

Developing a Training Program for Student Library Assistants to Make Scanned PDFs Accessible: A Case Study

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Introducing accessibility initiatives is increasing across academic libraries and effective library staff training is one of the factors for the successful implementation and continuity of any accessibility endeavours. This case study outlines the development of a training program to teach student library assistances to format scanned PDFs to be accessible. This study frames the development of the training program within the context of accessibility training in academic libraries, considerations for training student assistants, cognitive load theory, and training delivery options. This article will be of interests to libraries developing services to format scanned PDFs to be accessible.

Introduction

Scanning initiatives, like mass digitization projects, Interlibrary Loan, local Scan and Deliver services, and Course Reader services, can improve access to print collections in academic libraries (Cancilla et al., 2017; Olubiyo et al., 2022; Shrauger & Dotson, 2010; Wu et al., 2022). However, scanning print material does not always mean improved accessibility for everyone. Users with visual impairments and print accessibility needs often encounter scans that are not usable with their assistive technology (Beyene, 2018; Mulliken & Falloon, 2019; Southwell & Slater, 2012).

Most institutions have processes in place for individuals with disabilities to request alternate formats of library material in response to legislature requirements such as the Accessibility for Ontarians with Disabilities Act (AODA) (Integrated Accessibility Standards, 2011). Nonetheless, these processes often require the person with a disability to spend additional time and energy to access the same material that sighted users have immediate access to. The processes for requesting alternate formats are often not completed in a timely manner, and the lack of timeliness getting accessible material is a major barrier for visually impaired users (Kilmurray et al., 2005; Mulliken & Falloon, 2019; Reed & Curtis, 2012). To address the issue of inaccessible scanned material, some academic libraries are engaging in proactive endeavours, such as incorporating best practices for scanning to improve image quality, processes to recognize the text in scans, and workflows to apply semantics and alt text to scanned PDFs

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(Kwak & Newman, 2018; Lee, 2020; Wu et al., 2022; Zhou, 2010).

As academic libraries embark on initiatives to improve the accessibility of their scanned material, they will also need to develop training programs that address the technical aspects of making scanned material accessible. The process of formatting scanned PDFs to be accessible requires a degree of technical precision, repeated over hundreds of documents. Effective training is fundamental to ensure a high level of quality in the finished PDF that is consistent across multiple staff producing the accessible documents over time. This article will contextualize the issue of inaccessible PDFs and describe the development of a training program for student library assistants (SLAs) to make scanned PDFs accessible, incorporating considerations from cognitive load theory and training delivery options.

Background

Ableism and the Impacts of Inaccessible Library Material

Acknowledging that readers may have varying degrees of understanding about accessibility, this section briefly contextualizes ableism in academia and academic libraries, describes the impacts of inaccessible library material, and introduces the social model of disability as a framework for addressing accessibility barriers.

Academia perpetuates ableism and contains barriers that make it challenging for anyone with a disability to enrol and complete a degree (Dolmage, 2017). Ableism is defined as:

a system of assigning value to people's bodies and minds based on societally constructed ideas of normalcy, productivity, desirability, intelligence, excellence, and fitness. This systemic oppression leads to people and society determining people's value based on their culture, age, language, appearance, religion, birth or living place, "health/wellness," and/or their ability to satisfactorily re/produce, "excel" and "behave." (Lewis, 2022)

In the context of higher education, "academia powerfully mandates able-bodiedness and able-mindedness... and this demand can best be defined as ableism" (Dolmage, 2017, p. 70). Academia sets able-bodiedness and able-mindedness as the default or the norm, and students who do not fit within this frame must seek out retrofitted accommodations to engage in the classroom pedagogy (Dolmage, 2017). By making inaccessible library materials available to patrons, academic libraries contribute to the systemic oppression that is ableism and reinforce societal ideas of normalcy that assume all patrons accessing these materials are able-bodied. Patrons with disabilities frequently encounter inaccessible library materials, including scanned materials; they must rely on accommodations that require medical documentation of a disability to access the same material that is readily available for their able-bodied counterparts (Mulliken & Falloon, 2019).

Accessibility legislature, such as the Accessibility for Ontarians with Disabilities Act, which requires academic libraries to provide alternate formats of library material for persons with disabilities upon request (Integrated Accessibility Standards, 2011), is a step towards more equitable access of library material. However, this legislature reinforces socially constructed ideas of normalcy and the medical model of disability, which "establishes disability as an individual problem" (Cameron, 2014, p. 100). As Dolmage (2017) highlights, "the accommodations offered still demand that the student must accommodate him or herself to

the dominant logic of classroom pedagogy” (p. 80). In the case of providing alternate formats of library material, the individual is viewed as the problem, as opposed to the materials that are inaccessible as being the problem; the patron becomes responsible for ensuring the library materials they need are accessible through accommodation requests. Individuals with disabilities spend additional time and labour collecting required documentation of their disability, registering with the correct offices, and waiting for the material they need to be made accessible. Often times, the material is not made accessible in a timely manner, which sets these individuals behind in their course work, making inaccessible material a major academic barrier (Kilmurray et al., 2005; Reed & Curtis, 2012). In their conference presentation with Bruce et al. (2022), blind scholar Ashley Shaw states: “a system dependent primarily on accommodations is designed to place undue burden on the individuals seeking accessible materials, limiting our collective power to remove systemic barriers that impact all of us” (17:44).

An alternative approach to providing accessible materials is one that follows the social model of disability, which “shift[s] the attention away from the functional limitations of individuals with impairments onto the problems caused by disabling environments, barriers, and cultures” (Barnes, 2013, p. 18). A move towards the social model of disability is to change the way academic libraries approach their services, spaces, and collections by taking accessibility into consideration from the start and examining how the library itself perpetuates the need to accommodations. This accessibility-first approach replaces the assertion that able-bodiedness is the norm with the expectation that a person with a disability will engage with library material and that, therefore, all library material and the resources should be readily available in an accessible format.

It is important to acknowledge that not all accessible formats are suitable for all accessibility needs or preferences, as noted in Mulliken and Falloon (2019). Therefore, accommodations may still be required until libraries are able to make material available in multiple accessible formats, for example HTML, PDF, ePub and MP3. Nonetheless, as Shaw in Bruce et al. (2022) explains: “libraries have a responsibility to ensure that their materials are accessible to everyone, including patrons who use screen readers” (17:22). Beyond responding to requests for accommodations, academic libraries have a responsibility to address calls from individuals with disabilities to improve the accessibility of library material. By using the social model of disability framework and by considering accessibility first, academic libraries can help remove the barrier of inaccessible resources that places undue burden on people with disabilities, and can contribute to dismantling systemic barriers within academia.

DG Ivey Library

The DG Ivey Library is a small academic library within the larger University of Toronto Library system. Our library is located at New College, one of the seven colleges within the Faculty of Arts & Science college system at the University of Toronto St George Campus, which provides students with a smaller community within the larger institution (New College, 2023a). The library supports both New College students and the students enrolled in the interdisciplinary programs at New College, which include Critical Studies in Equity and Solidarity and the Disabilities Studies program. New College and the interdisciplinary academic programs at New College emphasize “equity, diversity, community engagement and social justice” (New College, 2023b). Within this context, our library is positioned to approach our services,

collections and spaces with an equity driven lens.

Our library employs nine to ten student library assistants (SLAs) to help with day-to-day operations and to support library services. One of the core services offered by the library to faculty and sessional instructors is the Online Course Reader Service. Through the service, the library provides students enrolled in participating courses free access to their course readings, while adhering to Canadian copyright provisions and existing library licenses. We provide direct links to electronic resources, upload scans of material only available in print, and place print books on short term loan for the duration of the term (Kwak & Newman, 2018). Scanned material is analyzed on a case-by-case basis following the University of Toronto *Fair Dealings Guidelines*, which outlines a process for determining if a work meets Canadian *Copyright Act* provisions that “permit dealing with a copyright-protected work...for specified purposes [including] research, private study, education...” (University of Toronto, 2012, p. 1). If material that does not meet *Fair Dealing Guidelines*, we collaborate with the Scholarly Communications and Copyright Office to obtain licenses or permissions from the rights holders to use the works for the duration the course. Scanned material that meets *Fair Dealing Guidelines*, has a license purchased, or permission from the rights holder obtained is made available to students in participating courses through our learning management software, Quercus.

In the winter term of 2018, we adopted the social model of disability framework to re-examine our Online Course Reader Service and introduced a new procedure, the “Accessible PDF Procedure,” through which our SLAs format all scanned PDF readings to be accessible (Kwak & Newman, 2018). Our in-house Accessible PDF Procedure is comprised of the following three processes:

1. The Scanning process, which follows best practices for scanning to produce high quality scans.
2. The OCR process, which includes image correction and performing optical character recognition on the scans using the software ABBY FineReader.
3. The Tagging process, during which PDFs are tagged to be accessible following the Web Content Accessibility Guidelines 2.0 recommendations for PDF accessibility using the software Adobe Acrobat Pro.

Incorporating the Accessible PDF Procedure into our regular operations introduced additional training requirements. There are videos and tutorials available online which demonstrate how to make PDFs accessible. However, these tutorials focus on digital-born PDF’s and do not cover the additional complexities of making scanned documents accessible, which include:

- ensuring there is little shadow or pencil markings, which can impact the characters that are recognized during the OCR process,
- verifying that the content of the document is recognized as the appropriate content type (e.g., images are marked as images, text is marked as text, and so on), and
- ensuring that the recognized characters accurately reflect the content in the scan, as this impacts the text layer of the PDF with which screen readers engage.

With these considerations in mind, our library worked on developing an effective program to train our staff to format scanned PDFs to be accessible.

Literature Review

A literature review was conducted to examine the current landscape of accessibility training in academic libraries, considerations when training student library staff, the application of cogni-

tive load theory for training, and training delivery methods specific to student library assistants.

Accessibility Training in Academic Libraries

Most studies on accessibility training in academic libraries focus on accessibility awareness training or training for library staff who directly support patrons with accessibility needs. Content covered in these training programs includes the legal requirements, best practices for providing customer service to persons with disabilities, as well as assistive technology available at the library (Brannen et al., 2017; Carter, 2004; Charles, 2005; Chittenden & Dermody, 2010; Forrest, 2007; Mellon et al., 2013; Roth et al., 2018). Brannen et al. (2017) describe collaborating with their institution's accessibility office to develop their training program. Schroeder (2018) briefly mentions PDF training in their overview of accessibility initiatives at their institution; however, no details about the training program are provided. The scope of topics covered in accessibility training programs has broadened to include accessibility in online instruction. Lewitzky and Weaver (2022) describe an online training on Universal Design for Learning for asynchronous (pre-recorded) online library instruction, which covers making content accessible. Although the scope of accessibility training is expanding, there remains a gap in the literature that details a training program for library staff to format scanned and accessible PDFs.

Training Student Library Assistants

Libraries often rely on student employees as a cost-effective way to maintain library operations (Mitchell & Soini, 2014); however, employing students requires additional considerations when developing training programs. Student employees have a higher turnover rate and limited employment periods since they are often employed only for some duration of their academic enrolment. A high-turnover rate makes training student staff more time consuming as libraries often hire and train new staff each year. Libraries often have a short period of time to complete training and integrate new staff into the schedule (Kathman & Kathman, 2000). As part-time employees and students, they may only have partial commitment to their jobs and their understanding of library services is limited when compared to full-time library staff (Kathman & Kathman, 2000). Additionally, academic libraries generally hire new staff at the start of each academic year, which means that staff are trained during a time when students are managing a new school year (Wetli, 2019). Libraries need to find the right balance of spending enough time training SLAs so they can adequately perform their duties while also not overwhelming them with the duration of training and the amount of information shared.

Cognitive Load Theory in Training

When developing a training program for a complex process, it is valuable to explore best practices for reducing the amount of cognitive load required to learn the content. Broadly speaking, cognitive load theory (CLT) is the concept that:

- learning takes effort (Martinez, 2014),
- humans have the capacity to learn a limited number of new elements at a given time (Cowan, 2001), and
- “learners are often overwhelmed by the number of new information elements” (Paas et al., 2004, p. 1).

CLT also assumes that there will be a capacity limit for the focus of attention (Cowan,

2001), and that less cognitive effort is needed when new information is associated with existing knowledge (Pickens, 2017).

When applying CLT to training student library assistants, one study recommends: “organizing content of training sessions so that they include chunks of related material or tasks” (Martinez, 2014, pp. 556–557). Additionally, trainers can apply specific training techniques to help reduce cognitive load, such as “increasing difficulty” (ID), “part-task training” (PTT), “training wheel,” and “scaffolding” (Hutchins et al., 2013; Martinez, 2014; Wickens et al., 2013). The ID technique follows the principle of training less complex tasks first and increasing the complexity of the task as the training progresses (Wickens et al., 2013). The PTT technique refers to dividing a multi-part task into individual parts and training staff on one part of the process at a time (Martinez, 2014). PPT allows learners to gradually layer on their new knowledge and build skills over time, which lessens the cognitive load on learners (Martinez, 2014). The training wheel technique refers to the use of lockouts that prevent learners from accessing actions or content that are not relevant to the current phase of learning (Hutchins et al., 2013). Once learners acquire the required skills to complete the current phase, the next relevant content is made available to the learner (Hutchins et al., 2013). Scaffolding refers to providing learners with instructional support when they are introduced to new concepts or skills (Hutchins et al., 2013). Hutchings et al. (2013) found that scaffolding techniques are more effective when the instructor is not present.

Methods for Delivering Training to Student Library Assistants

Although delivery methods for training SLAs vary across academic libraries, some common methods include in-person, online, and hybrid training.

In-person training techniques

A survey administered to student staff supervisors across North America found in-person training to be the most common delivery method (Mitchell & Soini, 2014). Group in-person training sessions offered multiple times to accommodate varying schedules are described as effective methods to train multiple employees (Becker-Redd et al., 2018; Vassady et al., 2015). Becker-Redd et al. (2018) found an increase in the retention of information when using a mandatory in-person group training session, rather than online training modules.

Although a common delivery method, in-person training has its own challenges, especially with the time commitment from the trainer and scheduling training sessions where all students are available to attend (Boeninger, 2013; Connell & Mileham, 2006; Michalak & Rysavy, 2018; Vassady et al., 2015). Connell and Mileha (2006) note that although in-person training may be preferred, it is time consuming to conduct. Vassady et al. (2015) found that scheduling students to attend in-person group training sessions was one of the biggest challenges they faced with their in-person group training. To combat this issue, Becker-Redd et al (2018) suggest offering one-on-one training, as opposed to a group training session

Online training techniques

The current literature describes online training as an option that allows for greater flexibility than scheduling an in-person training session, provides learners with easy access to information, and gives the learners autonomy over the pace at which they complete the training (Bell, 2016; Manley & Holley, 2014; Mitchell & Soini, 2014). Online training can help reduce the

amount of hands-on staff time needed to train student library assistants and creates a standardized training plan to help with consistency in training (McKenna, 2020). Online training also reduces the need for “refresher training on the more detailed information required of the job” (Mitchell & Soini, 2014, p. 602).

When it comes to online training, there are a variety of tools and strategies available, including the use of videos, library guides, or sharing content on electronic learning management systems (Bell, 2016; Boeninger, 2013; Macnaughton & Medinsky, 2015; Manley & Holley, 2014; Michalak & Rysavy, 2018). Boeninger (2013) recommends using videos as an alternative to in-person training when the training is designed to demonstrate a tool, software, or web application. Videos allow the trainer to “use the same methods to demonstrate a resource that they would use if they were to teach someone how to do something in person” (Boeninger, 2013, p. 178). A key strategy for successful use of videos for training is to keep the videos short, ideally under five minutes (Boeninger, 2013; Manley & Holley, 2014). This approach makes it easier for learners to go through the content in a short period of time and at their own pace and makes it easier for the trainer to update the content (Boeninger, 2013; Manley & Holley, 2014).

One of the challenges with online training is the onset investment of time to develop the content. However, McKenna (2020) notes that the long-term amount of time saved by using online training makes it worth the initial investment.

Hybrid training techniques

Taking the benefits of face-to-face and online training into account, Manley and Holley (2014) and Wetli (2019) describe the use of hybrid training techniques. In the case of Manley and Holley (2014), students were given one week to watch video clips that introduced them to basic systems and procedures followed by in-person on-the-job training (Manley & Holley, 2014). Similarly, Wetli (2019) describes a hybrid model where staff were asked to complete an online course on Canvas (a learning management system) that included pre-assessment quizzes and modules. The staff were then required to attend a two hour in-person training session spread across three evenings, where they were able to practice what they learned in the online course (Wetli, 2019). Both Manley and Holley (2014) and Wetli (2019) found the hybrid training successful for information retention and saving time for training and re-training student staff. Wetli (2019) also noted the added benefit of the online component functioning as a knowledge repository that staff could access throughout their employment.

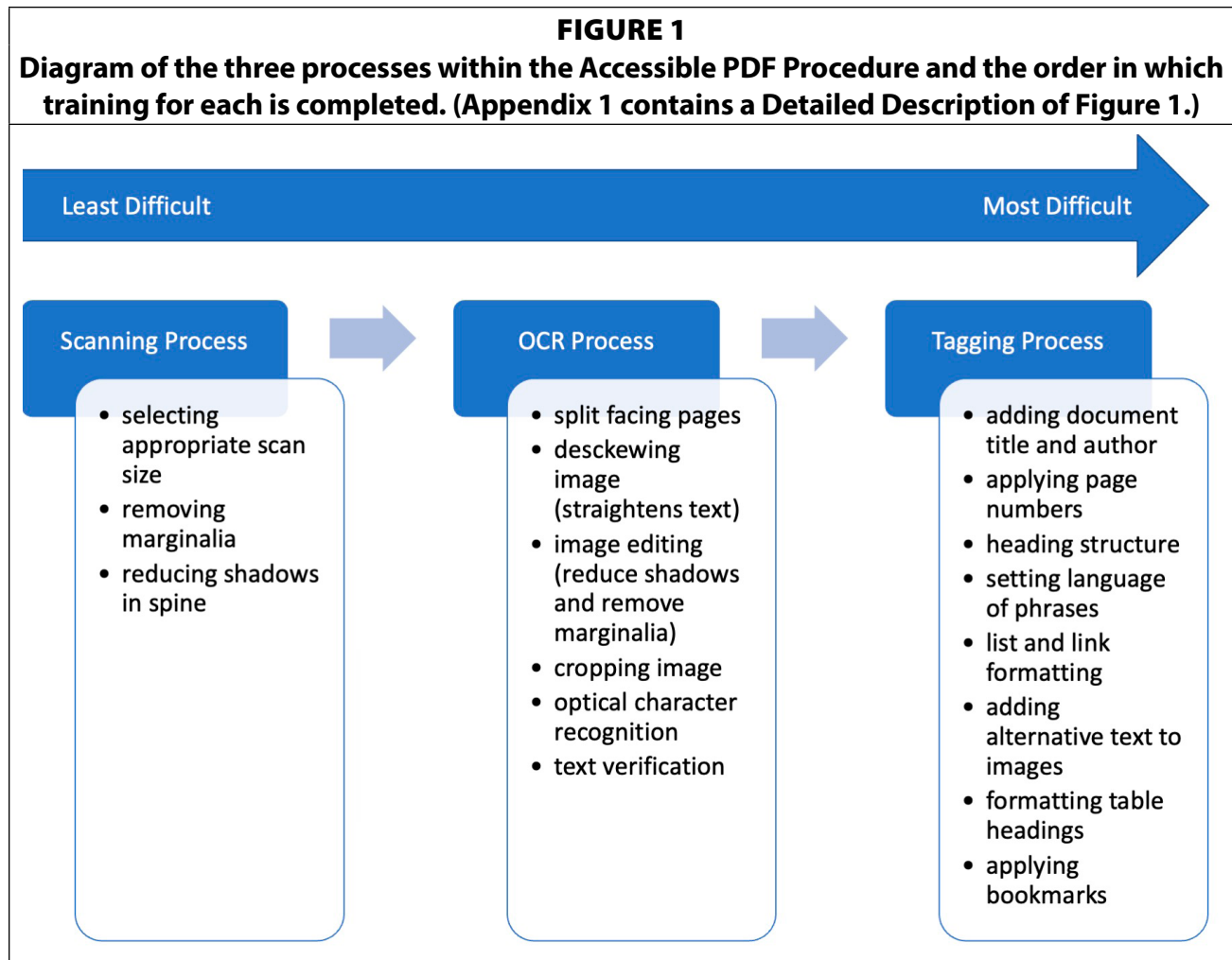
Developing a Training Program

When developing the training program for the Accessible PDF Procedure, we took into consideration that SLAs have a high turnover rate and limited scheduling availability. We also had to find a balance between ensuring staff had all the information they needed to complete a complex process while not over loading SLAs with information. To achieve this balance, we took into consideration cognitive load theory and options for the mode of delivery.

Cognitive Load Considerations

The entire Accessible PDF Procedure is complex and can be overwhelming for a novice learner. We recognized early in the development of our training program that we needed to incorporate techniques from cognitive load theory to ensure information retention.

We incorporated part-task training (PTT) and increase difficulty (ID) by breaking apart the Accessible PDF Procedure into three smaller processes and trained staff on one process at



a time, in order from least to most difficult. Figure 1 displays the three processes, from least to most difficult, and the tasks associated with each process.

Staff are first introduced to the concept of a text layer within a PDF during the scanning training when we explain how marginalia (pencil mark-ups) impact the quality of the text created during OCR. During the OCR process training, we build onto this understanding by teaching SLAs that the text in this layer must reflect the content in the scanned image. Once they move on to the Tagging process training, they further build on their understanding of the text layer representing the content of the scan with the concept that this text layer needs additional mark-up (like headings and lists tags) to be properly understood by assistive technology. Building on their existing knowledge helps to reduce cognitive load by connecting new information with existing knowledge (Pickens, 2017).

We incorporated the “training wheel” technique, which encourages learners to focus on current learning objectives (Hutchins et al., 2013). In our case, staff complete the training for one process, demonstrate their understanding and mastery, and then are trained on the next process.

Additionally, we incorporated scaffolding into the training program by providing a sample training PDF for staff to use and by introducing a “feedback period” where staff are required to share at least three additional PDFs to be reviewed by the trainer. The training PDF is the same file used throughout the documentation and later in the videos. Using the

same file provides SLAs with a familiar starting point for their first attempts when learning each process and allows them to leverage their familiarity with the training PDF to build on their knowledge as they learn more complex processes. After SLAs are trained on each process, they enter a feedback period where we review the three PDFs that they have completed, provide feedback as needed and re-direct SLAs to training material if any issues are found. This provides us with an opportunity to verify if there is any loss in comprehension from the training and provide guidance when needed.

Mode of Delivery

Our library spent between 2018-2021 working on identifying the best mode of delivering this training. The following section outlines our process for selecting a mode of delivery that was the most effective for our library to train staff to format scanned PDFs to be accessible. Ultimately, we found that in-person training was not a good fit for this context, and that developing a series of complementary training videos proved successful.

In-Person training

The first iteration of the training program was offered in-person in 2018 to nine SLAs. When deciding which delivery method to use, we took into consideration our past experience successfully training SLAs on standard operations using in-person group training sessions along with the existing literature, which suggested in-person training was preferred by supervisors and staff (Mitchell & Soini, 2014, pp. 596–598; Vassady et al., 2015). As mentioned earlier, the SLAs were trained first on the scanning process, then the OCR process and lastly on the tagging process.

Training for the scanning and OCR processes occurred during the SLA's regularly scheduled shifts and followed a similar format, which included:

- providing SLAs with a reference printout of written documentation for the process being trained
- a live demonstration of each step in the process
- opportunity for the SLA to repeat the step(s) to demonstrate their understanding.

To ensure that SLAs could observe the live demonstrations, these sessions were conducted as one-on-one training due to space limitations around the scanner and single computer station that featured the software used for the OCR Process, ABBYY FineReader.

For the tagging process, we developed a two-hour in-person group training session and offered it twice based on availability. The session included a PowerPoint presentation introducing key concepts for accessibility and elements of an accessible PDF, as well as activities and a live demonstration of how to complete the Tagging process. To teach heading structures, we printed a two-page excerpt from a chapter and SLAs were asked to indicate the appropriate heading levels. This was followed by a take up with the correct headings shared and a discussion about why each heading level was applied. For alternative texts, we provided the group with two images and asked each SLA to write alt text based on the best practices covered in the instruction. We took up the descriptions and discussed the different approaches staff took to describe the images. Following the presentation and activities, we provided a live demonstration of the steps involved in the Tagging process. When demonstrating the more complicated steps in the Tagging process, we asked each SLA to practice under supervision of the trainer.

The training documentation used for all the processes was available to staff for review afterward on our SharePoint site.

Challenges with in-Person training

The first iteration of the in-person training program was offered for two cohorts of SLAs. After the second time running the training program, we found that delivering the training in-person was challenging because of scheduling conflicts and SLAs displaying low retention of information.

Scheduling in-person group training sessions for the tagging process proved to be a challenge, like the experience described by Michalak and Rysavy (2018) and Vassady et al. (2015). We were unsuccessful accommodating all SLAs to attend the multiple in-person group training sessions, despite selecting dates and times based on common availabilities by using the scheduling aid Doodle Poll. Due to these scheduling conflicts, we had to offer multiple in-person group instruction with smaller cohorts; offer one-on-one training sessions during the evenings for some SLAs; or forego training some SLAs on the tagging process.

Moreover, in-person training proved ineffective for retaining information. Many SLAs requested repeat demonstrations, particularly for the tagging process. Although SLAs had the opportunity to ask questions during the in-person training sessions, it was only once they began to attempt each process on their own that they uncovered questions about certain steps. We also noticed many errors in the practice PDFs that SLAs completed following the tagging training session. This led us to believe that there was too much information being shared during the in-person training sessions and SLAs were not able to retain all the information, even with the availability of supporting documentation.

Developing online videos

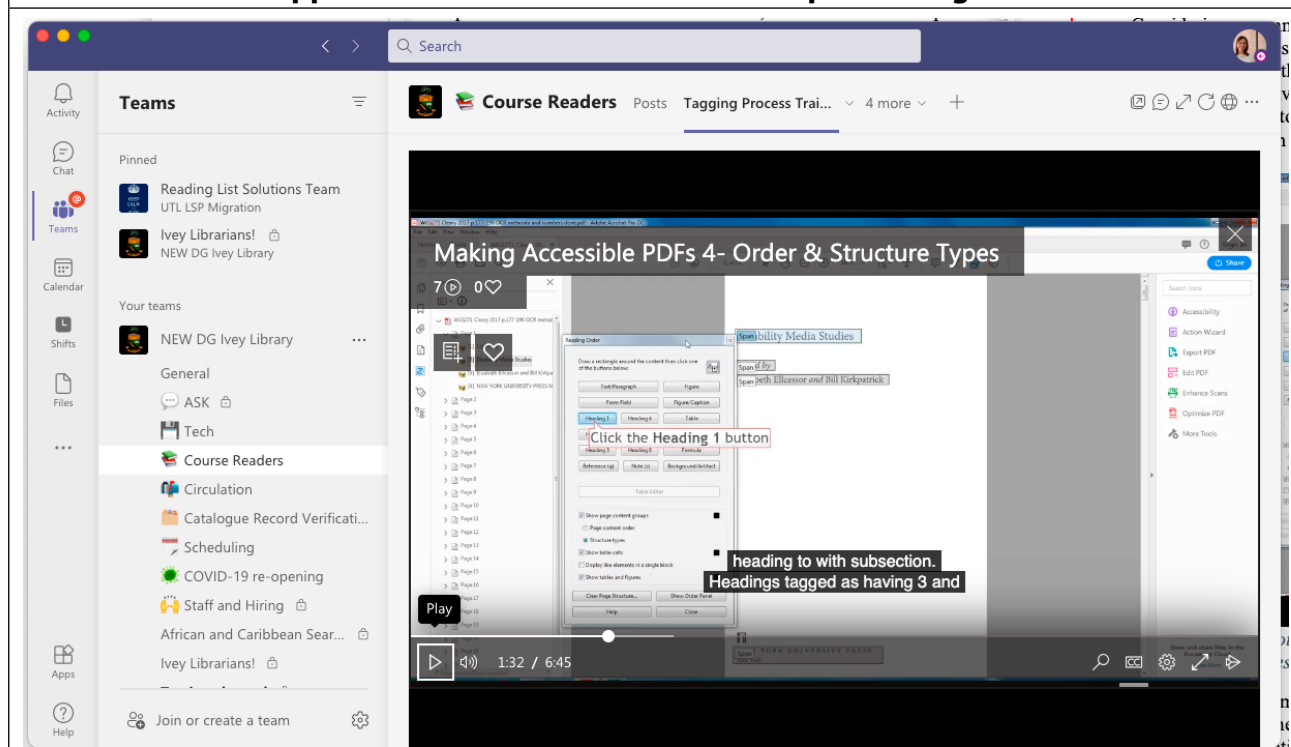
Ultimately, we explored developing videos for our training program. Training videos are a good alternative to in-person training, especially when training features the demonstration of software (Boeninger, 2013; Forrest, 2007; Mellon et al., 2013; Pionke, 2020). Using videos for training provides greater flexibility for the learner to proceed through the material at their own pace and to re-watch content when they need additional guidance (Boeninger, 2013; Mitchell & Soini, 2014).

We decided to pilot using videos with the tagging process first as this process is the most complex and one that SLAs had the most difficulty with. To develop the training videos, we collaborated with an experienced SLA who was familiar with the entire Accessible PDF Procedure. This served two purposes:

- leverage the perspective of an SLA who had undergone the previous training
- capture shortcuts and patterns discovered by SLAs while completing the procedure

The SLA was provided with the necessary equipment and 20 hours to make the training videos. When developing the videos, the SLA divided the content into short videos under five minutes each, which the literature suggests offers greater flexibility for editing and updating content and more flexibility for the viewer to watch the content at their own pace (Boeninger, 2013; Manley & Holley, 2014). The screen recordings included box highlights to draw the viewers' attention to specific areas of the screen and comment boxes with written instructions. Using on-screen cues is known as signaling and can help reduce split attention and cognitive load (Pickens, 2017). Figure 2 is a screenshot of one of the training videos and illustrates an example of the onscreen instructions and highlights. The screenshot of a training

FIGURE 2
Screenshot of tagging process Training Video 4.
Appendix 1 contains a Detailed Description of Figure 2



video shows the option for “Heading 1” in the Reading Order panel highlighted with a blue box and a comment box with the instruction “Click the Heading 1 button” to provide visual cues in addition to the audio instructions. (See Figure 2)

Incorporating videos in the existing training program

In March of 2019, we introduced the tagging process training videos into the Accessible PDF Procedure training program. We continued to train SLAs on the scanning process and OCR process through one-on-one in-person sessions. Once staff displayed a mastery of the OCR process, they were trained on the tagging process. We shared a link to “Tagging Process Training Videos” playlist, an untagged copy of the same PDF that was used in the training videos, as well as documentation for the tagging process. SLAs were instructed to watch the videos, read the associated documentation, and practice on the training PDF during their regularly scheduled shifts. We did not place a time frame for completing the training (i.e., one or two shifts), instead, we encouraged staff to work through the training videos and the practice PDF at their own pace. Based on our previous experience with the in-person training, we recognized that some individuals benefited from more time to learn the tagging process.

We also encouraged library staff to communicate via Teams chat if they had any questions about any steps in the process. Having this support available throughout the training ensured that SLAs had the instructional support they needed to succeed. SLAs notified us once they completed making the training PDF accessible, we then reviewed the training PDF, provided feedback, and directed them to specific videos when issues with the training PDF were discovered. Once the training PDF met accessibility standards, the SLA entered the feedback period.

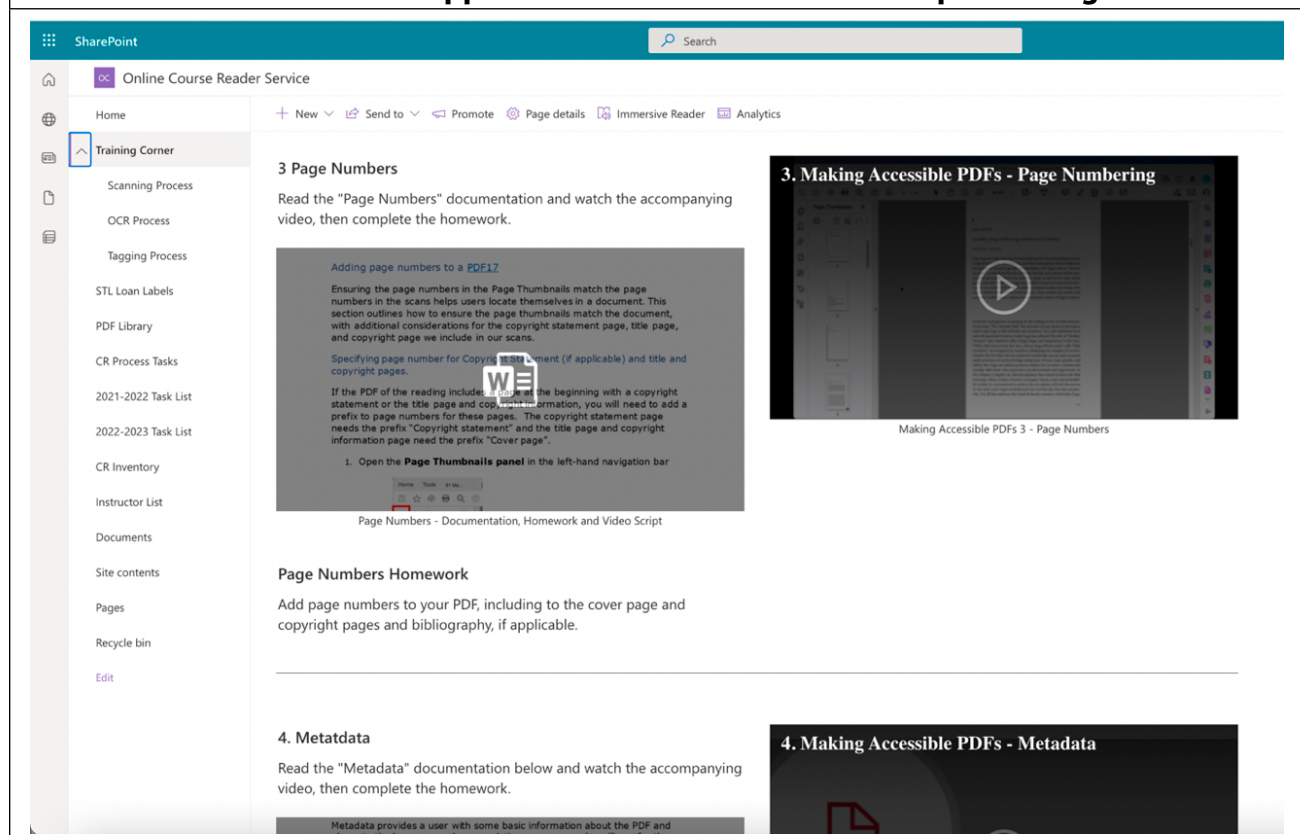
Benefits of online videos

Incorporating videos into the training program was observed to increase learning and offer greater flexibility for training the tagging process than in-person group training sessions. A new cohort of SLAs completed the training using the videos and successfully produced high quality tagged PDFs.

The videos were effective for information retention since SLAs were able to watch the training videos at their own pace during their variously scheduled shifts, and to pause or re-watch content as needed. The videos also supported the use of a training PDF more effectively, as SLAs were able to practice on the training PDF in sync with the progression of the training, as opposed to having to recall all the information covered in a one-time training session. The flexibility of allowing SLAs to rewatch content and work on the practice PDF with immediate access to a demonstration of the steps resulted in fewer requests for training refreshers (e.g., repeating demonstrations or repeating content covered in the training) and fewer errors in the PDFs submitted for review.

Using videos offered greater flexibility in terms of which SLAs were able to participate in the training. Since the SLAs were able to complete the video training during their existing shifts, there were no issues with scheduling training sessions and coordinating with student schedules. This also meant all SLAs were able to participate in learning the tagging process, as opposed to only SLAs that were able to accommodate the additional training time. Using online videos also allowed SLAs to work through the core content independently and rely on the librarian for support on more complex questions or concerns.

FIGURE 3
Screenshot of the Training Corner on the DG Ivey Library Course Reader Service SharePoint website. Appendix 1 contains Detailed Description of Figure 3.



Transition to a fully online training program

The benefits of incorporating the tagging process pilot videos prompted us to develop additional training videos to replace all in-person training for the entire Accessible PDF training program. The OCR process was chunked into four sections, an introduction to ABBYY, image editing, optical character recognition and tables. The scanning process was kept as one part since the process is less complex.

With the move to training videos for the entire Accessible PDF Procedure training program, we developed a page on our SharePoint site dedicated to training, similar to the repository Wetli (2019) described. This page includes:

- links to all the training videos,
- accompanying documentation,
- the training PDFs that are used throughout each stage of the training program, and
- homework for each step

Figure 3 is a screenshot of the training page and illustrates the structure of each section, including relevant documentation, video(s), and homework.

We provide new SLAs a link to the training section for a single process at a time and instruct them to watch the video, read the documentation, and complete the homework using the training PDFs provided. As SLAs complete the training, they are encouraged to ask questions. Once SLAs complete their training PDFs we review their work and provide feedback. When the SLAs are able to produce a training PDF with no issues, they enter the feedback period to ensure they are able to consistently produce a high-quality PDF after which SLAs are assigned PDFs as part of their regular workflow.

Discussion

The development of our training program spanned several years as we explored different delivery methods to help our SLAs learn the intricate steps involved in making scanned PDFs accessible. Overall, we found it beneficial to incorporate the following into our training program:

- techniques to help reduce cognitive load, including part-task training, increasing difficulty, the training wheel, and scaffolding; and
- videos to efficiently demonstrate the steps involved in complex and multi-step processes.

Since transitioning to a fully online training program using videos in 2021, we have successfully trained eleven new SLAs on the Accessible PDF Procedure. We found moving to online videos increases retention of information, offers greater flexibility for SLAs to complete the training at their own pace, eliminates scheduling issues, and reduces the need for refresher training. Creating short videos also makes it easy to update content, which has been necessary as updates to best practices for accessible PDFs emerge.

Another benefit to using online videos for the training program was being able to continue to train our students during the COVID-19 pandemic, which rendered in-person training impossible due to social distancing measures that were in place. As with many academic institutions, our library had a social distancing policy in place during the height of the pandemic to ensure the health and safety of our staff. Our library tried to remain open as much as possible during the pandemic to be able to provide students with access to technology that was required for their studies and to maintain the operation of our services, like Online Course Reader Service. Several staff were not yet trained on the Accessible PDF Procedure

when social distancing was in-place so having an entire online training program with videos allowed us to continue to train staff on this key procedure in a safe way.

For libraries considering using online videos for training, we recommend taking the time to explore screen recording software options and select an option that can be used by all staff in your library. This will help if you experience staffing changes that might impact who is able to update the content or create new content for the videos.

Future Directions

A possible future direction for the training program is to migrate the program from our library SharePoint to a learning management system (LMS). Macnaughton and Medinsky (2015) and Bell (2016) describe transitioning to an LMS to train library staff because it offers flexibility for the learner to engage at their own pace and provides the trainer with opportunities to create engaging learning objects. Transitioning to an LMS would allow us to incorporate some of the structured training wheel techniques by locking access to content until the learner displays their existing knowledge of the current content through assessment tools. Additionally, migrating to an LMS would help facilitate sharing the training program with other libraries within the larger University of Toronto Library system or beyond our institution.

Conclusion

Inaccessible library material, including scanned material, contributes to an inequitable library and educational experience. Providing users with accessible library material is needed to live up to claims of equity, diversity and inclusion within academic libraries and librarianship. Processes that require medical documentation, registration with specific offices, and individual requests are often described as “very time consuming and very frustrat[ing]” (Bruce et al., 2022, 2:00). Examining library services, spaces, and collections through the social model of disability framework will allow libraries to identify societal barriers that prevent patrons with disabilities from engaging with the library materials without the need for an accommodation.

As libraries strive to make their collections, services, and spaces more accessible, we need to consider the training implications for staff. It is important for institutions interested in developing a training program to consider:

- the impact of cognitive load on the trainee and apply cognitive load theory to help reduce the strain on the learner,
- unique considerations when training part-time student library staff, and
- the mode of delivery that best suits the needs of the library.

In terms of developing a training program for formatting accessible scanned PDFs, our library’s experiences lead us to recommend:

- incorporating part-task training, increase difficulty and training wheel techniques to help reduce cognitive load,
- incorporate self-paced videos to improve information retention and reduce (or remove) scheduling issues for training, and
- homework for trainees and provide feedback to trainees.

Our experience supports the literature in suggesting that training videos offer both greater flexibility when scheduling issues arise and provide library assistants the affordance to review material at their own pace. We also recommend sharing the videos online along with relevant documentation so that library assistants have consistent access to the materials.

The training recommendations presented in this paper are transferable to other accessibility initiatives within all libraries, such as the creation of electronic accessible recourses with word processors or creating accessible library guides (LibGuides).

References

- Barnes, C. (2013). Understanding the social model of disability. In *Routledge Handbook of Disability Studies*. Routledge. <https://doi.org/10.4324/9780203144114.ch2>
- Becker-Redd, K., Lee, K., & Skelton, C. (2018). Training student workers for cross-departmental success in an academic library: A new model. *Journal of Library Administration*, 58(2), 153–165. <https://doi.org/10.1080/01930826.2017.1412711>
- Bell, B. (2016). Training academic library staff using an online learning management system (LMS). *The Bottom Line*, 29(4), 237–240. <https://doi.org/10.1108/BL-02-2016-0008>
- Beyene, W. M. (2018). Digital inclusion in library context: A perspective from users with print disability. *Journal of Web Librarianship*, 12(2), 121–140. <https://doi.org/10.1080/19322909.2018.1427657>
- Boeninger, C. F. (2013). Using online videos for staff training. In A. Stewart, C. Washington-Hoagland, C. T. Zsulya, & Library Leadership and Management Association (Eds.), *Staff development: A practical guide* (Fourth edition, pp. 177–186). American Library Association.
- Brannen, M. H., Milewski, S., & Mack, T. (2017). Providing staff training and programming to support people with disabilities: An academic library case study. *Public Services Quarterly*, 13(2), 61–77. <https://doi.org/10.80/15228959.2017.1298491>
- Bruce, C., Marsden, M., Martiniello, N., Schiafone, C., Shaw, A., & Weiler, M. (2022, November 14). *Ensuring that the "World's knowledge is accessible by all": Canadian blind scholars share their experiences of journal and other digital content*. 2022 CRKN Conference: Strength in Community, Montreal. <https://vimeo.com/770786119>
- Cameron, C. (2014). The medical model. In C. Cameron, *Disability Studies: A Student's Guide* (pp. 99–101). SAGE Publications Ltd. <https://doi.org/10.4135/9781473957701.n31>
- Cancilla, N., Glushko, B., Orfano, S., & Slaght, G. (2017). Engaging faculty and reducing costs by leveraging collections: A pilot project to reduce course pack use. *Journal of Librarianship and Scholarly Communication*, 4(0). <https://doi.org/10.7710/2162-3309.2137>
- Carter, C. J. (2004). Providing services for students with disabilities in an academic library. *Education Libraries*, 27(2), 13. <https://doi.org/10.26443/el.v27i2.202>
- Charles, S. (2005). Person first, disability second: Disability awareness training in libraries. *Library Review*, 54(8), 453–458. <https://doi.org/10.1108/00242530510619147>
- Chittenden, M., & Dermody, K. (2010). Removing barriers to access: Libraries and the Accessibility for Ontarians with Disabilities Act. *Feliciter*, 56(3), 94–96. <https://www.proquest.com/lisa/docview/347850502/citation/4A8573DABC2C438CPQ/1>
- Connell, R. S., & Mileham, P. J. (2006). Student assistant training in a small academic library. *Public Services Quarterly*, 2(2–3), 69–84. https://doi.org/10.1300/J295v02n02_06
- Cowan, N. (2001). The magical number 4 in short-term memory: A reconsideration of mental storage capacity. *Behavioral and Brain Sciences*, 24(1), 87–114. <https://doi.org/10.1017/S0140525X01003922>
- Dolmage, J. T. (2017). *Academic ableism: Disability and higher education*. University of Michigan Press.
- Forrest, M. E. S. (2007). Disability awareness training for library staff: Evaluating an online module. *Library Review*, 56(8), 707–715. <https://doi.org/10.1108/00242530710818036>
- Hutchins, S. D., Wickens, C. D., Carolan, T. F., & Cumming, J. M. (2013). The influence of cognitive load on transfer with error prevention training methods: A meta-analysis. *Human Factors: The Journal of the Human Factors and Ergonomics Society*, 55(4), 854–874. <https://doi.org/10.1177/0018720812469985>
- Kathman, J. M., & Kathman, M. D. (2000). Training student employees for quality service. *The Journal of Academic Librarianship*, 26(3), 176–182. [https://doi.org/10.1016/S0099-1333\(00\)00096-3](https://doi.org/10.1016/S0099-1333(00)00096-3)
- Kilmurray, L., Faba, N., & Alphonse, L. (2005). *Access to academic materials for post-secondary students with print disabilities* (0-9686659-4-2). National Educational Association of Disabled Students. www.neads.ca/en/about/projects/atam/atam_report_final_en.pdf
- Kwak, A., & Newman, J. (2018). An accessibility-first approach to online course readers. *Reference Services Review*, 46(3), 340–349. <https://doi.org/10.1108/RSR-04-2018-0046>
- Lee, M. C. (2020). Improving accessibility in interlibrary loan using OCR. *Journal of Interlibrary Loan, Document Delivery & Electronic Reserve*, 29(1–2), 75–87. <https://doi.org/10.1080/1072303X.2020.1859426>
- Lewis, T. (2022, January 1). *Working definition of ableism*. TALILA A. LEWIS. www.bit.ly/ableism2022

- Lewitzky, R., & Weaver, K. (2022). Developing universal design for learning asynchronous training in an academic library. *Partnership: The Canadian Journal of Library and Information Practice and Research*, 16(2), 1–18. <https://doi.org/10.21083/partnership.v16i2.6635>
- Macnaughton, S., & Medinsky, M. (2015). Staff training, onboarding, and professional development using a learning management system. *Partnership: The Canadian Journal of Library and Information Practice and Research*, 10(2). <https://doi.org/10.21083/partnership.v10i2.3573>
- Manley, L., & Holley, R. P. (2014). Hiring and training work-study students: A case study. *College & Undergraduate Libraries*, 21(1), 76–89. <https://doi.org/10.1080/10691316.2014.877739>
- Martinez, S. L. (2014). Training Tech Services' Student Employees Well: Evidence-based Training Techniques in Conjunction with Coaching and Mentoring Strategies. *Cataloging & Classification Quarterly*, 52(5), 551–561. <https://doi.org/10.1080/01639374.2014.903548>
- McKenna, J. (2020). So many students, so little time: Practical student worker training in an academic library. *Journal of Access Services*, 17(2), 74–82. <https://doi.org/10.1080/15367967.2020.1718505>
- Mellon, B., Cullen, M. G., & Fallon, H. (2013). Implementing an online training course in disability awareness for frontline staff. *SCONUL Focus*, 58, 5.
- Michalak, R., & Rysavy, M. D. T. (2018). Online onboarding: Library workplace training in a trilingual interactive online asynchronous environment. In D. Ifenthaler (Ed.), *Digital Workplace Learning* (pp. 291–306). Springer International Publishing. https://doi.org/10.1007/978-3-319-46215-8_16
- Mitchell, J., & Soini, N. (2014). Student involvement for student success: Student staff in the learning commons. *College & Research Libraries*, 75(4), 590–609. <https://doi.org/10.5860/crl.75.4.590>
- Mulliken, A., & Falloon, K. (2019). Blind academic library users' experiences with obtaining full text and accessible full text of books and articles in the USA: A qualitative study. *Library Hi Tech*, 37(3), 456–479. <https://doi.org/10.1108/LHT-08-2017-0177>
- New College. (2023a). *New College & the University of Toronto*. New College. <https://www.newcollege.utoronto.ca/why-new-college/new-and-uoft/>
- New College. (2023b). *Welcome to New!* New College. <https://www.newcollege.utoronto.ca/>
- Olubiyo, P., Achebe, N., & Olubiyo, L. (2022). Digitization of information resources in university libraries in Nigeria: Challenges and way forward. *Library Philosophy and Practice (e-Journal)*. <https://digitalcommons.unl.edu/libphilprac/7444>
- Integrated Accessibility Standards, O. Reg. 191/11 (2011). <https://www.ontario.ca/laws/regulation/110191>
- Paas, F., Renkl, A., & Sweller, J. (2004). Cognitive load theory: Instructional implications of the interaction between information structures and cognitive architecture. *Instructional Science*, 32(1), 1–8. <https://doi.org/10.1023/B:TRUC.0000021806.17516.d0>
- Pickens, K. E. (2017). Applying cognitive load theory principles to library instructional guidance. *Journal of Library & Information Services in Distance Learning*, 11(1–2), 50–58. <https://doi.org/10.1080/1533290X.2016.1226576>
- Pionke, J. J. (2020). Library Employee Views of Disability and Accessibility. *Journal of Library Administration*, 60(2), 120–145. <https://doi.org/10.1080/01930826.2019.1704560>
- Reed, M., & Curtis, K. (2012). Experiences of students with visual impairments in Canadian higher education. *Journal of Visual Impairment & Blindness*, 106(7), 414–425. <https://doi.org/10.1177/0145482X1210600704>
- Roth, D., Pure, T., Rabinowitz, S., & Kaufman-Scarborough, C. (2018). Disability Awareness, Training, and Empowerment: A New Paradigm for Raising Disability Awareness on a University Campus for Faculty, Staff, and Students. *Social Inclusion*, 6(4), 116–124. <https://doi.org/10.17645/si.v6i4.1636>
- Schroeder, H. M. (2018). Implementing accessibility initiatives at the Michigan State University Libraries. *Reference Services Review*, 46(3), 399–413. <https://doi.org/10.1108/RSR-04-2018-0043>
- Shrauger, K. J., & Dotson, L. (2010). Scan by Numbers: Interlibrary Loan Lending Statistics Shape Digital Initiative. *Journal of Interlibrary Loan, Document Delivery & Electronic Reserve*, 20(3), 135–148. <https://doi.org/10.1080/1072303X.2010.488517>
- Southwell, K. L., & Slater, J. (2012). Accessibility of digital special collections using screen readers. *Library Hi Tech*, 30(3), 457–471. <https://doi.org/10.1108/07378831211266609>
- University of Toronto. (2012). *Fair Dealing Guidelines* University of Toronto. University of Toronto. https://www.provost.utoronto.ca/wp-content/uploads/sites/155/2023/02/2023_FairDealingGuidelines.pdf
- Vassady, L., Archer, A., & Ackermann, E. (2015). READ-ing our way to success: Using the READ scale to successfully train reference student assistants in the referral model. *Journal of Library Administration*, 55(7), 535–548. <https://doi.org/10.1080/01930826.2015.1076309>
- Wetli, A. (2019). Training temporary reference staff for maximized learning: A case study. *The Journal of Academic Librarianship*, 45(5), 102032. <https://doi.org/10.1016/j.acalib.2019.04.009>
- Wickens, C. D., Hutchins, S., Carolan, T., & Cumming, J. (2013). Effectiveness of part-task training and increasing-

- difficulty training strategies: A meta-analysis approach. *Human Factors: The Journal of the Human Factors and Ergonomics Society*, 55(2), 461–470. <https://doi.org/10.1177/0018720812451994>
- Wu, A., Davis-Van Atta, T., Scott, B., Thompson, S., Washington, A., Jones, J., Weidner, A., Laura Ramirez, A. L., & Smith, M. (2022). Navigating uncharted waters. *Information Technology and Libraries*, 41(3), 1–16. <https://doi.org/10.6017/ital.v41i3.14719>
- Zhou, Y. (2010). Are your digital documents web friendly?: Making scanned documents web accessible. *Information Technology and Libraries*, 29(3), 151. <https://doi.org/10.6017/ital.v29i3.3140>

Appendix

Detailed Description of Figure 1

Figure 1 displays a process diagram for the Accessible PDF Procedure. Along the top of the diagram is an arrow pointing from left to right. At the start of the arrow on the left side of the diagram is the label “Least Difficulty” and at the tip of the arrow on the right side is the label “Most difficult”. The process diagram below contains 3 process categories labeled (from left to right) Scanning process, OCR Process, and Tagging process. Each process has a list of steps.

The Scanning process includes:

- selecting appropriate scan size
- removing marginalia
- reducing shadows from spine

The OCR Process includes:

- split facing pages
- deskewing image (straightens text)
- image editing (reduce shadows and remove marginalia)
- cropping image
- optical character recognition
- text verification

The Tagging Process includes:

- adding document title and author
- applying page numbers
- heading structure
- setting language of phrases
- list and link formatting
- adding alternative text to images
- formatting table headings
- applying bookmarks

Detailed Description of Figure 2

Figure 2 is a screenshot from the training video titled “Making Accessible PDFs 4 – Order & Structure Types”. On the screen, the training PDF is open to the book cover page. The reading order pane is open on the left-hand side and the Reading Order panel is open. The text “Disability Media Studies” in the PDF is selected and Heading 1 option in the Reading Order panel is highlighted blue, with a comment bubble contains the text “Click the Heading 1 button.”

Detailed Description of Figure 3

Figure 3 is a screenshot of the section “Three Page Numbers” from the Tagging Process within the Training Corner of the Online Course Reader Service SharePoint site. In the left side site navigation, the Training Corner option is at the top of the list and includes links to the Scanning Process, OCR Process, and Tagging Process. In the main content area of the page is the section titled “Three Page Numbers,” which is divided into two. On the right side, below the section title, are the following instructions “Read the ‘Page Number’ documentation and watch the accompanying video, then complete the homework.” Below these instructions is a file viewer titled “Page Numbers – Documentation, homework and video script.” To the right is a video thumbnail titled “3. Making Accessible PDFS – Page Numbering.”

Below the section titled “Three Page Numbers” is the section titled “Page Numbers Homework” with the following text “Add page numbers to your PDF, including the cover page and copyright pages, and bibliography, if applicable.”