according to which element of the module was adjusted. Participants were asked to select all categories that were relevant to the adjustments made for them*

<b>Element of study</b>	<b>Total</b>
Module materials	8
Tutor marked assignments (assessments completed during the course of a module)	8
Support and communication from your tutor	8
End of module assessments / exams	6
Tutorials	4
Third-party resources, articles or books	2
Tools used in module activities	1
Forums	1

## Discussion points

While this data is not necessarily generalisable to other institutions or teaching models, this work shows the potential to gather data systematically around accessibility barriers and solutions, the extent to which features intended to promote accessibility by design are used and effective, and how adjustments are currently being delivered.

In this initial study with a relatively small data set, we have not analysed the data according to the specific module studied. But with more data such analyses could lead to a process to identify with higher accuracy where barriers exist in the curriculum. Similarly, there is scope to analyse this form of data on barriers according to categories of disability, however there are challenges as categories can encompass a wide range of needs, and students can describe their disabilities in diverse ways [13].

A further approach with potential value would be to analyse changes over time, for example to see if there was a reduction in individual adjustments and increases in students either not facing barriers or able to overcome these independently. These could constitute valuable measures of success for initiatives to enable greater accessibility by design.

Staff may not predict every barrier that may be faced but we can do more to collect and learn from data and incorporate this into standard teaching designs as an ongoing process of information sharing and improvement. We also found that students appreciated the elements that represented an

accessible by design approach, such as making study times flexible, and recording tutorials. Many students clearly value the ability to download study materials in multiple formats without having to request these, even if there was room for improvement in the delivery of this.

Reflecting on the data analysis reported here, barriers to accessing study materials and tools for online learning were more common but more often resolved independently. Rich media presented more requirements for support and more unresolved barriers than text-based sources, suggesting further work is needed to ensure consistent accessibility in these.

Barriers in tutorial and forum activities were less often resolved. There is less work 'by design' in these spaces. Tuition entails many individual staff devising and running a wide variety of activities, often improvised and with complex communications across multiple channels. Peer learning can also create barriers if students do not consider accessibility in interactions with each other. Further training in inclusive or universal design approaches could be impactful here, but there may also be a role for specific or adapted frameworks that are better suited to guiding staff towards creating inclusive online tuition [14].

Accessibility of assessment is of paramount importance to equity since it is directly linked to the outcomes achieved. There were a relatively large number of adjustments made to overcome barriers in assessment, indicating opportunities to do more in assessment design, enhancing flexibility and consideration of disabled students and the barriers they would face.

Further research conducted for this project looked to understand staff perspectives on the processes for individual responsive adjustments and accessibility by design. Combined with the data reported here, these lead to further recommendations such as:

- More systematic recording, sharing and reflection on the responsive adjustments made so that there can be an active process of exploring how these could be achieved by design in the future.
- Further collaboration to clarify responsibilities, ways of working, and achieving consistency across the multiple staff roles involved in making adjustments, including student support advisors, faculty, tutors, media specialists and library staff.
- Continual awareness building and piloting of technological innovations as these could both empower students to overcome barriers independently and reduce the ad hoc and time pressured work involved in making responsive adjustments.

## Conclusions and Possible Next Steps

The research reported here contributes to understanding of how online and distance learning can become more accessible by design. Systematic approaches for students to report and provide feedback, such as the method piloted here, can play a valuable role alongside enhancing staff understanding of how teaching and learning can be designed to be accessible and inclusive. We will likely always need responsive adjustments in certain situations, and feedback can enhance processes for devising and putting these in place too. However, better evidence of where the barriers currently arise and the challenges these create should underpin strategies and encourage upfront investment in accessibility.

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## References

1. Persson, H., Åhman, H., Yngling, A.A., & Gulliksen, J.: Universal design, inclusive design, accessible design, design for all: different concepts--one goal? On the concept of accessibility--historical, methodological and philosophical aspects. 14, 4, (2015). <https://doi.org/10.1007/S10209-014-0358-Z>.
2. Hector, M.: Arriving at thriving: Learning from disabled students to ensure access for all. (2020). Policy Connect, Higher Education Commission. [www.policyconnect.org.uk/research/arriving-thriving-learning-disabled-students-ensure-access-all](http://www.policyconnect.org.uk/research/arriving-thriving-learning-disabled-students-ensure-access-all)
3. Evans, C., & Zhu, X.: Disability evidence review with TASO (Transforming Access and Student Outcomes in Higher Education). (2020). [eprints.lincoln.ac.uk/id/eprint/52870/](http://eprints.lincoln.ac.uk/id/eprint/52870/)
4. CAST.: Universal Design for Learning guidelines 2.2. [udlguidelines.cast.org](http://udlguidelines.cast.org)
5. Maguire, F., & Hall, R. A literature review of Universal Design for Learning. (2018). De Montfort University. [dora.dmu.ac.uk/server/api/core/bitstreams/74caef5a-b16c-4d90-ac35-129320d49585/content](http://dora.dmu.ac.uk/server/api/core/bitstreams/74caef5a-b16c-4d90-ac35-129320d49585/content)
6. Capp, M.J.: The effectiveness of universal design for learning: a meta-analysis of literature between 2013 and 2016. 21, 8, (2017). <https://doi.org/10.1080/13603116.2017.1325074>
7. Ok, M.W., Rao, K., Bryan, B. R., & McDougall D.: Universal Design for Learning in Pre-K to Grade 12 Classrooms: A Systematic Review of Research. 25, 2 (2017). <https://doi.org/10.1080/09362835.2016.1196450>.
8. Disabled Students UK.: Going back is not a choice: Accessibility lessons for higher education. (2022) [disabledstudents.co.uk/not-a-choice/](http://disabledstudents.co.uk/not-a-choice/)
9. Seale, J.: E-Learning and Disability in Higher Education: Accessibility Research and Practice. (2013). Routledge.
10. Heylighen, A. & Bianchin, M.: How does inclusive design relate to good design? Designing as a deliberative enterprise. 34, 1, (2013). <https://doi.org/10.1016/J.DESTUD.2012.05.002>.
11. Cooper, M., Sloan, D., Kelly, B., & Lewthwaite, S.: A challenge to web accessibility metrics and guidelines: putting people and processes first. Presented at Web for All 2012 (W4A '12). (2012). <https://doi.org/10.1145/2207016.2207028>
12. Coughlan, T., Ullmann, T. D., & Lister, K.: Understanding Accessibility as a Process through the Analysis of Feedback from Disabled Students. Presented at 14th Web for All Conference (W4A '17) (2017). <https://doi.org/10.1145/3058555.3058561>.
13. Coughlan, T., Iniesto, F. & Carr, J.: Analysing Disability Descriptions and Student Suggestions as a Foundation to Overcome Barriers to Learning. 1, 4 (2024). Journal of Interactive Media in Education. <https://doi.org/10.5334/jime.836>
14. Buxton, J.: Design for Accessible Collaborative Engagement: Making online synchronous collaborative learning more accessible for students with sensory impairments. (2023) (Doctoral dissertation, The Open University). <https://oro.open.ac.uk/91722/>