Inclusive Access

An Inclusive Design Approach to Digital Accessibility Skills Training

by

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Abstract

While working as an accessibility consultant on digital accessibility and AODA compliance, I evaluated current practices in workplace accessibility training for overall effectiveness, cost, and inclusive approach to instruction. My ethnographic review led to a new design approach for accessibility training that aims to reduce barriers to access, while increasing retention and understanding. Using adult learning theory and a constructivist model for skill building, I proposed a training design that utilises topic-based, guided video segments that were uploaded to YouTube for public view. While the content's exposure was lower than expected, feedback collected indicates that there is an appetite for a more innovative approach to accessibility training.

Acknowledgements

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Dedication

Solomon; to say that you have been a monumental influence on my life would be an injustice on the impact your love, support and encouragement have been. Without you, the stars would never be within reach. I dedicate this work to you.

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Accessibility and Inclusive Design: An Introduction

Accessibility is a complex subject. Not only does accessibility bring forward challenges to design; but also, accessibility challenges the way we think of, and perceive standard design. “Accessibility means access. It refers to the ability for everyone, regardless of disability or special needs, to access, use and benefit from everything within their environment.” (Canadian National Institute for the Blind, 2017) Accessibility also “refers to the design of products, devices, services, or environments for people who experience disabilities.” (Accessability Ontario, 2017)

If a design fails to address the need to accommodate a user, then the design fails to realise it’s purpose. And while standard designs can produce viable products and services, they often fail to incorporate the needs of an atypical user. This approach to design results in a gap in the product or service viability in a truly representative group of users.

The result of a design is dependent on the outlook of the designer, and the design process they use. In very general terms, standard designs follow the standard design iteration process: define the problem, collect information, brainstorm and analyse, develop, test, revise, repeat) (Chicago Architecture Foundation, 2015, Courtney, 2017). The designer continues this process until the

design performs as expected. There may, or there may not be feedback from the potential user of the design while the designer tests for solutions.

Standard Design Process

A standard design approach asks designers to use their own observations and assumptions when they begin to craft their initial design ideas.

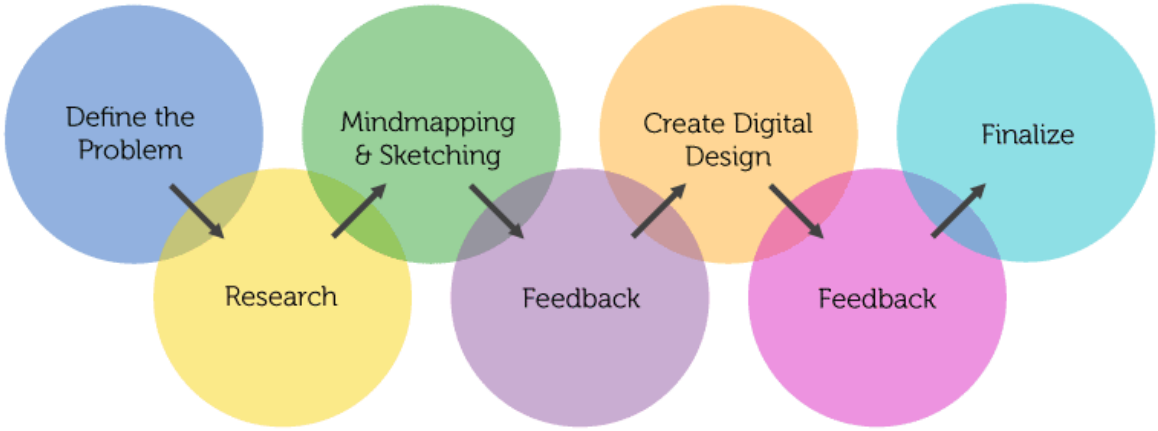

Figure 1. The basic steps for the standard design process. Image retrieved from **Johnathan Courtney's article on user research**.

However, when a designer utilises a standard design practice, there is a greater probability that the design will overlook the needs of any user with a disability. What usually occurs when a standard design is implemented and the creator discovers an accessibility gap, the solution is to remediate the design. While remediating can solve

many accessibility failures in a design, remediation does not solve all of them. Remediation is also much costlier than designing proactively for accessibility.

Universal Design Process

Universal design, on the other hand, was born of the design faults in the standard design method. Instead of using the standard design process, the universal design process tries to expand on it. Universal design encourages designers to incorporate 7 essential design principals while they build their designs: Unbiased, flexible, perceivable, effective and extensible, and capable of handling errors.

When designers utilise universal design, they try to shed as many design assumptions about their user as possible. The hope is that this evolved design thinking process will create a design that is available and usable by anyone regardless of "age, size, ability or disability" (National Disability Authority, 2012, para. 1).

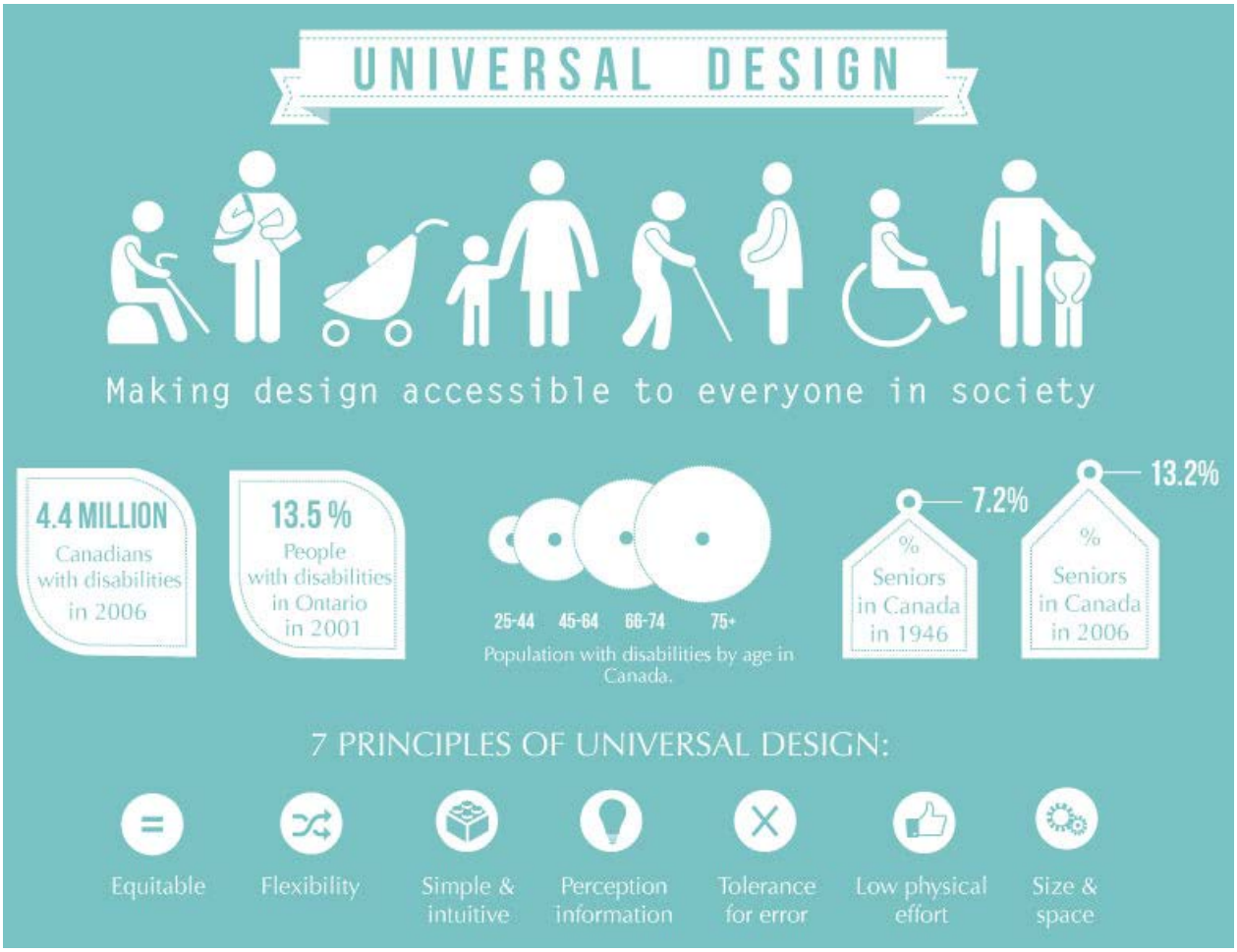

Figure 2. The 7 Universal Design principals that designers are encouraged to use. Image retrieved from **Imagineer's Home Remodeling Project**.

Universal design though focuses mainly on including disability within the design process, and how designing to accommodate disabilities is beneficial for a larger audience. This is an important distinction from the final design process I will introduce in this section.

Inclusive Design Process

The inclusive design process, on the other hand, is a "design that considers the full range of human diversity with respect to ability, language, culture, gender, age and other forms of human difference." (Inclusive Design Research Centre, 2017) Inclusive design encourages anyone who is designing or crafting something for someone else—be it a product, a service, or space—to include the needs of a person whose experience sits as an outlier within the general population in that context.

The guiding principles of inclusive design encourage designers to examine the context of their design, the user, and the method (Inclusive Design Research Centre, 2017). Inclusive designers are encouraged to ask questions, get insights from the end user and engage them as co-creators to improve the product's design. Some questions that the designer is encouraged to ask throughout the design process are: What is the design supposed to do? Who are the users? Who are the users you haven't thought of? How is the design used if the user had a broken arm/leg/hand/foot? What if the user was outside/in the dark/inside? In what way could the design be used that the designer hasn't considered? Designing for flexibility and the unique needs of each user is a cornerstone of the inclusive design framework.

Figure 3. A diagram illustrating inclusive design principles. Retrieved from the **Inclusive Design Research Centre**.

But inclusive design isn't easy, especially if designers aren't aware of what prevents a person with a disability from using a standard design in the first place. This design challenge is part of an ongoing conversation within design and consumer communities as designers seek to develop innovative ideas and expand how design thinking can evolve to address accessibility and inclusion.

For example, if a designer was designing a logo for a business, standard design practice would involve feedback loops between the designer and the business until a logo design concept was chosen. The logo's design would be built based on the business' need, and the message that the business desired to convey.

If a designer uses universal design practice, the design process would be similar to standard design processes, however, there are two distinct changes. First, the designer would suggest getting feedback from a consumer group before choosing any of the designs. Second, a designer would recommend the design undergo sensitivity and accessibility review before the design is picked.

An inclusive designer would follow a design practice similar to universal design, but, the inclusive designer would incorporate accessibility and inclusion considerations into the logo concepts before presenting it to the business. The inclusive designer would start the design process by asking questions like the ones listed above. The inclusive designer would look at the design goal from different angles and seek feedback from the intended user pool to learn more about what those users like and don't like about logo designs for that business, and in general.

Some examples of inclusive and accessibility considerations are: using high contrasting colour combinations to include low-vision consumers and high visibility

when the logo is printed in greyscale. The inclusive designer could also think about building the design so that different languages do not modify the logo design to a large extent when the brand undergoes translation. The inclusive designer tries to think of the many barriers to accessing a product that an end user may face and solves for them.

The benefit of using an inclusive design approach for the design process allows for accessibility and inclusion to be built into the design naturally, without burdening the process. With the advancement of technology and the increased reliance on these technologies, there is an increased demand and need for inclusive designs.

The Accessibility for Ontarians with Disabilities Act

A result of this increased need is *The Accessibility for Ontarians with Disabilities Act* (called the AODA for the remainder of this paper), which seeks to create a barrier-free Ontario by 2025 (Government of Ontario, 2017). Barriers, according to the act, would mean anything that would prevent the use, access, or inclusion of services for anyone regardless of ability.

The passage of the AODA will profoundly affect everyone, not just people with disabilities. As the discussions around accessibility and inclusion seeps into Ontario's societies, people are discovering that inclusive design benefits everyone. The AODA simply provides a framework for the development and implementation

of accessibility practice to build a more inclusive Ontario. The first paragraph of this act states:

> Recognizing the history of discrimination against persons with disabilities in Ontario, the purpose of this Act is to benefit all Ontarians by,
>
> (a) developing, implementing and enforcing accessibility standards in order to achieve accessibility for Ontarians with disabilities with respect to goods, services, facilities, accommodation, employment, buildings, structures and premises on or before January 1, 2025; and
>
> (b) providing for the involvement of persons with disabilities, of the Government of Ontario and of representatives of industries and of various sectors of the economy in the development of the accessibility standards. (2005, c. 11, s. 1. Extracted from The Accessibility for Ontarians with Disabilities Act, (2005))

The AODA has been refined to address key areas in which accessibility needs have been identified, "including a physical barrier, an architectural barrier, an information or communications barrier, an attitudinal barrier, a technological barrier, a policy or a practice" (The Accessibility for Ontarians with Disabilities Act, 2005, para. 6) What the AODA doesn't explain, is what an accessible and inclusive

design should be. Some areas of the act provide very specific guidance, while other areas are broad and open to interpretation.

These open perspectives can lead to confusion, even for professionals who have had previous experience designing for accessibility. But for those who have no previous experience, the AODA's guidelines are even more challenging to meet.

That is where industry professionals (often in the form of consults and training) can help by guiding businesses through the evolution from their existing practice, to adopting ones that comply with the AODA. When accessibility consultants and instructors help a business, they often do so by auditing the business' space, service or content to assess where the business is lacking according to AODA standards, and then helping businesses formulate a plan of action (Accessability Ontario, 2017). Businesses also have the option to send staff to open workshops so that the employees can bring back information that relates specifically to that business.

This problem extends beyond implementing the AODA; an additional challenge surfaced as consultants and professional accessibility instructors try to help businesses adapt AODA practice. When the AODA's guidelines are this broad, or, when there are gaps in guideline coverage, accessibility instruction for best practices must stem from the instructor's point of view. This form of instruction can lead to different standards for

implementing the same guideline. The dissimilarity of standards for the same AODA guideline can create a disparity for users who require an accommodation. This issue is becoming more apparent because the AODA requires large organisations (businesses with more than 50 employees) to have public-facing content available in accessible formats by January 1, 2016. Small organisations (0-49 employees) must meet this same guideline by January 1, 2017 (The AODA, 2017).

While the act provides a structured timeline to help businesses implement accessibility and inclusion, the outcome of the act and its goals fall outside this paper's discussion. For this paper, I will review and discuss the design approach for workplace professional skills training in digital accessibility. Because of our heavy reliance on digital communication in everyday life, I believe that digital accessibility is one of the most important areas of inclusive design and accessible design.

The approach to digital accessibility is a different approach to accessibility and inclusion than built environments or customer service. The design for digital accessibility is very challenging for someone who hasn't experienced a disability. Disabilities in this context are invisible to a non-disabled person. It is much easier to perceive physical accessibility barriers than it is to perceive accessibility barriers for a website or in a document.

Since digital accessibility is so challenging to instruct, the majority of instructors build their training almost entirely off the Web Content Accessibility Guidelines (WCAG)—which the AODA references and mandates for accessibility compliance. There is nothing wrong with using this resource, but this document is highly technical and challenging to follow, even for web developers. Additionally, this resource was not developed for document accessibility; which creates an added layer of interpretation when the WCAG is used for document accessibility standards. That makes accessibility training for digital documents and communication from the WCAG more complicated. It also means that instructors are more likely to stick to accessibility checklists when they teach in order to provide an uncomplicated framework for businesses to follow. The problem with this instructional approach is that context, and best practices are completely ignored. It also makes the instructional materials difficult to use after training is complete. While there are resources available for reference, a great deal of information required to complete the task at a later date is missing. For example, instructors know that in general, sans-serif fonts are recommended for use, because these fonts can be easier to read. However, the instructor may not mention that the text of a document should be perceivable and understandable to the end user; complex language and highly technical terminology creates barriers to understanding. I believe that this approach to instruction is not a best practice, and in my opinion, will create inaccessible experiences.

For a better training experience, I propose an inclusive design approach to training delivery. To give businesses more comprehensive accessibility knowledge I think instructional methods should evolve to incorporate adult learning theories and inclusive design. Instruction should fit the learner, and every learner and learning context is different. Providing options for the learner to choose a method that best suits their needs would go a long way. Utilising constructivist principles of adult learning theory will make training more effective, and address gaps in accessibility knowledge. I also think that incorporating digital accessibility into training delivery and training resources will allow more people to benefit from, and have access to training.

In this paper, I review and discuss the design approach to digital accessibility training and the gaps that current approaches generate. I also gather feedback from people who have completed digital accessibility training and use observations of their experiences to develop a training pilot that I believe bridges knowledge gaps, corrects for poor training delivery and provides more comprehensive accessibility knowledge more effectively.

At this time, I think I should point out that this paper discusses digital accessibility in terms of what the two aforementioned businesses experienced while training staff to meet AODA compliance. I cannot comment on training practices for customer service or built environment because it is outside the scope of this project. There is also a heavy

emphasis on the use of WCAG techniques to build training. It is also important to acknowledge that digital accessibility is more than learning how to use WCAG guided techniques. However, the review I conducted on vendor acquired training focuses on the vendor's approaches to digital accessibility, which, in my opinion, is through the lens of the WCAG. I delve deeper into this observation later in the paper, but I advise the reader to keep this in mind going forward.

Ethnographic Review: Accessibility Training

My introduction to inclusive design came from a personal experience as an undergraduate student. I found that the school's practice for communication and resource distribution at the post-secondary level was lacking. Course resources for students weren't housed online unless requested, and if they made it to the school's online platform it was in the form of poor quality scans, or non-OCR PDFs. Other format requests took weeks to acquire and usually arrived long after the resource was needed. I strongly felt that communication and student resources should be presented in ways that allowed everyone to consume the information in whatever way suited their needs (digital, print, web, etc.).

After starting the Inclusive Design program, I also began working where I could stretch my inclusive design muscles. During my experience as a digital accessibility consultant for two separate businesses (which involved digital communication and digital education support) I discovered that the barriers I had experienced as an undergraduate student were more pronounced because these two environments did not regularly think about, or consider what the barriers to access or to consume these products could look like.

The design, language, use, and product medium were all built for an audience that closely resembled the abilities and experiences of the design teams. This was problematic because designing for yourself allows for certain expectations to leak into the design, such as education level, knowledge about the topic discussed, product medium preferences, etc. These assumptions aren't realistic and potentially fail the needs of a general audience that exists outside that organisation. This design practice is also in direct conflict with inclusive design, and most likely with the requirements of the AODA.

The AODA now requires large organisations (businesses with more than 50 employees) to have public-facing content available in accessible formats by January 1, 2016, and for small organisations by January 1, 2017 (The AODA, 2017). Creating accessible content has been challenging for content creators (those directly responsible for building, supporting and updating any public-facing material, service or product) as they have come to realise that creating accessible and inclusive content requires a shift in how they build and distribute what they design.

While advising a communications team, I realised that to design accessibly the staff would require a completely fresh perspective. It also meant that all produced material needed to comply with the AODA's digital communications

guidelines, which are adapted from the Web Content Accessibility Guidelines (W3C, 2017). And while many staff were comfortable using the office's existing software to do their work, the programs the office used were significantly out of date, and unable to produce accessible content. The software needed to undergo a significant upgrade, which impacted how staff performed their work. This transition to build inclusive products meant that the entire team was required to take training; to reframe their thinking about communications processes and to update their technical skills in order to use the new office software.

I was asked to acquire technical skills training supports first. The communications manager believed that technical skills training for digital accessibility would take more time and effort than reframing design thinking strategies the communications team used. To find training, I was asked to produce a list of training resources from a pre-approved vendor catalogue that the communications team could use to upgrade their skill set. The goal was for staff to take training in parallel to their current work so the team could begin to interweave digital accessibility practices and produce AODA compliant work.

Because the employer sought to evolve their workplace and develop staff, I agreed that accessibility training from professional vendors seemed practical. Contrary to online open source documents that listed the components of

accessibility practice, professional vendors anchored digital accessibility training through instruction. I also believed that using training professionals would make this transition easier for staff since professional training instructors were familiar with training adults with various skills and educational backgrounds.

The end goal was to fully train staff so that they could handle any work they were assigned and produce an accessible format. Until staff were trained, the business needed to outsource talent to complete this work, which is not a sustainable or cost effective choice long term.

However, when employers don't know what their staff need to learn in order to comply with the AODA's digital accessibility guidelines, choosing a vendor to provide adequate training can be daunting, and risky.

It was through my professional experience that I was provided with a first-hand look at how these two businesses began their journey and how each employer would support each team as they worked towards digital accessibility compliance. These environments provided an excellent ethnographic opportunity to review the workplace training industry, the consumption of accessibility training, and the effectiveness this training had.

In the first work environment where I consulted, I was required I give feedback and guidance on accessibility needs for a project that the department was involved in. However, I quickly discovered significant gaps in the technical skillsets across the team and found that certain staff members were only involved in very small parts of the overall product. Once those parts of the product development were complete, those staff members would be switched out with other staff. The staff that switched into the team would take on parts of the project that had just come into focus. This process continued throughout the life of the project. I felt that because this project was always under development with a temporary staff that technical skills gaps were even more problematic.

This team was responsible for building a product that was accessible since it was going to be available to the public, yet the team didn't have any understanding of what accessibility meant in the context of their project. Nor did the staff know how to identify and reduce barriers to this design. It was assumed that to be AODA compliant the final product was only required to be compatible with a screen reader device.

When I looked at this project in its entirety instead of in parts I noted that each member of the team would need to understand how each of their personal contributions to the design would affect an accessible experience of the overall product. Additionally, each team member should also understand how to work with the other development

team members to resolve accessibility issues for a component in the overall design if that component failed to meet accessibility needs/AODA compliance.

When the need for training across the team became apparent, I was asked to sift through a list of approved vendors to obtain digital accessibility training from—if this kind of accessibility training was offered from the vendor at all. Any vendor I considered would also need to meet the following specific criteria:

1) Training vendors must provide training in a local space in Toronto, or through an online webinar.
2) Training must specifically cover the needs for the current work i.e., the vendor must offer condensed training on accessibility within areas that specifically pertained to digital documents, web, media and communications compliance.
3) Staff members needed to learn what they were required to know while taking the fewest courses possible. The organisation had a limited training budget and training needed to be cost effective.
4) Training should be as succinct as possible. Anytime staff were away from their desk engaged in training left the project team short-handed and delayed product delivery.
5) Lastly, the vendor must offer post-training support if follow-up questions came up after training completion, or, in the case that staff needed additional help.

As I moved through the preferred vendor list I found that most vendors didn't offer much information about inclusive design practice, or digital accessibility skills training. Instead, the list of preferred vendors mainly focused on business processes, management, interpersonal, and networking skills. Software or technical skills training were only offered within a handful of training packages and from only a few of the vendors on the list, I was given. An even smaller percentage of those vendors offered any training on current AODA standards. Additionally, the training presentation was not AODA compliant. Once I found a vendor that fulfilled approximately 70-80% of what we needed, the employer immediately began to use that vendor's services. We then looked for other resources to fill the remaining gaps.

When staff began training they started to ask me questions about accessibility concepts they were introduced to. Through these vendor-based training experiences, the staff members (from here on referred to as "learners") brought barriers to their learning about digital accessibility to my attention. I continued to search for additional solutions to provide answers to their questions and address their concerns. It was from this process that I made so many additional observations about the experience these learners had, and about the professional training industry. These observations prompted me to investigate the vendor based training models, along with other available support resources on digital accessibility. After this evaluation, I concluded that current

professional digital accessibility training creates significant barriers to learning because they produce gaps in coverage through training cost, the approach to instruction, the use of available resources, and, teaching out of date practices.

Digital Accessibility Training: Background

As the public has slowly been introduced to broader concepts surrounding accessibility and inclusion, there is also an expectation that education and training to guide inclusive and accessible practice will meet public need. What I have learned is that people assume there is a single way to make their digital content "accessible" and that one single method can be used for everything in all contexts. However, that is not the case. Instead of clarity on this subject, training vendors generate more confusion by perpetuating this misconception. Like all accessible and inclusive design, "digital accessibility" means different things in different contexts—meaning the application of accessibility and inclusion is different from one context to the next. You can't use the same ALT text (text that is used to supplement an image for someone who can't see it) for all images, as an example or even for the same image in another context (e.g., a picture of a tree frog in a photography article vs. in an environmental protection document would have different alt-text as it would be used to convey different information). This varied application (and the subjective interpretation of accessible)

creates another unique complication: information and education about digital accessibility concepts lack clarity.

Approaches to digital accessibility, inclusion, and interpretations of public responsibility vary greatly from one person to the next—in both personal and professional spheres. Because of subjective interpretations of responsibility, training and education developed by private sector organisations do not always meet needs of the accessibility community. In my experience, "digital accessibility" training explains AODA compliance as making digital content compatible with screen reader technology. This extremely narrow focus for digital accessibility training neglects other vitally important areas of accessibility like the colour contrast, use of language, logical flow and structure of content, font face, text size, images of text, navigation with assistive technology, and, the ability to magnify content without distortion.

This misunderstanding of what "digital accessibility" means is understandable though because accessibility terminology is specialised and hard to demonstrate without prior knowledge, practice, or first-hand experiences with accessibility barriers. For these training companies, it is hard to know how to train others when the trainers themselves aren't always aware of the implicit biases that they, the instructors, start with. Also, instructors do not have access to plain language resources either, because the AODA accessibility guidelines are developed from a combination of specialised practices and

the Web Content Accessibility Guidelines, or WCAG (World Wide Web Consortium, 2017). The WCAG is a highly technical guide as well, built for web designers and developers to make web content accessible. The WCAG's language and terminology is very specific to web-based work, yet it is the only guide we currently have that helps improve digital accessibility. Thus, because of the highly technical nature of support documentation available, it is difficult to clarify what accessibility means for the public. Never the less, businesses must comply with the AODA's digital accessibility guidelines. If an employer has no prior exposure to accessibility practice, this task can feel particularly overwhelming.

Accessibility Training: Problem Space

AODA compliance has allowed for a niche market to form around training for accessibility. This niche market has been both a blessing and a curse for consumers because most training options are overpriced, outdated, or overbooked. Training sessions are also provided infrequently, which continues to inflate the cost of training.

To further complicate things, the Government of Ontario didn't provide much information about accessibility practices prior to the AODA's introduction. Which allows for inadequate accessibility training to be perceived as better than having no training at all.

Lastly, digital accessibility training is available only through select vendors, and in restricted formats (webinars, in-person classes or as online text-based supports). There are alternatives to vendor training, such as open license material. Openly licensed resources can usually be found through tech support documentation, blogs, or other user-made training. Openly licensed information is more widely distributed but comes with its own set of risks and barriers for learning.

Training Resources: Professional Vendors

Professional vendor training for digital accessibility is usually offered only once a month and with extremely limited seating (8–12 seats per course) (Eliquo, 2017). Offering training this way creates artificial inflation. Plus, this form of training only works for companies who can afford to use a training vendor in the first place. The average cost of a single course for digital accessibility training from a licensed Canadian vendor costs approximately $500.00 per course (Accessibility Ontario, 2017, Eliquo, 2017).

What's worse is that digital accessibility content from these vendors is featured in a course alongside regular training material—accessibility content does not get a standalone course. Using this method of instruction means that digital accessibility concepts may only get 10-15 minutes of coverage within an 8-hour training session. Additionally, instructors only discuss what learners need to do for AODA compliance, to

avoid legal risk. Instructors don't touch on any of the logic or theory behind digital accessibility guidelines or explain to learners how to take this newly acquired information and integrate what they learned into everyday work. Training is focused on remediation (fixing or repairing a document for accessibility and AODA compliance), not design. This means that learners don't learn how to remove barriers when they design content; learners are taught how to compensate for them. These vendors are in the training business to make money, and training companies earn more if training content is spread over several courses, and blocked up as "beginner, intermediate, and, advanced" topics. Because these courses usually require another course (or courses) to be taken first, the result is that accessibility training for one topic could cost at least $1500.00 per employee based on the average cost mentioned. That is a significant burden on any employer.

This approach to accessibility training could take months for a learner to complete if the employer can't enrol their staff into consecutive courses, or enrol learners for consecutive courses in a timely fashion. Delays to complete training could also be related to associated cost, conflicts with production schedules, or, the number of seats available to register for a course. If a learner is forced to wait too long between training sessions they are likely to have trouble remembering the concepts they learned previously. A lapse between courses creates another barrier to learning because learners

then have to pick up where they left off (sometimes after significantly long periods), and struggle to continue learning, despite the time lapses.

But there are other resources to help learners that must wait significant periods between training sessions, or, for employers who cannot afford to enrol staff in expensive training programs. Learners and employers always have the option to use other available resources that can help fill in gaps or to supplement expensive course costs. That is where openly licensed publications and resources can be helpful, but using openly licensed materials comes with some risks.

Training Resources: Open license, Creative Commons

Openly licensed material can offer a wealth of information that is directly and indirectly, related to digital accessibility concepts, training, education, and guidance, but the reliability of these resources can be perceived as less professional than corporately offered training. This point of view is unfortunate because attitudes about the material largely stem from where it can be obtained. Unlike training companies who have access to secured platforms to house their training resources or webinar recordings, independent content creators (anyone who builds digital content for another person to consume, such as web pages, media, documents, etc.) usually house video-based instruction on free or public websites like YouTube, Vimeo, etc. to reduce production

costs. Public websites like the ones mentioned house content from a vast selection of sources, but none of the material is vetted for authenticity before it's made public. That practice, unfortunately, brands all instructional content as questionable, including material that comes from a reliable source. Additionally, independent content creators may not have access to professional tools to build their training, which can result in content that appears amateur.

Poor sound, low visual contrast or a lack of subtitles can cause significant barriers to the learning experience. And though the appearance, or sound of a creator's work does not indicate its quality, it is often perceived to. The content creator needs to have a clear understanding of ways to reduce barriers for the learner while also providing reliable and accurate information. It is often the case that if a content creator can't achieve the same level of quality that is obtained from "professional vendors", viewers may avoid using it out of fear that the material is unreliable.

Online content creators that build content independently aren't required to adhere to a release schedule or update their content regularly either. Many do, but it is entirely possible that a content creator who makes quality content from reliable sources, is only able to produce material for a few months.

That being said, open license material is more flexible than vendor training sources in that the process involved is more open and transparent since creators share ideas. This can make the content more open to review, and better reflect current industry practices. Additionally, not every online independent project is abandoned, and if one person leaves a project, others can pick it up to keep it going.

Openly licensed training is a free to obtain source that can be internationally available so more people can benefit from the information. Open license training models have tremendous potential to provide relevant and quality instruction—if learning material is presented in a way that benefits the intended audience. This is a difficult goal to achieve, and not just by open license contributors.

Training Instruction

The quality of a learning experience is directly related to the quality of instruction (appropriate, current, engaging, memorable, helpful) the learner receives. This is true regardless of where the training is obtained from. Creating accessible and AODA compliant digital content requires a set of skills that the learner may not otherwise need for their work. With a business' sudden need to be compliant, staff members are expected to understand and apply accessibility techniques to their work—without prior exposure to them. In my experience, staff from the two businesses I worked with

expressed that complying with digital accessibility standards under the pressure from the AODA compliance is very stressful. Therefore, it is very important that this training and any related learning material is provided in a concise and applicable way.

Wooden, or, unengaging instruction is one way that workplace or skills based training can be ineffective. AODA compliance training is usually taken out of necessity, not preference, so it is important to engage the learner with the material as much as possible.

It has been my experience while reviewing various training resources that the instructor will provide the list of accessibility criteria that the content creator is responsible for. The learner is meant to take said list and apply the criteria to all work the learner would produce going forward. Sometimes there is information about how to implement accessibility criteria in a piece of software, but the implementation provided to the learner is not always up to the level that equates current best practice. For example, the instructor may show the learner how to fix a PDF that isn't accessible, so that it can be used with assistive technology, but the instructor won't address how remediating a document doesn't solve inaccessible designs. At the point of remediating content, the design process is finished. So even if the PDF can be remediated for use with assistive technology, there are a slew of other barriers that that technique cannot address. This instructional approach is inadequate because it doesn't solve problems

where they start. It tacks additional work onto the workflow once the design is complete. The learner is then responsible for additional work at their workplace and doesn't learn what best practices are, so that they can evolve their workflow.

It is important that when a learner seeks information about an accessibility training topic that they are also provided with:

- Specific instruction on how to successfully implement accessibility concepts for that topic.
- Access to information about other criteria that can directly influence the chance to successfully implement accessibility for the main learning topic.
- Information about the reasoning behind the need to implement that topic's digital accessibility criteria.
    - Information to explain why making this specific component accessible to others is important.
    - How this digital accessibility component influences other components that are related to accessibility and AODA requirements within that context.

Without incorporating these considerations into accessibility training topics instructors only increase the gaps in knowledge instead of filling them in.

Training Content Relevance

Additionally, there is no guarantee that the learner is going to find learning material that supports current AODA standards from training vendors, or from open license material. Since the AODA is adapted from the WCAG and other accessibility recommendations (for the built environment, etc.), the AODA standards for digital accessibility that learners need to understand are subject to current best practices. Digital accessibility best practices regularly undergo updates and improvements. The World Wide Web Consortium modifies and adds updated content into the WCAG technical support documents/websites; the driving force behind WCAG practice. Additionally, the World Wide Web Consortium provides another evolving support resource, the Web Accessibility Initiative (WAI) that content creators should use to learn from and develop best practices.

Unless the instructor reviews these practices regularly, the material they host will end up providing incorrect instruction. At the time of this writing, the WCAG guidelines have had one complete revision, with current guidelines following WCAG 2.0 recommendations. Version 2.1 is currently a public working draft, which improves on prior recommendations, and expands on the methods already provided in WCAG 2.0 (W3C, 2017).

Digital Accessibility Training: Real-World Contexts

Through my professional experience, employers slowly try to incorporate digital accessibility practices into their existing workflows in phases, or steps. Initially, when training commences, they seek to train a single staff member as a subject matter expert so that digital accessibility can be "added" to all public work post-production. However, building accessibility into work is most effective when designing with digital accessibility in mind at the start of the process and then building it into the design. It doesn't take long for learners to realise that building digital accessibility concepts into content requires a bigger commitment than just a single subject matter expert.

Once this realisation is made, learners approach their employers. Employers are then faced with bringing all staff that create, or contribute to public facing digital content up to equal technical skill levels. For employees, this prospect can be anxiety-provoking or threatening if the employee feels less confident in their ability to learn new software skills. For employers, it's a newly added expense that they need to fit into an already taxed working budget just to comply with the AODA's digital accessibility guidelines. For everyone, it usually means time-consuming skills training before anyone can get to learning accessibility concepts.

Any accessibility training investment is not a small one. Once employers make the commitment to train their employees on digital accessibility guidelines, the employer needs to be sure that the trained employee will be able to perform any, or all accessibility related tasks associated with that employee's respective duties.

For some employees, this arrangement works. The accessibility trained employee returns to their regular duties better informed of how to perform that work with an accessibility outlook. For other employees, the scope of their required work changes drastically once training is complete. The accessibility trained employee becomes the "resident expert" for their employer, and then that employee ends up responsible for everything related to digital accessibility in that workplace.

It is not uncommon for employees with digital accessibility training to gain "new" responsibilities when training is complete. Some employees strategically agree to complete digital accessibility training so that the employer will think carefully about which employee to "downsize" if the workplace struggles financially. However, it is worth pointing out again that designing content accessibly requires more than a single resident expert.

The aforementioned experience as a digital accessibility consultant left a lasting impression. As I continued to work in this field, I was hired at another, similar work

environment, though performing a slightly different digital accessibility consultant role. For this business, the production team worked collaboratively on all assigned work, and I was asked to contribute the accessibility component of this workflow.

When I began my role, I discovered that I was the only one with any training or knowledge in digital accessibility best practices. However, the work I was provided had already received final approval. By the time material reached me it was too late to make any changes to the design—even if the approved design compromised the item's accessibility. Of course, no one wanted to produce inaccessible work, but at the same time, no one realised that the way work was being developed would be inaccessible.

I voiced my concerns about this to my employer and coworkers. I explained some of the barriers that were being produced with the current workflow model. Like my previous experience, both the employees and the employer were receptive to changing their workflow methods, but no one knew where to begin. There was no ebb to the flow of new work projects, which meant that employees would need to learn as they went, and incorporate digital accessibility skills as soon as it was possible. Designs in progress could be re-evaluated if there was enough time, and new designs would need to be examined for accessibility barriers before they moved forward. There was one problem though. Before this new workflow could be effective, employees would need to be on the same page about what practices the office would use as a new standard.

The employer asked if I had any recommendations for staff on how to learn digital accessibility concepts. There was a unique caveat to this request though, this was a small office with an even smaller training budget, and there was little time for the employees to invest in extensive training programs; was it possible for the staff to learn whenever they had free time? Did I know who could do that?

Immediately, Lynda.com came to mind, an online video-based training website that was widely used for workplace training. But, did the Lynda.com course library have enough information about digital accessibility? Did Lynda.com's digital accessibility training focus on design techniques or just remediation? What about software specific concepts and strategies? Could staff learn about non-technical skills related to digital accessibility, like inclusive design thinking strategies?

Upon closer examination, I discovered that of the nearly 6000 courses available on Lynda.com, there were only six courses tagged to contain any accessibility content (Lynda.com, 2017). From this small selection of courses, one course discussed design thinking, while the rest focused specifically on remediation techniques, and only in a select few programs. However, the approach that Lynda.com takes with training would suit the needs of this office very well. Courses are broken up into short video modules that can be viewed at the learner's convenience. If the learner only had a few minutes to dedicate to their training effort, they could fit that training in, and continue progressing

at a steady pace each day. Should a learner forget something they watched, they have the option to return to a previously viewed video and re-watch it. This is a benefit to learners, and re-watching a video carries no penalty, nor does it interference with the rest of the learner's course progression.

I then realised a common thread across these two workplaces. In both situations, the employer wanted their employees to engage in training, but the commitment to training was a significant resource drain for daily workflow. The problem was that digital accessibility training content to support the learner's need was not available in a format that also supported the needs of the work environment.

We're Not in School: Educating Working Professionals

The context for which adults learn with workplace training is very different than learning that takes place in an educational context (Javadi & Zandieh, 2011). It's very important that the learner's prior experiences and knowledge are taken into consideration when the training is developed (Huang, 2002, Javadi & Zandieh, 2011). Therefore, workplace training can't use the same approach that instructors use in other educational settings because this would introduce unnecessary barriers to the learner's experience.

As I examined the pain points (sources of frustration) that the learners provided me with about their experience with digital accessibility training, barriers began to emerge in part due to deviation from recommended practices as documented in the literature on adult learning theory. One of the first barriers learners identified was when training is built with a bias against a learner's knowledge. This occurs when an instructor assumes that the learner has no pre-existing knowledge on the training topic. The instructor insists that the learner takes all basic level courses before enrolling in any advanced training. This approach takes away the learner's agency to jump into training based on where the learner believes their personal knowledge gap exists. It also forces

learners to invest significantly more time in training than may be necessary, and can also result in high dropout rates if the learner believes that the material is a waste of time.

This isn't to say that instructors are deliberately forcing learners to waste their time. But this is often the result of training that is designed linearly, or when a learner is forced to switch training sources. Different training on the same topic, but developed by different instructors will unfortunately not transfer to one another easily. Linear training approaches do not have the flexibility needed to use the learner's pre-existing knowledge as an asset, or resource. Drawing upon a learner's skills and experiences can boost the learner's interest in learning. Learners who see training as additions to their "reservoir" of skills (Imel, 1998) rather than a repeat of what they know are more likely to engage.

Online Delivery: Rethinking Training Design

Getting a learner's attention and maintaining that engagement during a training session is even more difficult in an online context (Meyer, 2015). With the majority of workplace training (both soft skills and technical skills) now delivered online, it has become more important to allow for flexibility in the training's presentation. This barrier is a very challenging one for instructors to surpass. There may be several reasons why a training model is being used, even if it doesn't work for everyone who uses it. In addition

to that, many training designs are built from and reference an older model of learning. The landscape for learning has changed with the introduction of the internet, which has provided an excellent platform for workplace training, but, it also allows learners to become easily distracted. To fix this, Meyer argues, training needs to be moved away from book based learning designs, and adapt itself to the unique environment in which it is consumed (2015). Linear approaches that assume the learner has no prior knowledge of the topic–even topics on digital accessibility, do not build onto the learner's skills or contribute to their reservoir of knowledge. It is important that the training is balanced, and incorporates layers of information that learners can access based on what they already know.

Don't Re-Invent the Wheel

Another way to keep learners engaged with the content they view is to teach using narratives (Merriam, 2008). That is not to say that it is important to train by storytelling. Rather, it is important for training to have a fluid and cohesive narrative that ties the material together so that the learner can make sense of it. Learning through narrative allows the learner to add the material they are learning to what they already know. It also allows the learner to take what they've learned and understand how to apply it to the workplace context. This is especially important with digital accessibility training. Learner's identified that the training they took strictly told them how to make

material accessible post production (remediation). There was very little if any coverage in the training that discussed how to build more accessibly from the start to eliminate the need for remediating their work. Digital accessibility training did not teach learners how to modify what they already knew. Instead, the training added to the workload by creating an additional, unnecessary step to their workflow process.

This training approach doesn't allow the learner to weave this new knowledge into their work "narrative", or evolve their design thinking. The learners commented on how they routinely need to check resource material to be sure that they haven't forgotten to include accessibility considerations once their work was finished. Digital accessibility concepts remained an outside separate practice that intruded on the learner's workflow, instead of becoming integrated with it. Including a narrative within the training material is another key factor that the instructor should take into consideration when designing training for a learner to use.

Fill Knowledge Gaps

Along with a cohesive narrative, it is important that there is an opportunity for learners to self-direct their learning (Huang, 2002, Larson, 2013). It is important that learners can learn the way they feel most comfortable. This is another facet of learning that moves away from the linear approach that I observed from the vendors I reviewed.

Workplace training deals in a unique situation where everyone participating is a respected professional, including the instructor. However, it's very important that the expertise of the learner's profession is taken into account when approaching the learning material. Not every learner has the same skill set coming into the training, and each learner has valuable experience in their respective field that they hope the training will compliment and grow.

Training for All Ages, Skillsets, and Experience

Some learners expressed concern that the instructor rushed through software techniques used to execute digital accessibility concepts. Contrary to the learner who may have advanced skills or prior knowledge in the training topic, some learners may have some advanced knowledge, but weaker technical skills. Because digital accessibility training attracts learners from diverse fields, a linear approach to digital accessibility training will not work in this context. Training needs to be malleable enough that learners can obtain specifically what they need for their individual workplace contexts (Javadi & Zandieh, 2011). In this case, modular training would be ideal because it allows learners to approach their training based on what they need to learn, according to their duties (Huang, 2002). Prescribed, or, cookie cutter courses just don't work.

Rationale for a New, More Inclusive Design

In order for a new design approach for digital accessibility training to work, the design requires a better understanding of the audience the training is meant to serve. Based on my review of adult learning theory and workplace observations, new training designs would need to be:

- Available in an online format so that the training can be accessed anywhere (Huang, 2002).
- Available in a format that learners can visit and revisit easily whenever the learner has time.
- Available in a flexible format that allows learners to self-direct their learning, in whichever way that meets the needs of the learner's work environment.
    - Any information that directly influences digital accessibility, but is not part of that training topic should be referenced and resources to these referenced topics need to be provided. For example, training on how to mask hyperlink text in a digital document should also mention that if a document is available to print, the link's full URL needs to be included at the end of the document.
- Able to accept learner questions, feedback and comments on training material so that gaps can be addressed and included in design revisions.

- Conscious of the learner's time.
    - self-contained training topics should not exceed 15 minutes in length.
    - Concepts that require more in-depth attention should be presented in a sequence of parts that can be as self-contained as possible.
- Free to the public.
    - No digital accessibility training should produce a barrier to access for any learner because of cost.
- Available in an accessible format (The Accessibility for Ontarians with Disabilities Act, 2005).
    - At no time should digital accessibility training material be made available in a format that doesn't also comply with the guidelines that it teaches.
    - Training resources should also include audio transcripts and any references that were used to build training so that the learner can review what the material has been constructed from, or review the video transcript at a later time.
- Presented in a way that shows the 3-way interaction of inclusive design.
    - Training should answer "what is it?", "why do we need it?", and "how do we do it?" for each guideline discussed (Javadi & Zandieh, 2011).

- Aware of non-assistive technology design practices to inform the learner that designing accessibly is not designing for screen reader compatibility; there is much more to it (The Accessibility for Ontarians with Disabilities Act, 2005).

On further reflection, this format also shouldn't penalise the learner if they need to revisit material they have already viewed. Nor should material prevent the learner from viewing material "out of order", which would allow the learner to self-direct their learning. The purpose behind this training is to help the learner build upon existing skills, or, to help them build skills they do not have; digital accessibility training should contribute to, and expand on the learner's reservoir of knowledge. I didn't feel that current designs supported this outlook very well. Additionally, training focus needs to incorporate ways to remediate existing content, as well as to approach design and creation of new content in an accessible way. In other words, designing accessibly calls for a culture shift in the design approach, and evolve the learner's approach to their work. Not just in how digital accessibility training is consumed by the public, or, how the public implements the knowledge learned, but how the training is designed for the public as well.

Inclusive Design: Idea Development

To begin, I examined the key factors that informed the learner's need to create accessible work from my ethnographic review. Because the end goal for employers was to train their employees so that the business could be compliant with the AODA, I decided to examine AODA digital accessibility guidelines first. I had to narrow the scope and examine the specific context for these employers and potential learners so that the training needs could be correctly identified. According to the timeline set out by the province of Ontario, businesses were preparing for January 1, 2017's compliance criteria; "make all your public information accessible when asked" (Government of Ontario, 2017, para. 8).

Once I had identified the business needs, I reviewed the key factors for accessibility in relation to the content these two groups would most likely produce. Since both groups were document-heavy agencies, the main software that they were required to use was for word processing, PDFs, and forms. This means that these two groups would focus their effort for training so that their document production resulted in accessible and compliant documents for the public.

Training Scope: Size Matters

Specifying the scope of the work was key in identifying the training needs of these learners. I could take the context of these two groups and cater the training framework to fit this need. I could then reuse this framework to develop training material that would benefit others whose training needs were similar. First, I examined the software that the learners would be using and became familiar with the pitfalls and shortcomings (if any) in the program's capability to produce accessible designs. If issues were discovered, I made note of these problems so that I could find ways to reduce or remove the issues when I discussed training concepts that were affected by them.

Because the primary software the two companies used was Microsoft Word, there were plenty of resources available on the Microsoft support website. I began with the built-in tool that Microsoft used to help content creators audit their work for Section 508 Guidelines in the United States. Since Section 508 also uses Web Content Accessibility Guidelines 2.0 as the standard for digital accessibility (United States Access Board, 2000), this auditing tool was a great way to deconstruct the various digital accessibility criteria used in a document for the purposes of training.

I also used Microsoft's tech support forums as a tool to help solve quirks and issues that could come up for learners during the training process. When I found the

appropriate support pages, they were included as a resource or reference for any training that may require it. I did not want learners becoming frustrated with their documents while trying to internalise new skills. I hoped that providing this extra information would reduce any negative impact that making changes to a document might cause. For example, one training topic would touch on document breaks and advise the use of multi-column layouts to replace text boxes. For this specific concept, I thought that including the tech support pages on the use of columns would be beneficial to learners if they needed additional supports carrying out this technique to make their content more accessible.

Design Decisions

Building Backwards

I began by examining how Microsoft's Accessibility Auditing tool audited a document and assessed the criteria Microsoft used to generate a pass/fail result. What I discovered was that the Accessibility Auditing tool, the *Accessibility Checker,* divided the criteria it used into three main categories: Errors, Warnings, and, Tips (Microsoft, 2017).

A content creator receives an error when an element of the document creates a significant barrier to anyone who has a disability or uses an assistive technology device. Warnings are less severe, and cause barriers to many people with a disability, though not all users with disabilities will experience difficulty. Lastly, Tips are provided when the auditing tool discovers content that, if presented differently, would be easier for someone with a disability to use or understand. With these criteria in hand, I was able to break down the key components of a document based on the severity of the audit result. For example, an image that does not have alt text is categorised by the audit tool as a significant barrier and it would produce an error (Microsoft, 2017).

This three-category system allowed me to capture the most critical topics that learners would need to understand in the context of their work, using a tool they were familiar with to ensure that all work met the required standards (Javadi & Zandieh, 2011).

One Piece at a Time

This discovery led to a divergence from existing training methods to the approach I decided to use. The material that I found for auditing the accessibility of a document was from a technical support manual, broken down into a table to illustrate problems and solutions for the audit criteria. The very nature of this material though was non-linear. When I reflected on this further, I realised that AODA digital accessibility criteria are based on WCAG 2.0 guidelines. These guidelines were also separate, detailed concepts that were presented individually, and built off one another to create an accessible experience. Therefore, I believed that it did not make sense to present any of this information in linear form to the learners.

It also made sense to build training material from the audit tool because training would then align with the tool learners used to check their work. Not only that, the criteria that Microsoft featured in the auditing tool were based on WCAG 2.0 guidelines. Over time the tool would evolve with the software, according to WCAG changes. Additionally, the support manual broke the criteria down into specific categories that were self-contained. Each topic required enough attention that it was possible to discuss each criterion on its own as short individualised tutorials.

Using What Learner's Know

This discovery supported a constructivist approach to training instead of a standard approach to inclusion, and would also align with Huang's review of education for online learning environments (2002). Specifically, that working professionals bring a diverse set of skills and professional outlooks with them to the learning environment. Building off those skills and experiences will solidify the concepts that the learner is trying to retain (Imel, 1998). Because the goal of workplace education is competency, and then mastery of the skills learners need to do their job (Javadi & Zandieh, 2011), this approach seemed like a better fit.

For learners to obtain competency in each digital accessibility topic, training would require a brief overview of how barriers were introduced when no accessibility considerations were taken. This would illustrate to the learner context specific reasoning for the theory that drove digital accessibility practice. The instructor could then demonstrate how the criteria were implemented in the learner's software, using tools the learner was familiar with.

From my observations, I discovered that using a familiar environment helps reduce any anxiety the learner may have about learning new concepts. During my ethnographic review learners previously identified that current training practice used

remediation techniques instead of showing the learner how to integrate the concepts into their existing workflow. By showing learners the steps required to implement accessibility, in their own environment, it allows learners to visualise how they could integrate the work into their daily practice. The familiarity of the tools used would also reduce learners' anxiety about successfully implementing the accessibility criteria.

Designing for Diverse Skillsets

For others who have less technical aptitude, seeing the familiar environment would lower the barriers to competency and eventual mastery of these concepts. These learners may not have used the tools mentioned in the training segments before, but the training is less intimidating in familiar environments than learning to use new software to do the same work (Chin & Hastings, 2006). I mention this only because there is no guarantee that all learner skill sets are equal, and, if they aren't, it is possible that a learner will not identify a weakness in their knowledge (Javadi & Zandieh, 2011). Therefore, the training should be sensitive to the diversity of the learners who may end up using it.

The point above further illustrates the need for layers of information within training. Because all learners take accessibility training to learn digital accessibility concepts, showing how tools are used within the software to execute those concepts

provides valuable knowledge for everyone. For example, some learners may be comfortable inserting images into a document, while others may not. But, all learners need to understand how to add ALT text to their images, so covering that process from start to finish would make sure that all learners have the same information once training is complete. The inclusion of technical skills training within accessibility training doesn't need to take very long or take the focus away from the digital accessibility concept. It will, however, cover any gaps in how the tool is accessed, and how to use that tool to create accessible content.

Developing the Training Scope

I then took the list of accessibility criteria and began to map out topics that could be generated from the support document, including sub-topics and supporting technical skills. I was very conscious about how much information would be required to discuss and evaluate all criteria, and, in some cases, I was able to pair two or more concepts together if they solved the same digital accessibility barriers.

I also noted any topics that couldn't be solved with the accessibility auditing tool and tied them into the overarching accessibility narrative. I knew it was important to discuss both criteria that were automatically audited and ones that required the learner's manual check. Especially because digital accessibility is more than just WCAG techniques. However, it is easier to introduce topics surrounding digital accessibility when there is

concrete information to reference. Starting training with abstract constructs, on the other hand, would be much more difficult.

To help learners remember how the criteria are related, I tried to pair them up as best I could with other, closely related topics. For example, one such topic included three criteria that affected the presentation of paragraph text to a user, line spacing, paragraph spacing and font size. None of these criteria could be automatically checked by the auditing tool in the software, but these three topics were closely linked and could be integrated into one segment. It was also more likely that the learner would associate them as one topic because all three criteria could be accessed through the same area of the ribbon menu of Microsoft Word.

Modern Training Design Requires Modern Delivery

What I found interesting was that even though these topics were complex and required attention to detail, they could be covered in short segments, that lasted no more than 12 minutes. This would respect the learner's time and allow them to access the training whenever they could without having a large demand on their daily schedules (Huang, 2002). These bite-sized segments would also be much less intimidating than other full-day course options, especially if the learner only needed training on some of the topics. The next challenge I faced, was what format to provide the training in.

Immediately, I knew that in-person training would not work for this design. It would simply be too time-consuming for the instructor to schedule and organise bite size training in multiple workplaces, all over Toronto. Likewise, synchronous webinars would also present some challenges with organising and scheduling sessions as short as these would be. Also, if any technical issues should arise during the sessions, the entire segment timeslot would be used attempting to resolve them. That would only waste time.

Pre-recorded training segments seemed like the best option to preserve the short, self-contained, self-directed learning. Additionally, various literature on workplace training pointed to the success of Lynda.com's training website, which has been using pre-recorded training for years (Larson, 2013, Martin, 2015, Meyer, 2015, The New York Times, 2012).

Compared to other training websites, Lynda.com was considered a step above other options because the training segments provided guided instruction by professionals who had expertise on the topic they discussed. Meyer (2015) argued that this was significantly more effective than handing a script to an actor who usually made the training experience feel comical. Additionally, other leading Massive Open Online Course Companies (MOOCs) didn't offer the breadth and flexibility that would fit the style of learning that suited this training design. I examined Corsera, Udacity, and edX,

which all provide similar online training environments and content; yet I still returned to the Lyda.com platform because their self-paced, self-directed model fit best with my design approach.

Once I knew what style and format the training would be offered in, I knew that I had to be sure that I understood why the pre-recorded short segment videos would work. According to Lynda Weinman (founder of Lynda.com), the reason that she felt the recorded videos were so well received was because they complimented in person education (Larson, 2013), with the added benefit of an individualised learning path. No one course required a student to view all the material. Learners could simply view what they needed to complete a task, or, expand their skills base. This lets learners customise their learning outcome, while still getting the guided tutorial that mimicked a 1:1 learning setting.

When I uncovered this piece, this training approach suddenly made perfect sense. Time and time again when I was growing up, if I asked for help with a task, especially a computer related task, I would always insist on verbal instruction while I performed the task myself. If someone guided me on how to do the task while I performed it I found the information easier to retain. So, to me, it only made sense to follow this same instruction design for this type of training.

Building a Professional Tool

Once I decided on the approach I wanted to take, I realised that there were a set of standards that the learners would undoubtedly have when they viewed the material. It was important to me that what I produced performed as closely to professionally created productions as much as possible. I felt that this was necessary if I was going to find out if Lynda.com's approach for digital accessibility training would work. To accomplish that I decided to learn more about video production so that I could to do my best to recreate a similar experience.

I re-evaluated the WCAG criteria again, this time using a different instructional perspective. I jotted down notes the same way that I would for speaking at a meeting, or for public speaking in general. I figured that this approach would work better with my new design approach over trying to build a full course outline. I also started digging into best practices to produce training media—something I had never undertaken before.

I began by evaluating what I believed were the critical components to produce this medium so that it would be deemed "good quality" by learners. I started developing my standards by evaluating what was already being produced by media industry professionals and comparing it to openly licensed, user-made alternatives. I used an ethnographic approach for open license reviews and searched for comments on user

made videos that were hosted on popular media websites such as YouTube, Vimeo, Dailymotion, and Twitch. For the professional review, I consulted articles and blogs from experienced media producers who offered their own tips and techniques to beginners.

One particularly helpful professional resource came from a veteran YouTuber named David Turnbull. His blog gave a detailed process for amateur video creators to follow, including tips on script building, video length recommendations, and general screencasting best practices like cursor movement and how to guide a viewer's focus (Turnbull, Jul 12, 2016). These tips and practices matched what was reflected in the commentary for David's and other well-received YouTube videos. This information provided a valuable framework that I could build from. I took this information and started building drafts of training outlines, and tried to create guided instruction like the example below:

> Paragraph Formatting/White Space—Topic Introduction;
>
> In this episode we will examine the use of white space between document paragraphs to increase a document's accessibility. White space is empty space in a document that is formatted with many tools in Microsoft Word to serve specific purposes. (Godin, 2017, p. 1)

Where Training Would Live

The next decision I needed to make was how learners would access the training. Unlike other MOOCs, I did not have a domain name at my disposal, nor did I have my own online storage to provide learners access to download or stream this content. I also wasn't sure if this design would be well received enough to invest in any of this technology; it would also be very difficult to pay for online storage, or a domain while keeping this access free to the learner. Since one of the barriers learners identified was the cost associated with training, I wanted to do what I could to keep everything free to the public.

Then I started to investigate online storage and streaming services. My preference was to stream media to mimic the learning giant, Lynda.com's environment more closely. This decision led me to review services like YouTube, Vimeo and Daily Motion. I was immediately drawn to YouTube, mostly because of the recognition the site had since its acquisition by Google. However, before I decided on a service I thought it was important to check and see if the site met any needs that I thought my training would have:

- Similar material or training content as my training segments

    - If the site didn't typically host software training skills on the platform I was using (Microsoft Word), then learners would not go to that site to look for any training of that kind.
- Video referrals/recommendations
    - A part of Lynda.com's appeal is based on the referral system the site uses to connect learners with content from the training library. When a learner views a video, related videos are shown on the right-hand side of the screen. If a learner wants, they can jump topics to customise the learning experience.
- Video playlists
    - If any of the training segments required a sequence of videos to tie the concept together, it was important that the sequence could be placed into a playlist to make it easier for learners to find connected content.
- Support Closed Captions (CC) and transcripts
    - The training segments should provide an example of accessible and inclusive design. Therefore, it was important that the site supported CC and transcripts for learners who may need it.
- Didn't create accessibility barriers for learners who used assistive technology

    - Content featured on should support the same pedagogy as the training. If a learner required it, then the site and the hosted videos should all be navigable with a keyboard.
- Allow learners to communicate and provide feedback to the content creator
    - Feedback was vital to the design process; if the learners couldn't give feedback then it was going to be very hard to know if the design was working
- Free or Open License
    - Because I was uncomfortable with the excessive cost for digital accessibility training, the site I used must not charge the learner for using the streaming service.

When I used these criteria to assess the features of each website I was considering, YouTube and Vimeo quickly became the top two choices. These two media streaming sites were the only two that utilised HTML5 coding for their site, actively designed their websites/features for accessibility, and, provided a space that fostered feedback and allowed the viewers to connect to build a community.

Of these two contenders, YouTube ended up as my top choice. In addition to the above benefits, YouTube also hosted far more training material than Vimeo; took advantage of playlists, provided video recommendations, and, lastly, YouTube did not

ask the consumer or the creator to pay any fees to use their services. YouTube was also an industry leader in providing support for assistive technology as part of their mainstream design process (Ellis, 2010, Google, 2017, Griffin, 2015), an approach that matched the premise of my training design very well. So I joined the website and created a channel using the name *Inclusive Access.*

Once these pieces were lined up, I felt that I was ready to begin building scripts and recording material. I hoped to produce training early enough into the project timeline to give myself for six months' time to collect feedback on my design approach.

Discussion & Insights

Initial Thoughts

Designing individual tutorials was much more challenging than I had originally anticipated. Specifically, I found it difficult to build self-contained segments that covered all the relevant information that I believed was crucial for that specific accessibility concept. It also took more time to plan the tutorial framework and phrase the information appropriately (i.e., avoid the use of industry specific terminology without also providing definitions, etc.) than I planned. From start to finish a single script draft could take anywhere from 8-10 hours.

Once I finished drafting the scripts I realised that I would also need example material to feature in each tutorial. I had not considered this component of the design. I wasn't sure where to begin, so I turned to other user-made and professionally created learning aides to get a better idea of what would be required. What I found the most challenging was crafting example material that felt appropriate for real-world situations. It wasn't possible to create an "all circumstances" example, so instead I tried to use a scenario that would remain somewhat general, but I still hoped that it was applicable to as many situations as possible.

I began to see how some of the training that I critiqued came to be. It was an incredibly fine line to walk between "too general" and "too specific". As a professional who was familiar with industry standards for digital accessibility, I could only imagine how difficult it would be for instructors with minimal exposure.

Lastly, as an insider to the field of accessible and inclusive design, I noted that training from both professional vendors and in open license material approached accessibility from the only way they know how—by framing it through the concrete, verifiable criteria found in the WCAG. As outsiders, I had to remind myself that they are training others on topics they may not understand very well. Therefore, the remediation standpoint that was used for training made sense.

Once I felt that I had a video ready to serve as a pilot, I uploaded it to see what responses I got. Once my videos started gathering views, I waited to see what insights learners would provide. The feedback I received was positive. However, it was pointed out to me that while the tutorial was conscious of accessibility needs for viewing the video, I neglected to include keyboard shortcut navigation in the tutorial itself. This instruction would not be helpful to anyone who didn't use a mouse. Admittedly, I hadn't considered that aspect of instruction. Going forward I vowed to remember to include alternative methods to perform any tasks or techniques I discussed in the training.

In the end, I managed to get the six months' I'd hoped for to gather learner feedback. I believed that learners who sought accessibility knowledge wanted to solve a specific problem. To find a solution I expected that learners would use keyword searches to locate content that gave them the information they needed. I did some keyword searches at the beginning and at the end of my project to see where the Inclusive Access channel fell within search results. At the beginning of the project, my channel could be found at the bottom of the second page of search results, when searching for my video keywords or channel name. At the end of my project, the Inclusive Access channel managed to move up to become top results on the first page when tutorial-related keywords or the channel name was used when searched for on multiple computers using different accounts.

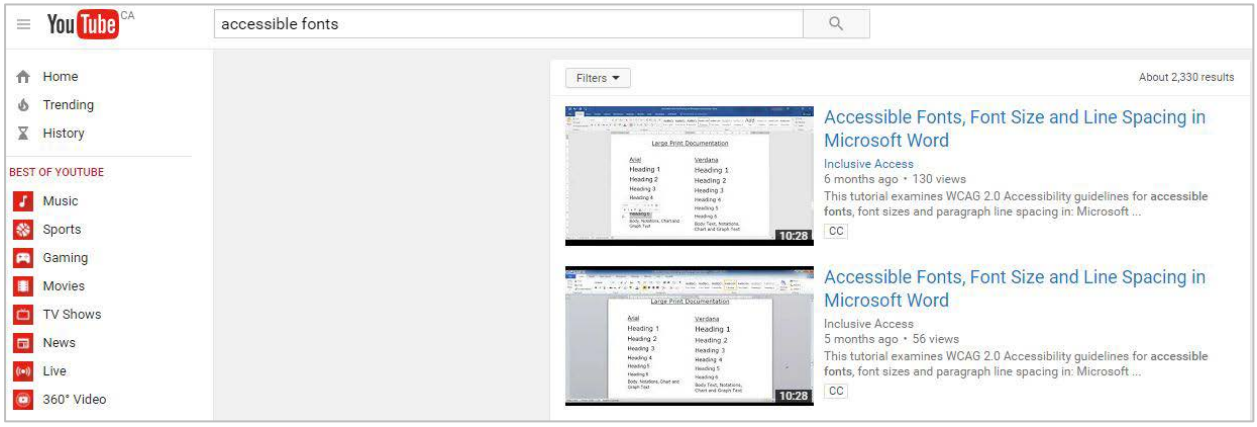

Figure 4. YouTube search results feature Inclusive Access tutorials as the 1st and 2nd video when tagged keyword searching is used.

On January 17, 2017, I also received an email from a marketing company who offered to promote my content for me. I declined this offer since it would prevent me from seeing what kind of exposure the videos garnered on their own. What I hadn't anticipated was YouTube's internal promoting system. YouTube's promotion system uses the number of views a video receives to increase the chances of showing as a top search result. This creates a kind of echo chamber effect, which could potentially prevent my content from ever being seen by the learner.

Despite this potential complication to exposure, my channel did receive a total of 225 views in six months. A few learners subscribed to my channel (4), and others left only positive or thankful comments. I only received one comment that was not relevant to the material, which YouTube categorised as spam.

This positive feedback is encouraging. Though I would like more commentary before declaring the design a success, the absence of negative feedback posits that this design points in the right direction. One comment I found particularly promising came from a learner who thanked me for the resource and asked for more training in other software.

The idea that there was an appetite from learners for more training in different software was exciting to me, but as I read that comment I realised just how big this

project could really be. For the scope of this project, I don't think that I could have done anything to fulfil that appetite if I worked alone. What might work to help meet that need would be to make a collaborative channel, where different training for accessibility was taken on by others who had expertise in other software. This approach would move my design model even closer to what is offered from Lynda.com, but that isn't necessarily a bad thing. Dividing the work would make the content creation demands more manageable and timely.

In the end, it took about 16 hours to produce a single video. From start to finish it took around 26 hours. Originally, my goal was to produce around 20 tutorials so that I had enough content to attract additional views, but that scale was just too large for the constraints of this project. My fixed timeline forced me to restrict production to a pilot channel of just five videos. This smaller catalogue of material likely affected the amount of traffic my channel generated because I couldn't cover as many topics. I likely missed the chance to help solve accessibility challenges that learners were potentially searching for. None-the-less, based on this request there is a potential need for digital accessibility training beyond the pilot that I featured.

Another outcome that I didn't anticipate was the international viewership my channel received. When I reviewed the channel analytics I discovered that the Inclusive Access channel had been visited by learners from all over the world (see Figure 6). One

potential benefit that I hadn't really considered for my material was the international use of my online training services. Even though international views are lower than views from North America, these international views speak to the widespread benefit to online training resources to build knowledge.

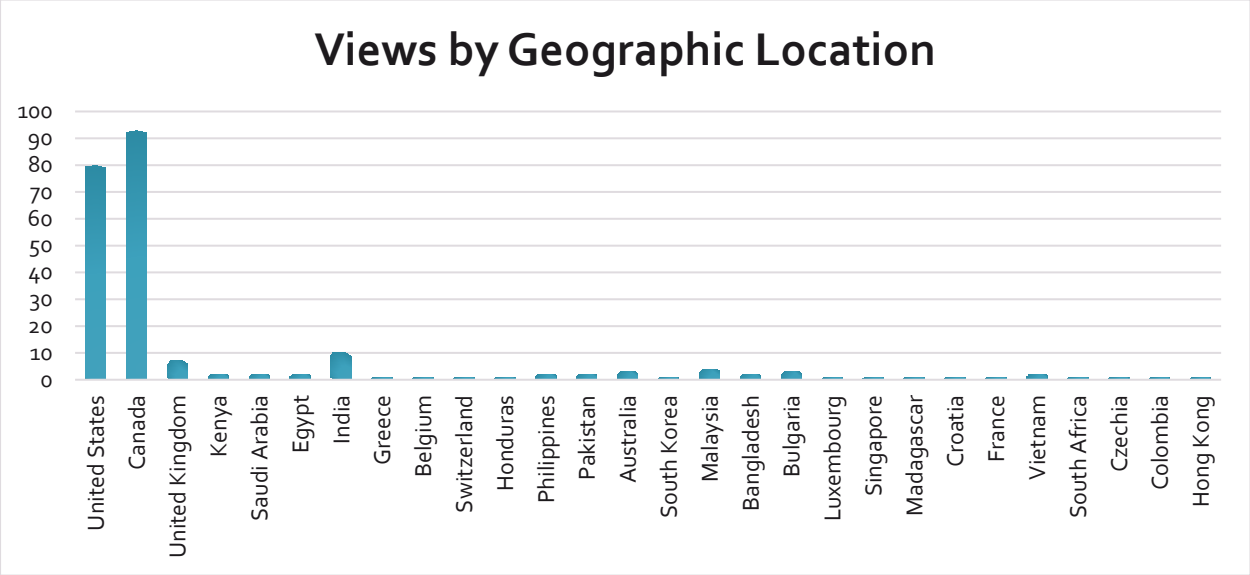

Figure 5. The number of views the channel received based on ISP geographical location.

The other valuable information that the channel's analytics told me was that the main traffic my channel received came from exactly where I expected it to; from keyword searching, and from recommended content that learners were shown when they viewed information similar to my channel's material (see Figure 7).

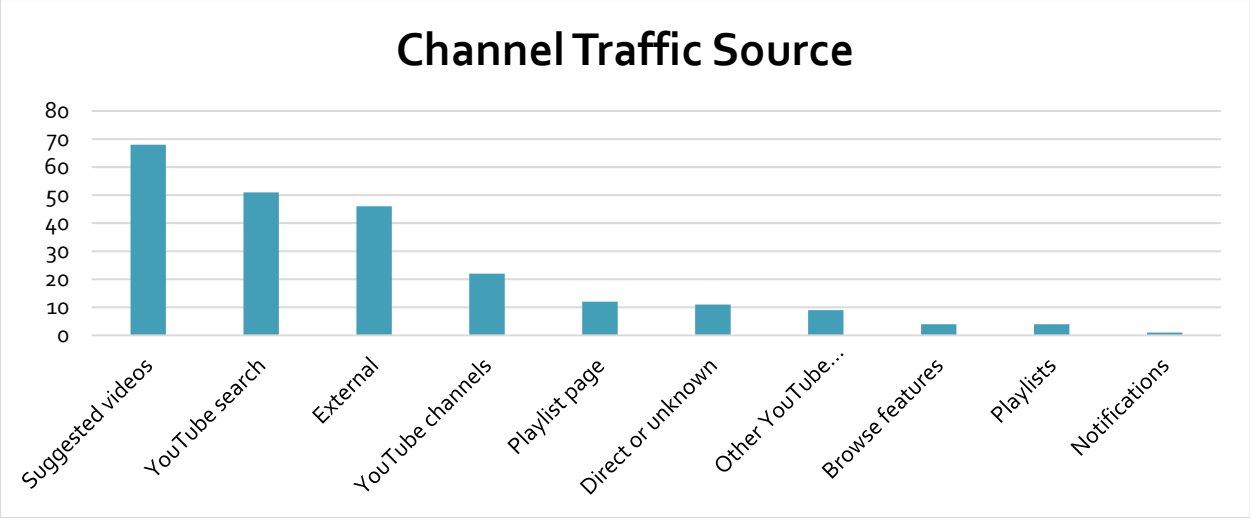

Figure 6. The channel's number of views based on how the content was accessed.

Working on this project challenged me in ways that I didn't expect. The insights that I gained were equally unexpected but incredibly valuable. I would have loved to have at least another six months to gather feedback from this pilot, or had the opportunity to work with a team to produce more material and see if more content generates more traffic. That being said, I didn't receive negative comments, or requests to modify the material I posted. I take that as a sign that this design has potential if given enough material to release, and was promoted more effectively. In hindsight, I would have used social media to help boost awareness of this channel and its purpose within communities that may be approached about digital accessibility training resources. Another factor that could influence the design's success was the fact that I started with a pilot for a program that may be oversaturated with "how to" material. This is a downside to using a popular media channel, and it may have prevented learners

from viewing my tutorials when there were so many others to choose from. Too many choices can be just as bad as too few.

My channel also lacked a brand identity, which didn't help distinguish my content from the dozens of other user-made content. A channel banner, logo, or even a promo trailer about the channel's purpose might have lent the channel some credibility that other training channels may lack. If I had the opportunity to do this again, I would make sure that the channel had proper branding when it launched.

Experiencing Technical Difficulties

Once all the material I needed to build my first tutorial was ready, I started recording. After I finished the first tutorial video I was struck by how very unprepared I was for the unique challenges that producing narrated video had. First of all, trying to create a guided tutorial, while screencasting and reading a script simultaneously created the most garbled, unorganised, and difficult to follow experience. The narrative was full of awkward pauses, "ands", "Ums", and "Uhs". I had incredible difficulty maintaining my pace because I was very conscious that I was live-recording my audio while I made the screen captured video; the guidance ended up uneven, and distracting.

Sound quality compounded the poor experience even more. I was using a standard set of ear buds with a built-in microphone to record my voice. However, the

microphone wasn't fixed to anything. The microphone dangled freely and kept brushing up against my clothing, which at best smothered my vocals, and at worst made loud bursts of noise. In the end, I never bothered to edit that first attempt. It was so poorly recorded that I didn't think it was possible to improve the experience enough to release it. I scrapped that video as a failed attempt and started reading more about recording audio.

I decided to revisit the original video tutorial blogs to help me evolve my process. David Turnbull's blog advised new creators to record audio first and separately from video, which I now agreed was a simpler way to approach the process. What I didn't know, was how to achieve studio quality sound with my ear buds. I spent about two days researching audio recording devices, recording techniques and at home "hacks" to improve the quality of my audio. I did many tests, but I still ended up with sound bouncing around the room. My audio sounded like I was speaking in a large, empty room.

Then, one day during my search, I came across a YouTube video that promised to help audio novices achieve better sound quality using a virtual audio mixer (Alphaa, 2015). There was a link to the software's website, so I decided to check it out. It took some time to learn how to use the features, but luckily the YouTube creator Alphaa also gave viewers access to a file with recommended settings to help people get started.

But even with the audio mixer, I found that the audio remained flat. I kept looking for solutions in blogs, forums and sought recommendations from professional sound engineers. It didn't take me long to realise that my problem was because of my chosen microphone, not the room or the software. If I wanted to get better quality sound, I needed a proper analogue or digital microphone. My ear buds were just too far away from my mouth, and the components were of inferior quality. This would cause too much variation in the audio quality for the kind of recording I wanted to do.

Figure 7. VoiceMeeter's live monitoring user interface. Image retrieved from **VB-AUDIO Software**

I quickly learned that the kind of microphone that I needed was dependent on what type of audio I wanted to record, and what space I was recording in. Different microphones, it turned out, have different strengths and weaknesses in different settings. There are innumerable recommendations about which microphone performed best overall, but since I had no prior experience with this kind of work, I kept digging to see if I could find a review that I believed I could trust to give me honest advice. I randomly came across a recommended video on YouTube one day while re-watching a previous video about sound recording. The recommended video was part of a series called Audio 101, and the series author used his full name instead of a username, a trend I noticed was more common for known industry professionals. I grabbed the name, Jason Levine, and googled it. The results were promising. Jason Levine is an Adobe sound engineer. Watching his series was very enlightening. It captured exactly what I need to know, and helped me understand what my specific needs were, and which equipment would help me do the job. After I watched the first video I reflected on the needs I had to record sound. Specifically, I was told to consider what I was recording (voice, instruments, etc.), what the space I recorded in sounded like naturally, and what the purpose the recording would serve (music, voice over, etc.).

The space I was recording in was a room that isn't sound proofed, inside in my apartment. There would always be ambient noise (random bumps and bangs in the

background) from my surrounding neighbours. Because my environment was unpredictable compared to a sound studio, I shouldn't pick a microphone that was hypersensitive to ambient and random sounds. I did more research and decided on the Blue Snowball Ice microphone, a digital USB microphone made specifically for podcasts, voiceovers and general vocals. When my new microphone arrived, I started sound tests around my apartment. I eventually found a space that dampened ambient noise considerably and produced a better recording. What I didn't expect, was that I'd end up recording my audio inside my clothes closet. It was hot, dark and cramped. So dark in fact that my handwritten speaker's notes were now useless. But the clothing helped to absorb excess noise that otherwise bounced around the room, and eventually gets picked up by the microphone again. I decided that it would be better to type up my notes and read them off my iPad than try and find another nook that had the same sound dampening qualities. Another unexpected outcome of this recording arrangement that I didn't expect was that my dog would be so curious about what I was doing, and sniff the edges of the door while I was recording a script. I had to shoo her from the room and close the door to keep her curiosity at bay.

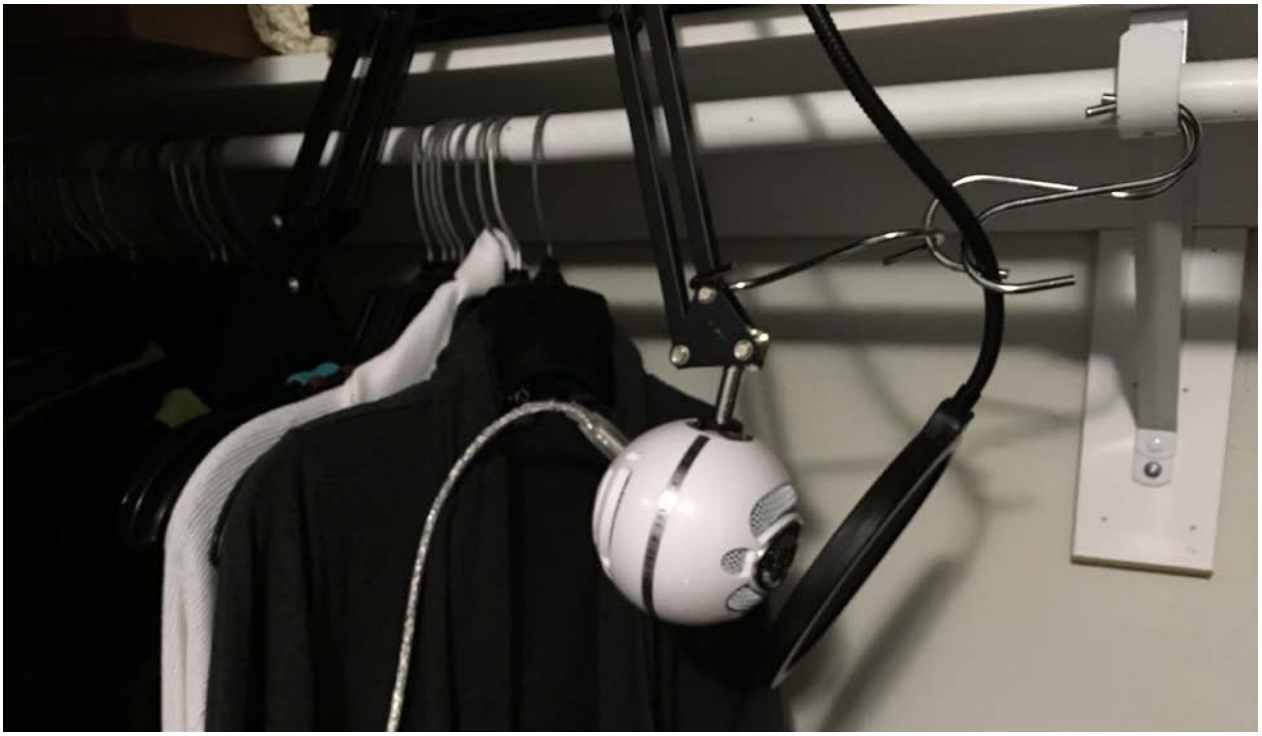

Figure 8. My Blue Snowball Ice microphone rigged as a hanging microphone inside my bedroom closet.

Even after all the research and sound trials, I was very unprepared for how much work was required to put one of these video tutorials together. There were some elements to the process that I expected, like learning how to use the recording and editing software, but things like learning how to speak properly into a microphone never even crossed my mind.

From that point forward video production went smoothly until I encountered software issues on my laptop. My editing software no longer functioned correctly and I was unable to continue production until I solved the software issue, or, until I received a

loaner computer. However, my software issues persisted beyond the life of the project, several months after they were first identified, so I sought out a loaner computer from my university.

After I received the loaner I was forced to record training on my original computer, a Windows 10 PC to complete my software training pilot in Microsoft Word 2016. Then I had to export the recordings to a mac computer so that I could edit the audio and video. There is still no clear documentation online that I could find about why my editing platform doesn't work on PC, but in future, I'll know to investigate the status of software this support for any computer and software combination I consider so I can better avoid this kind of setback.

Next Steps For This Design

This project encountered a challenge that many design projects in online spaces tend to face; there was a lack of learner feedback to push my design through an additional iterative design loop. Without feedback from learners to co-design this instructional delivery approach, it is hard to say if my design was truly inclusive of learner needs. This also means that I wasn't able to completely integrate the inclusive design process for my work. I strove to use inclusive design for my project, and did my best to build the initial design from learner feedback, but follow up discussion with learners would be helpful to see if I was properly addressing their concerns.

To solve this problem for future designs, I would avoid relying on the channel's natural discovery. Instead, I would actively advertise the project and encourage learner engagement and co-design to fuel the design's development. While this project helped me narrow down how learners would naturally seek out training information, it did not provide me with the feedback loop needed to ensure the design fit learner needs. To build a more inclusive design process for this design I would build feedback loops:

- When developing the delivery platform.

    - While I believe asynchronous training is beneficial in this training context, do learners want the option for synchronous learning as well? Like webinar Q&As?
- After developing the training draft outlines.
    - Are the software skills that I believed essential to supplement accessibility training required as part of my training? Do learners want the option to view skills development separately?
- Building the initial pilot.
    - Sometimes, an idea works better in theory than it does in execution.
- After training has been available for 6-8 months.
    - I want to make sure that there is adequate viewership to support changes that learners request for the training.

But despite the challenges I faced, I believe that there is an appetite for digital accessibility training for the current versions of Microsoft Word, PowerPoint, and Excel (Office 2013/2016/365). The still used, previous versions of this software (Office 2003/2007/2010) are already well covered. I also think that that Adobe Acrobat training for accessible PDFs would be useful as well. Learners may also benefit from other programs in the Adobe Suite, like InDesign, Illustrator and Photoshop.

I also believe that it would be beneficial to begin supporting users on Mac platforms. Especially accessibility training in Mac native programs like Pages, Numbers and Keynote. Additionally, the Mac version of Office and Adobe should be covered because tools are accessed in different ways than in the Windows version of that same software.

Lastly, support for possibly the next most widely used platform, Google Docs is recommended once Google builds more features into the online platform. At the time of this paper, it had my experience that many features were missing that would allow the creation of documents which fully support an accessible experience. Google's online platform is widely used for its collaborative nature, which creates a unique environment for accessibility and training challenges.

To move forward with this project, I would like to use the feedback that the learners have provided to build supports in other software, as listed above. To do that I'd like to reach out to content creators who are experts in those platforms and co-build accessibility learning goals. I'd like to produce material that shows how to add accessibility and inclusion to a content creator's everyday process using the tools they already have, since the feedback that I did receive indicated that this approach is helpful.

Ideally, these modules would be guided by both parties together into a cohesive learning segment. In this approach, the software expert would lead learners through the design process, and I would explain where and when to involve accessibility and inclusion work into the demonstrated process. This would allow learners to see how to evolve their regular design and build methods to incorporate accessibility and inclusion into their work.

Additionally, I think that supplemental materials, like podcasts that discuss accessibility practices in different contexts, would be another way to engage the learner and expand their inclusive design thinking. This idea would require more research and reflection but it would be an opportunity to discuss digital accessibility barriers with people who deal with them and can share their experiences directly with people who design the content.

Conclusion

My training design made use of adult constructivist learning theory by following a modular instruction approach, allowing learners to build on skills they may have. For this project, the roles of context and the individual were especially prominent and influential to my design approach. I found myself asking the following questions as I built the initial design concept: Why was a learner seeking my training? How much time did the learner realistically have to devote to training? What would the learner likely know already? What is the least knowledgeable learner likely to know? For an overwhelming topic, how could I make material engaging and non-threatening? What barriers could my training approach create and how could I solve for them?

While I did borrow from other design processes, I believe that an inclusive design process was the most fitting. Specifically, inclusive design feedback loops would be helpful because I approached the design with assumptions and biases about how the learner would want to learn. Even though my approach was mostly based on reported experiences and observations from my ethnographic study, it was also partly based on what I read. Gaining learner insights would only improve my design.

Based on feedback that I did acquire, I have gained the following insights: how learners hope to learn new professional skills, how learners adapt to current work

demands before and after training, and, what demands will become based on employer expectations. Though this information led me to propose a new design approach for training supports, I built the design to evolve and grow based on yet more feedback. Even if my assumptions were incorrect, those design failures are another form of learning that drives the design idea forward.

During each training segment, I discussed how the accessibility theory relates to the currently discussed topic, why a technique will reduce or remove barriers, and how to improve the end user's experience. While developing my design I learned that not only did the learners need to be aware of what an end user may need; I, the instructor, needed to be conscious of, and accommodate learning barriers to my end users. I needed to be inclusive in my instructional approach, and, be accommodating to what my audience may need when I delivered training. The design, at that point, had come full circle, being inclusive and accessible to learners, and to the learner's future audience.

This encouraged me to explore my biases and educate myself on best practices in a medium I was unfamiliar with—video and audio. Lastly, to remove financial barriers to training, I placed the training pilot on a public, free to access website, one that gave learners an opportunity to provide feedback and ask questions.

While I was constrained from fully achieving my design goals, I do believe that the steps I have made constitute a more inclusive approach to digital accessibility training. Though I wasn't able to remove the barrier to evolve training based on learner feedback, this barrier was slightly reduced. The following barriers identified from my ethnographic review were removed:

- Training cost and restricted training availability
    - Training was hosted on a free to access website which allowed training could be accessed anywhere, and on multiple devices; learners did not have to register or wait for training. It was available when the learner needed it.
- Not current, or reusable.
    - Learners can visit and revisit the training easily whenever the learner has time.
- Inflexible
    - Training was provided in a modular, self-directed format which allows learners to choose their learning path, in whichever way that meets the need of the learner's work environment.

- Fail to acknowledge outside influences to accessibility best practices.
    - Any information that directly influences digital accessibility, but is not part of that training topic was referenced and resources to these referenced topics are provided.
- Lengthy, and resource draining.
    - No training topic for this training pilot exceeded 11 minutes in length.
- Available in an accessible format.
    - Every effort was made to provide alternative methods to access tools and software features when accessibility techniques were discussed.
    - Every training segment was Close Captioned, and a transcript is available for download to reference later.
    - I spoke slowly, clearly, and enunciated to prevent confusion, and I used common language to explain the accessibility concepts to my audience.
- One-dimensional.
    - I did my best in the training pilot to answer the “what is it?”, “why do we need it?”, and “how do we do it?” for each segment.
- Ignorant of non-assistive technology design practices.
    - While this was only a pilot for training, I did mention non-assistive technology reasons for best practices in each segment.

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