PARTNERSHIP
The Canadian Journal of Library and Information Practice and Research
Revue canadienne de la pratique et de la recherche en bibliothéconomie et sciences de l'information

Learning About Real Experiences From Real Users: A Blueprint for Participatory Accessibility Testing
Apprendre des expériences réelles des vrais utilisateurs : un plan directeur pour les tests d'accessibilité participatifs

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Article abstract

Although it is crucial for libraries to meet required online accessibility standards (e.g., Web Content Accessibility Guidelines 2.0), compliance with these technical standards does not guarantee optimal or equitable experiences for all library users who interact with online spaces or materials. Recent literature on accessibility testing has acknowledged the value of including people with disabilities in testing and designing digital objects and spaces. This thinking aligns with the library-based user experience (UX) principle that talking directly to users about their experiences using library services and resources is the most effective way to understand and thereby improve the overall library experience. In 2020, the UX Group at Western Libraries undertook a pilot accessibility testing initiative to plan, design, and deliver participatory accessibility testing with campus community members who had self-identified as living with a range of disabilities. Three accessibility tests were designed to assess five distinct digital objects, and 14 testing sessions were completed with eight participants. A semi-structured and participatory testing method allowed participants to freely interact with the testing objects, provide detailed feedback regarding their experiences using the objects, and recommend improvements to elements they found less accessible. This article includes an overview of considerations and challenges of the initiative as well as lessons learned in the process of securing funding, recruiting participants, designing the tests, and conducting testing. We reflect on the value of participatory accessibility testing and make recommendations for conducting similar projects at other libraries.

Learning About Real Experiences From Real Users: A Blueprint for Participatory Accessibility Testing

Apprendre des expériences réelles des vrais utilisateurs : un plan directeur pour les tests d'accessibilité participatifs

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Abstract / Résumé

Although it is crucial for libraries to meet required online accessibility standards (e.g., Web Content Accessibility Guidelines 2.0), compliance with these technical standards does not guarantee optimal or equitable experiences for all library users who interact with online spaces or materials. Recent literature on accessibility testing has acknowledged the value of including people with disabilities in testing and designing digital objects and spaces. This thinking aligns with the library-based user experience (UX) principle that talking directly to users about their experiences using library services and resources is the most effective way to understand and thereby improve the overall library experience. In 2020, the UX Group at Western Libraries undertook a pilot accessibility testing initiative to plan, design, and deliver participatory accessibility testing with campus community members who had self-identified as living with a range

of disabilities. Three accessibility tests were designed to assess five distinct digital objects, and 14 testing sessions were completed with eight participants. A semi-structured and participatory testing method allowed participants to freely interact with the testing objects, provide detailed feedback regarding their experiences using the objects, and recommend improvements to elements they found less accessible. This article includes an overview of considerations and challenges of the initiative as well as lessons learned in the process of securing funding, recruiting participants, designing the tests, and conducting testing. We reflect on the value of participatory accessibility testing and make recommendations for conducting similar projects at other libraries.

Bien qu'il soit essentiel pour les bibliothèques de respecter les normes d'accessibilité en ligne (par exemple, les Règles pour l'accessibilité des contenus Web 2.0), la conformité avec ces normes techniques ne garantit pas des expériences optimales ou équitables pour tous les utilisateurs des bibliothèques qui interagissent avec des espaces et des ressources en ligne. La littérature récente sur les tests d'accessibilité a reconnu l'importance d'inclure des personnes handicapées lors de l'évaluation et la conception d'objets et d'espaces numériques. Cette notion est en lien avec le principe de l'expérience utilisateur (EU) des bibliothèques où le fait de parler directement avec les utilisateurs de leurs expériences d'utilisation des services et ressources de la bibliothèque constitue le moyen le plus efficace de comprendre et donc d'améliorer l'expérience globale des bibliothèques. En 2020, le groupe de l'EU des bibliothèques de l'Université Western a lancé un essai pilote de tests d'accessibilité pour planifier, concevoir et réaliser des tests d'accessibilité participatifs avec les membres de la communauté universitaire qui s'étaient identifiés comme vivant avec un handicap. Trois tests d'accessibilité ont été conçus pour évaluer cinq objets numériques uniques et 14 sessions d'évaluation ont été réalisées avec huit participants. Une méthode d'évaluation participative et semi-dirigée a permis aux participants d'interagir librement avec les objets, de fournir des commentaires détaillés sur leur expérience en utilisant ces objets et de suggérer des améliorations aux éléments qu'ils trouvaient moins accessibles. Cet article comprend un survol des facteurs à considérer et des défis de l'initiative ainsi que les leçons tirées du processus d'obtention du financement, du recrutement des participants, de la conception des tests et de leur mise en œuvre. Nous réfléchissons sur la valeur des tests d'accessibilité participatifs et faisons des recommandations sur la manière de mener des projets similaires dans d'autres bibliothèques.

Keywords / Mots-clés

accessibility, user experience, accessibility testing, disability, digital objects; accessibilité, expérience utilisateur, tests d'accessibilité, handicap, objets numériques

Introduction

Talking to users and bringing their experiences into the design and development of services and spaces has become the gold standard in libraries. Providing accessible library services and spaces is fundamental to ensuring equal access for everyone. This article will outline how we, members of the User Experience (UX) Group at Western Libraries, applied user experience principles to address the shortcomings of automated,

manual accessibility testing (testing involving software, without human interaction) in order to provide better experiences to library users with disabilities. We will highlight what we learned, identify challenges we encountered, and provide suggestions and tips for engaging in this type of work. By sharing our experiences, we hope to offer libraries a blueprint for conducting similar accessibility testing projects and to show the value of engaging people with disabilities in accessibility testing.

In January 2020, we obtained special funding to pilot an accessibility testing initiative. The purpose of the initiative was to administer in-person testing with people with disabilities to better understand their experiences with library services and spaces. Ensuring compliance with the Accessibility for Ontarians with Disabilities Act (AODA) standards and meeting deadlines for Web Content Accessibility Guidelines (WCAG) 2.0 were two reasons cited in the project proposal. However, we felt it important to go beyond compliance when outlining the project's rationale in the proposal; we wanted the project to focus on improving the overall experience of library users with disabilities and not to rely on meeting standards and guidelines. The original scope of the project was intentionally broad, allowing testing of any library service, program, or space, with the goal of seeking the expertise and lived experiences of people with disabilities. With the onset of the COVID-19 pandemic in March 2020, and with many of Western University's students, faculty, and researchers working remotely, we prioritized testing online library services and spaces. We also had to pivot and develop a methodology and testing protocol for a remote setting, a necessity that ended up benefitting the project.

Another factor that benefitted the project was the inclusion of experiential learning opportunities. When this testing was conducted, two of us were students in Western's Master of Library and Information Science program, with one completing a co-op term and the other participating in a university-wide student internship program. The two of us who were students were actively involved in all steps of the research process, from working with different library departments to create the three tests to conducting testing sessions and analyzing the results. The experiential learning opportunity allowed us to delve into accessibility testing in libraries.

Accessibility Testing in Libraries

Research involving people with disabilities in libraries is a growing area of inquiry. Hill (2013) explained that 35% of LIS articles written about accessibility are research-focused, and only 36% of these research articles involve the experiences and perspectives of library users with disabilities. Pontoriero and Zippo-Mazur's (2019) research demonstrated that users with disabilities use physical and digital library spaces more than library materials. Pionke's (2017) interviews highlighted key points about the experiences of library users with disabilities in the physical academic library environment. Users explained that physical library spaces need to be made more welcoming so users can feel more empowered to ask for help. Several issues with the physical environment, such as aisles too narrow for wheelchair users and poor lighting, can make it difficult for users to navigate library spaces independently (Pionke, 2017). Users also expressed concerns over privacy, explaining that a lack of private spaces, or the need to request accommodations in very public spaces, meant their disability would

be highlighted for other library users. Similar concerns about privacy were found in Grassi's (2018) research into experiences in public library spaces. Finally, Pionke (2017) identified barriers to communication, especially during reference encounters. In general, communication barriers were exacerbated when library users were unsure where they could access certain kinds of information.

Library websites and digital services have become important tools for overcoming barriers, especially for research purposes and for planning visits to the library (Lazar & Briggs, 2015). Rayl's (2021) audit of their library's website identified several barriers, such as a lack of alt-text for images and library maps that cannot be read by screen readers. Barriers like these inhibit users with disabilities from accessing the information they need; this issue is also reflected in other studies (Pontoriero & Zippo-Mazur, 2019). Kimura (2018) argued that digital environments can be built with accessibility in mind so these barriers do not exist in the first place. While Rayl's study demonstrates the value of accessibility audits of library websites for identifying some barriers, it is also important to include the perspectives of users with disabilities to better understand users' experiences with these tools.

Our review of the existing body of research on accessibility testing in libraries revealed limits of accessibility guidelines like WCAG 2.0. Hill (2020) explained the concept of technical accessibility: although a library service or website might adhere to a particular accessibility guideline such as the AODA, this adherence does not ensure true equality for library users with disabilities. Standards such as WCAG 2.0 cannot achieve true equality because these guidelines "don't actually show you how someone uses a service or a website" (Carr et al., 2020). Additionally, although WCAG 2.0 provides a "framework that guides developers and webmasters … it is difficult to measure and test whether the contents comply with the guidelines or not" (Alsaeedi, 2020, p. 3). In response, library workers have been striving to go beyond technical accessibility when developing spaces and delivering services (Hill, 2011). User testing is often conducted to help implement meaningful changes to improve libraries' accessibility.

Of the several approaches to accessibility testing, including users with disabilities as participants is considered the best approach (Waecker et al., 2019; Walmsley & Johnson, 2003). Other approaches often involve automation or testing with able-bodied participants. These latter methods "fail to detect issues with the implementation of accessibility features" (Alsaeedi, 2020, p. 4).

The methods used when involving users with disabilities in accessibility research have continuously improved in recent years. While Hill (2013) noted that past research had focused on specific disabilities like vision disabilities, more recent studies (Brunskill, 2020; Pionke, 2017; Schmutz et al., 2017) have included participants with a wide range of disabilities. This newer approach helps broaden understanding of disabilities and helps capture a range of perspectives and experiences in accessibility research.

The qualitative methods used in accessibility testing research are increasingly open-ended; interviews have become the most common tool. Semi-structured, open-ended interviews allow researchers to learn about users' experiences and preferences, both of

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which show how library users with disabilities navigate and experience websites and services (Pontoriero & Zippo-Mazur, 2019). Additionally, Mulliken (2017) explained that "the nature of qualitative research allows a richer opportunity to explore topics in depth without preconceived questions limiting the responses" (p. 117), especially when using open ended approaches. Removing barriers that might limit participants' responses is important in research with users with disabilities because it creates a user-centred approach that can allow participants to guide the discussion. As Mulliken and Falloon (2019) found, the issues and ideas that participants raise can influence the focus of the research.

With the shift to more open-ended, participatory methods, recent research has emphasized allowing participants to direct conversations. Pionke (2017) encouraged open and frank discussions with participants in interviews. They explained that participants' expertise allows them to play a strong role in developing recommendations for changes. This participant-focused approach means going beyond traditional researcher interpretation and data analysis and engaging participants in the development of recommendations for service improvement. As Mulliken (2017) explained, users with disabilities "themselves can provide particularly reliable insights into the issues and potential solutions that are most critical to them" (p. 117). Participatory design methods like these "can lead to better user experience and better services, since those who will use and experience a service are able to provide essential direction in its design" (Young & Brownotter, 2018). Our research concluded that a participatory approach to accessibility testing involving users with disabilities reflected our desire to go beyond technical accessibility.

Accessibility Testing With Users in Practice

Both because the accessibility testing initiative was the first of its kind at Western Libraries and because it included an experiential learning element, the project's development was an iterative process. Additionally, participatory accessibility testing with users in academic libraries has not been conducted much in general, so limited literature on such testing was available. Within this context, we were fortunate to have the freedom to innovate and take chances and learn from our mistakes. The following section discusses the key stages in our process, from completing the accessibility testing project to the challenges and successes we experienced during the process.

Setting the Groundwork

A project proposal for the accessibility testing initiative was submitted to senior library leadership to solicit resources to support the project. Based on critical conversations with our partners in Western's accessibility community, we knew it was important to secure resources to compensate participants for each hour of service they provided. We sought participants with specific skills and expertise, and we wanted to make sure we could adequately and appropriately compensate participants for their contributions. Additionally, we thought it would be important to secure project funding for a subscription to the leading proprietary accessibility software JAWS. However, given the project's participatory approach, we soon realized this subscription was not necessary.

It would be ableist to ask users with disabilities to participate in the testing with our prescribed assistive technology. We needed to allow students to use their own assistive devices and technologies so students could conduct the testing in a way that best reflected their everyday experiences.

Once we secured funding, we began planning the project. The first and most critical step was to determine whether the project team would apply to Western's Non-Medical Research Ethics Board. We decided not to submit a formal ethics application, citing quality assurance exemptions (Canadian Institutes of Health Research et al., 2018, p. 18). However, with participants' best interests in mind, we decided to closely follow the guidelines of the national Tri-Council research bodies (Canadian Institutes of Health Research et al., 2018). The following discussion of our methodology demonstrates that participant consent, respect, and privacy were priorities during all stages of the design and implementation of this project.

Working With Library Partners to Determine Testing Needs and Identify Digital Testing Objects

The UX Group at Western Libraries works in partnership with all functional units across the library system. A secondary goal of the accessibility testing initiative was to build knowledge and expertise about the development of accessible library content and services across departmental units. To achieve this goal, we sent an open call to staff members explaining the accessibility testing initiative and inviting anyone with a digital object or service that might benefit from testing to participate in the initiative. Four subject experts from other units expressed interest in having digital materials tested. In all cases, these experts either were still working on creating the digital materials or expected to use them as models for similar resources in the future. The individuals were very interested in participating to receive feedback on their digital items and learn tips that could apply to future work. The digital objects and services included:

- Articulate Storyline information literacy modules

- A LibCal seat and computer booking tool

- FAQs created through LibAnswers

- An information literacy module for nursing students in Western's learning management system, OWL

- An Omeka site used to display digitized archival and special collections

We were very happy with the range of materials put forth for accessibility testing because it demonstrated the wide range of useful applications for the testing initiative.

During initial meetings with library partners, we had detailed conversations about the digital testing objects and about what everyone hoped to learn through the testing. Given that our partners had different levels of familiarity with accessibility-related issues

and with accessibility testing, these discussions were important opportunities to clarify objectives, identify the research questions for each test, and determine the different roles each of us would play in the testing process. Additionally, we invited our colleagues to attend one or more testing sessions so they could observe how participants interacted with their digital materials. We found that developing partnerships with subject experts early in the process was crucial to the success of the testing; close collaboration led to the creation of more useful accessibility tests and testing sessions.

Recruiting Participants: Partnership is Key

To follow best practices that emphasize the importance of collaborating with accessibility services (Arzola, 2016; Brunskill, 2020; Pontoriero & Zippo-Mazur, 2019), we reached out to several campus partners in key accessibility-related roles to discuss the testing and the best methods for recruiting participants with disabilities. A member of Western's Accessible Education team emailed our invitation to participate in the initiative to approximately 200 students who were registered with the Accessible Education office and who had identified as users of assistive technology. The invitation outlined the purpose of the testing, described what the testing would entail, including its participatory framework, and included information about the compensation participants would receive for the time they spent testing materials and for lending their accessibility- and disability-related expertise to the initiative (see Appendix A). This proved to be a highly effective means of reaching participants: we began to receive expressions of interest immediately after the email was sent and reached our target number of participants within a few days. We had also planned to run recruitment campaigns via the libraries' social media accounts and relevant campus partners' social media (e.g., the Society of Graduate Students' social media), but we generated sufficient interest through the email invitation.

Knowing Your Participants: Pre-test Survey and Communications

For our inaugural accessibility testing initiative, we decided to conduct untargeted accessibility testing to generate broader feedback that could be used to make the libraries' digital objects and services more universally accessible. An anonymous survey was emailed to all participants prior to the testing sessions to gather key contextual information including their prior experience with Western Libraries, status at the university (e.g., graduate student, undergraduate student), and, if applicable, level of study (Dermody & Majekodunmi, 2011; Xie et al., 2020). Due to ethical and privacy considerations and best practices for user research with participants with disabilities (Pionke 2017), the survey did not ask for a specific diagnosis or statement of disability. However, participants were asked broadly to categorize their disabilities (e.g., hearing disability, learning disability). This question allowed us to determine the applicability of the testing results. Upon reflection, we realized preserving anonymity was not possible given the small participant pool. In the future, we would not make this survey anonymous; instead, we would distribute it as a questionnaire to each participant before their testing session.

Seven of the eight participants who engaged in the testing completed the survey (see Table 1). We learned that those who completed the surveys were all lower- or upper-year undergraduate Western students and that all but one of the students had some familiarity with Western Libraries' online presence.

Table 1

Participants' Self-Identified Disabilities

Disability Category	Number of Participants
Vision	2
Auditory	2
Learning	4
Mobility	1
Other	1

Note. $n = 7$.

Although the survey participant pool was small, those who contributed identified as having a range of disabilities and, in some cases, more than one distinct disability. With this group of participants, we could have five different participants conduct each test, which aligns with UX best practices (Nielsen, 2000).

Prior to each testing session, we also sent each participant further information about the testing procedures and a copy of the accessibility test script that would be used for their testing session. Although we made it clear that they did not need to prepare for the tests, we wanted the participants to know what to expect during the testing sessions (Brunskill, 2020) and to have opportunities to ask questions.

Testing Protocols: Participatory Framework in Practice

Because we aimed to limit testing sessions to one hour, we divided the five items that needed testing into three different tests: one for the Articulate Storyline modules; one for the information literacy module in Western's learning management system; and another that included the Omeka site, the LibCal booking system, and the FAQs. After creating draft tests, we sent them to UX colleagues for feedback and to the library subject expert partners. We then conducted a practice session for each test. Our practice test sessions, in which we used the NonVisual Desktop Access (NVDA) screen reader, were useful for estimating how long the tests would take in practice and for assessing their flow. Gaining familiarity with some of the assistive technologies participants identified using in the pre-test survey proved valuable. For future testing, we recommend conducting pre-testing with community members who use assistive technologies in their everyday lives to gain a more accurate understanding of how participants may interact with the materials.

Each test we conducted included an introductory section that explained the testing procedure and encouraged participants to "think aloud" and ask questions throughout the tests (see Appendix B). We reiterated participants' consent to participate and how participants would be compensated for their time. In this section we also discussed our participatory design outlook. Because we anticipated that participating in this type of accessibility testing would be new to some participants, we requested that participants give us any recommendations they had for improving any aspects of the digital materials. We also underscored the fact that we were not testing them but rather the digital items. This section was designed to make the testing process transparent and to help participants feel comfortable to share openly within the session.

Following the introduction, most of each test was designed to encourage participants thoroughly to interact with the digital materials using the assistive technology they used in their everyday lives. One of the key UX principles of usability testing is that the tests should be exploratory and allow testers to complete the tasks in a way that mimics how they would interact with the tool or resource if they were using it independently (Schmutz et al., 2017). One of our biggest challenges was creating tests that would both allow participants to interact with the digital items in a familiar way and ensure they tested particular features of the materials. For example, the Articulate Storyline information literacy modules were designed to be completed in a largely linear fashion, so we strove to design questions that both asked participants to test key features throughout the test and also allowed them to move through the modules openly (see Appendix C for an example).

In total, we conducted 14 one-hour-long testing sessions with eight participants throughout October 2020; two participants completed one test and six opted to complete two tests. All of the tests took place over Zoom. To maintain participants' privacy, we did not record the sessions. Participants were given the option to turn their cameras on for the session. They were also asked to share their screens so we could observe their actions during the tests. Because we aimed to make the testing sessions unobtrusive for the participants, limiting the number of people attending the sessions was a priority. Two of us were present at all of the sessions; we took turns leading the testing and taking verbatim notes. Additionally, two of our library subject experts attended sessions relevant to their testing materials.

The assistive devices and technology used by participants at different points in the testing included Read and Write literacy software, Kurzweil 3000, screen magnifiers, high contrast display plugins, and hearing aids. It is possible that participants used additional devices during the testing sessions; some participants moved frequently between different technologies and sometimes decided to use alternate assistive technologies to determine how well they worked with the testing materials.

The testing sessions followed a semi-structured format. While each session loosely followed its script, we followed the lead of the participants by improvising questions based on their comments and recommendations and shifting the discussion and accessibility tasks based on their actions and responses. This flexibility gives participants more control over their comments and recommendations (Kitchin, 2000;

Mulliken & Falloon, 2019; Pionke, 2017). For example, in one session a participant with a mobility-related disability had very few difficulties interacting with the testing material, and for much of the session we moved quickly through the test script. However, when the participant noticed how accessible study spaces were labelled on a certain webpage, they paused to discuss the inconvenience caused when websites do not include adequate information for such spaces. In some testing sessions, participants became frustrated when interacting with materials that posed accessibility challenges for them. In these cases, we similarly modified the script as needed.

Follow Through: Post-Test Survey and Communications

Following the completion of this first iteration of accessibility testing, we sent participants a short survey designed to collect their feedback on the testing procedure and recommendations for how to improve the testing experience in future iterations. Specifically, this survey asked participants about the factors that influenced their decision to participate in the testing, whether they received sufficient information about the accessibility testing initiative prior to participating, and whether they had recommendations for how the testing sessions could be improved. Within the six completed surveys that we received, no recommendations were made for improving the testing procedure. However, all surveys included a statement about why the participant decided to be involved in the project. Students indicated that they participated because:

- they were interested in the project and thought that it was important;

- they were concerned with improving accessibility for people generally and wanted to help;

- they thought it was valuable to include a range of perspectives in the testing;

- as a person with a disability, they would personally benefit from the improvement of these materials; and

- they believed that universities are ableist in nature.

All notes taken during testing sessions and all survey data were stored on a secure shared network to which only the research team had access. After the testing had been completed, a report summarizing the findings was sent to all participants. We requested each participant's explicit permission to include their comments in any future reports or papers written about the initiative and to include them on a contact list for future accessibility testing.

Highlights of Participant Feedback

We found that what we learned from the accessibility testing often matched guidelines in the WCAG 2.0 standards. Participants often discussed layout and design features such as spacing and chunking of information; multimedia animations, graphics, and vidoes, and information orientation and navigation through a service or webpage.

However, what we learned also went beyond compliance, providing us with a more nuanced and deeper understanding of how design choices impact overall user experience. For example, although there are standards for colour contrast in WCAG 2.0, some colour schemes that meet these requirements, and pass automated accessibility tests, can still negatively impact user experience. This concern came up in multiple tests, including the Articulate Storyline testing and the OWL learning management system module testing. During the latter test, one participant commented that "grey on black is [their] nightmare" because, even in situations where there is "sufficient" contrast between the two colours based on WCAG 2.0 standards, it often makes text "unnecessarily difficult to read." This observation helped us learn about a significant barrier that made services and webpages difficult to use.

As each service was tested, participants with varying disabilities often made similar recommendations. Throughout multiple tests, participants often mentioned the importance of breaking down content into distinct sections. Participants who used assistive technology such as screen readers found that the technology would often read text incorrectly if it was "too tight." Similarly, one participant who did not use assistive technology explained that large amounts of text with insufficient spacing and paragraph breakdowns would be difficult "for people who get visually stimulated and overwhelmed." Another participant mentioned that their "eyes have a hard time focusing when there is so much [text] there." Participants suggested similar solutions such as "putting more spaces between the text to break up the paragraphs and to break up the sections and titles" and creating "separate boxes for each subheading." This overlap in feedback highlighted key accessibility issues for many users, no matter their disabilities.

In many instances, feedback differed between the participants. For example, when testing a video called "How to Read a Scholarly Article," some participants wanted the video to move at a slower pace, some wanted to speed up the pace of the video, and some suggested that "a script is nice for a screen reader." When watching a different video with few images, one participant highlighted the importance of visual aids for people who have hearing disabilities. They explained, "If the video is saying things the text isn't saying, it would be good to add that." Each of these different solutions highlights the need for customization and flexibility in service and content design. It also demonstrates the need to involve participants with a broad range of disabilities in testing; some of this feedback would not have been captured if we had recruited participants with the same disability.

Reflections on Participatory Testing

Our experience working with the student participants was extremely positive. While we had anticipated some participants might feel awkward thinking aloud during the tests, in practice the students were generally at ease with this approach and enthusiastic about sharing their expertise regarding accessibility and disability issues in online settings. Additionally, participants demonstrated deep knowledge of and empathy towards accessibility challenges encountered by people with the same disabilities that they identified as having, as well as challenges experienced by people with other types of disabilities. For example, one participant said, "others that I know would have trouble

finding that." Such comments were very common and added a level of depth that we could not have achieved through other forms of accessibility testing. In general, an hour proved to be enough time to establish rapport with participants and for them to explore the testing materials in depth. Additionally, we noticed that the participants who engaged in a second testing session tended to be more comfortable sharing feedback in these second sessions because they were familiar with the testing procedure and had already established a relationship with us.

We initially anticipated that virtual testing would be a challenge. However, we experienced quite the opposite; remote testing benefited participants. Virtual testing was convenient for participants, and it gave them the option either to appear on video or only to use audio. All participants were comfortable sharing their screens. We would recommend virtual testing when in-person meetings are not a viable or convenient option for participants.

In future testing, we would request participants' consent to record the testing sessions rather than relying on note taking to document the sessions. It was sometimes difficult to capture all of the feedback participants provided, and asking them to repeat themselves sometimes disrupted the flow of the conversation. There are a few ethical considerations for recording sessions. Recordings contain identifying information about participants, including their names, voices, and possibly their faces, and potentially self-identifying information about their disabilities. Some participants may not feel comfortable with the idea of recordings, even if given the option to refuse recording. However, having access to participants' verbatim comments when preparing reports would be valuable because it would allow the team to more easily and reliably include recommendations from participants in their own words. A screen recorder such as Camtasia could help mitigate some of the ethical issues with recording. This software can record the audio and screen sharing from each testing session without recording participants' faces or names. This strategy might be useful for allowing some anonymity while ensuring participants' comments are captured.

Although working with library users with a range of disabilities was an effective means of generating richer and more holistic feedback, in cases where a particular feature of a digital item is being tested (e.g., the alt-text used for images on webpages or social media) it may be more useful to limit participation to those who identify as having a particular type of disability.

The overarching objective of our study was not to obtain generalizable accessibility findings, but rather to work toward establishing a methodology for participatory accessibility testing that could be used at Western Libraries and other libraries. Consequently, our study's accessibility findings are limited by the small pool of participants who tested the materials and by the uneven distribution of participants with particular disabilities who tested each digital object. Because we did not ask participants to openly self-identify as having a specific disability before or during the tests, we could not ensure each object was tested by an equal number of people with specific disabilities. If we had wanted to answer questions about the types of accessibility features that people with certain disabilities require, our testing method would not have

been effective. Additionally, using a larger participant pool would have helped us determine how often users with disabilities experience some of the accessibility concerns. However, seeking a larger participant pool would have precluded us from conducting in-depth testing sessions and limited our ability to learn about the individual, qualitative differences between participants' experiences.

As noted in the highlights of participant feedback, it was not unusual for participants to provide us with contradictory feedback. However, several accessibility issues were noted repeatedly by different participants. Although contradictory feedback may seem like a hurdle for those designing digital objects, the range of responses to certain digital materials was instructive. It highlighted the importance of anticipating that different people would use and perceive the materials differently. Additionally, such responses underscored the idea that customization and adaptability are key and there is no one-size-fits-all model for accessibility; the conflicting feedback highlighted the importance of creating digital objects that could be used and manipulated differently by different users.

It is important to acknowledge the emotional labour of people with disabilities that often accompanies participation in a project of this nature. By sharing their expertise and providing feedback, participants educate library staff and researchers on accessibility issues. Describing an experience using a particular service or tool, particularly if the experience is negative, can be emotionally draining for participants. One way we tried to acknowledge participants' labour was to provide fair monetary compensation for their work. In order to demonstrate the value of this labour, the library must act on participants' recommendations. Implementing recommendations for existing library services and spaces demonstrates the high value of participants' contributions and shows that the testing is being taken seriously. Participants' feedback must be part of ongoing work toward meaningful change in the library system. Making testing a regular practice would facilitate the improvement of a wider variety of services, and allow for an even broader variety of experiences and perspectives to be included.

Observing participants' experiences helps library staff be proactive when designing future library services and content and provides insight into how to make these services universally accessible. The presence of library subject experts during testing was extremely valuable. They found that the experience helped them to better understand the user experience and the variety of issues that users can face when exploring services and content. Because participants were encouraged to think aloud throughout their sessions, they often explained how they were feeling and how design choices were impacting their experience navigating the tests. These insights cannot be attained from automated testing or from testing with able-bodied participants, and they are critical to going beyond technical accessibility to achieve equality.

A few considerations must be made for future rounds of accessibility testing. Because compliance with WCAG 2.0 Level AA standards must already be met by the time a new round of accessibility testing will occur, there is no need to test for compliance, nor compliance with any future standards. The goal of testing should continue to focus on going beyond technical accessibility and working towards true equality. Therefore, continuing with a broad, open-ended approach to testing will ensure that participants'

perspectives and experiences are at the core of service improvements. The team now has a stronger understanding of what this kind of testing can achieve and therefore can refine the methodology to continue improving the testing process. Finally, to ensure that the library is accountable to this work, staff must continue to develop relationships with library users with disabilities in order to respond to their experiences and needs.

Summary of Recommendations for Participatory Accessibility Testing

Based on our survey of the literature on accessibility testing and our experience conducting testing, we developed the following recommendations for conducting participatory accessibility testing with people with disabilities.

Setting the Groundwork

- Acquire funding to ensure participants can be compensated for each hour of testing.

- Partner with library staff to determine testing objects and/or services.

Recruiting Participants

- Work with accessibility partners on campus or in your community to recruit participants.

- Be transparent about all components of the testing, including its methodology and objectives and compensation that participants will receive.

- Develop a strategy to recruit participants with a wide variety of disabilities.

Pre-Test Survey and Communications

- Provide participants with test scripts and any other information that will help them understand what to expect at the testing session.

- Send short pre-test questionnaires to participants to collect information about their status in the university, general type of disabilit(ies), assistive technology that they will use during the test, etc.

- Use the first question of the survey to obtain participants' consent to participate in the testing and the survey.

Testing Protocols and Structure

- Consider using an online platform for the testing if online spaces or tools will be tested. Online testing may be more convenient for participants.

- Prior to the testing sessions, collect feedback on the tests and run each test through a mock testing session to ensure it runs smoothly and is the appropriate length.

- Consider recording the sessions with the participants' permission. It can be difficult to capture all feedback through note taking.

- Begin each test with a section that explains how the testing will work. This provides the participant with an opportunity to ask questions and re-establishes their consent to participate. It is also important to emphasize that the test is designed to evaluate library materials and not the participant, and that they may end the test at any time.

- Encourage the participant throughout the session to openly share their observations about the objects being tested and their recommendations for improving these materials.

- Keep the tests as open-ended as possible; an open format will allow participants to make their own observations about the materials and recommendations for improvement.

Post-Test Survey and Communications

- Send participants copies of the testing transcript and testing report.

- Ensure that participants have received compensation for their time.

- Distribute a short post-test survey to collect participants' feedback on the testing experience.

- If planning to do future testing, ask participants if they would like to be notified of future testing opportunities.

Next Steps

The pilot phase of the accessibility testing initiative resulted in the successful engagement of users with disabilities in improving library services. Additionally, a cumulative report detailing results of the initiative was shared widely and received with interest by other stakeholders at the university, including the Centre for Teaching and Learning and the Instructional Resource and Technology Centre, both whom are key to the e-learning ecosystem at Western. Because of these outcomes, participatory accessibility testing will become a regular activity of the Western Libraries UX Group. The second round of the accessibility testing initiative will include two components. Firstly, and most importantly, the digital objects and services from the first round will be re-tested to determine whether changes implemented from the findings are effective in

enhancing the accessibility of the services. Secondly, a new call for services, programs, or spaces will be sent to library staff so we can test a different suite of library services and content.

Conclusion

Involving participants with disabilities in accessibility testing is important for ensuring that the voices of library users with disabilities are heard. As both the literature and our own testing showed, participants provided different perspectives on user experience and library services than able-bodied staff members or automated testing. When participants not only share their experience but also provide specific recommendations that could improve their experience, their expertise is at the core of changes to library services. Participatory accessibility testing allows libraries to move beyond technical accessibility by providing the opportunity to understand the perspectives of people with disabilities, which can help determine what is required to create meaningful library experiences. Ultimately, participatory accessibility testing helps us work towards equality and systemic change, creating a foundation to design services for all and improve accessibility everywhere.

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Appendix A

Accessibility Testing Initiative – Call for Participation

Western Libraries

Background and Purpose

The Accessibility Testing Initiative is part of Western Libraries' work to improve the accessibility of the libraries' services. By collaborating with library users with disabilities, the Testing Initiative seeks to gain valuable feedback that will be used to make changes to services.

With the ongoing COVID19 pandemic, this first round of Accessibility Testing focuses on the libraries' online services, such as online modules and the study space booking system. Participants will be encouraged to share their experiences and provide recommendations.

Nature of Participation

The accessibility testing will be conducted remotely using Zoom. Interested participants will arrange a date and time for their testing session, which will last approximately one hour. A few days before the arranged test, participants will receive an email containing a link to a brief survey, a document that describes the tests the participant will be conducting, the names of the 2-3 staff members who will be present for the testing session, and a link to the arranged Zoom meeting.

During the testing, participants will be asked to complete a series of tasks and provide feedback based on their experience. The purpose is to test the services, not the participants, and as such the focus will be on the shortcomings of the services.

Participants will be asked to test approximately 2 different services. This work will be compensated with a $25 honorarium/hour.

Privacy

Participation in this initiative is confidential. The identity of participants will not be shared with anyone outside of the immediate research team.

Appendix B

Information provided at the beginning of all tests (script):

1. Hi, my name is _____, and I'm going to be walking you through this session. We are not recording this session, but my colleague _____ will be taking notes throughout the session. I know that you already know some of the background information about this test, but I wanted to go over it briefly again with you and give you the opportunity to ask questions. This test is part of Western Libraries' Accessibility Testing Initiative which is designed to test library spaces and resources to ensure that they work well and are accessible to all users. As a result of this testing, the library will work to improve areas that our testing participants find to be not user friendly.

2. This session is expected to take about one hour and I will make sure that it does not go over the hour. Please let us know if you wish to stop the session at any time.

3. Your feedback and expertise is extremely important in making [Institution Library] more accessible, so as a thank you for your participation we will be sending you a 25$ gift card for Amazon. These gift cards will be sent out by email once this testing cycle is complete (around October 23).

4. I want to emphasize that we are only testing the modules today and NOT you; there is nothing you can do wrong in this test and we really want to learn about any difficulties you may have when you are interacting with the modules and your recommendations about how they could be made better. Please don't be shy about pointing out problems with how these modules work; finding out that information is the whole purpose of the testing.

5. Please try to think aloud as we go through the test. It might seem like a funny thing to do at first, but by hearing you express any thoughts, comments, questions, or concerns you have about the tool you're interacting with right in the moment it will really help us understand your experience using it. Also, could you please share your screen during the session?

6. And to double check, do you consent to participate in this test today?

7. Do you have any questions at this point? If not, feel free to ask any questions as we move through the test.

Appendix C

Example of a section from the Articulate Storyline test script

1. Please start the first segment of the module and let us know if you have any comments about the first video segment.

    a. Did you find the video, audio, and images contained in this segment accessible?

2. Now please go on to answer the first quiz question.

    a. Do you have any comments about how the quiz feature worked for you?

3. Please continue to work your way through the next couple of video segments and quiz questions. Remember to keep thinking aloud as you go through the module and feel free to pause the module if there is something you want to comment on.

4. Now we would like to hear your thoughts on the drag and drop quiz task at the end of the module. Please share any feedback you have about your experience using this feature.

    a. Do you have any comments about the design of this quiz?

    b. Did you experience any challenges in interacting with the quiz?

5. After you've completed the quiz, please use the Review Quiz feature to look at the quiz results.

    a. Do you find this feature to be accessible?

6. Do you have any final recommendations about how this module could be made more user-friendly?