

**Adult Basic Education Student Perception of
Online Course Document and Media Accessibility**

Karen E. Ballengee

School of Information Science and Learning Technologies, University of Missouri

ISLT 9450: Research Methods in Information Science and Learning Technologies

Dr. Danielle Oprean

May 9, 2022

Adult Basic Education Student Perception of Online Course Document and Media Accessibility

Background and Significance of the Research

The percentage of postsecondary students taking at least one online course increased steadily from 2012 (25.5%) until 2019 (36.3%), with a sharp increase from 2019 to 2020 (72.8%) due to the COVID-19 pandemic (U.S. Department of Education, 2020). Based on the U.S. Census Bureau's (2012) estimation that 19% of the population may have a disability, it is probable that a large percentage of online students would be included in this statistic.

While much of the research has focused on postsecondary students, little attention has been given to students in adult basic education programs and online courses offered by those programs. Gregg (2012) defined adult basic education programs as programs that serve students without a high school diploma. These students may choose online courses because the flexibility of the programs fits with their additional responsibilities outside of the classroom.

Adult basic education students with disabilities may face additional barriers not faced by their peers. Some may have dropped out of school due to poor performance or failure which could be attributed to a learning disability. Once these students are out of the school system it may be difficult for them to recognize that they have a disability or be diagnosed with a disability. Gregg (2012) cited the costs for an evaluation as a possible barrier for students who may suspect they have a learning disability. It is likely that there is not only a large number of adult education students enrolled in online courses who have disabilities, but some of these disabilities may be undiagnosed, while the student may choose not to disclose their disability at all.

Adult basic education students enrolled in online courses have challenges that they would not normally encounter in the face-to-face classroom. These students are required to navigate the course in a learning management system, communicate with instructors through email and conferencing tools, download and read documents, watch videos, and listen to audio. All of these activities require a certain

level of accessibility. Designing accessible materials, providing captions, and creating multimodal lessons may be something that instructors have little to no experience in doing, especially those who may have been thrown into the online environment due to the transition to online courses for the COVID-19 pandemic (He, et al., 2022).

Problem Statement

Documents and media contained in online courses need to be accessible so that students of all ability levels have equitable access. While some studies focused on adults with disabilities, almost all of them focused on college or graduate-level students. Students of all ages and every ability level need equitable access to course media and documents in order to be successful in the online classroom environment.

Previous studies examined how many students had disabilities or an instructor's perspective of the accessibility of the course or course materials; however, in order to provide access to adult students of all abilities, it is critical to gather insight into how these students experience these courses and their perception of whether the courses provide them with the necessary support they need to be successful. These perceptions could help uncover if there are any discrepancies between instructor perceptions of accessibility compared to what the student may perceive as accessible.

Purpose of Study

This quantitative study explores adult basic education online students' perceptions of the document and media accessibility in online courses. The students surveyed will be enrolled in a regional adult education program in a northeastern state. Survey questions will be based on the World Wide Web Consortium's (W3C) Web Accessibility Standards, the principles of the Universal Design for Learning (UDL), and the University of Alabama's *Ten Steps Toward Universal Design of Online Learning*. Information gathered in this study will be used to inform course design and faculty training in the future.

Literature Review

This review seeks to explore adult basic education student perceptions of the accessibility of online documents and media and how the accessibility of these assets can help inform the design of accessibility frameworks to help shape faculty awareness and training. Searches were conducted using Google Scholar and Virginia Commonwealth University's library search using the keywords: adults+ disabilities, adult basic education students+disabilities, online students+disabilities, course+accessibility, document+accessibility, and Universal Design for Learning (UDL). Since this topic is related to online courses, newer sources were sought to reflect up-to-date practices and the increase in online learning during COVID-19. Sources contained in the reference section of the articles and the statistical reports that were referenced as secondary sources were also used. The literature is organized by themes that include approaches to adult students with disabilities, the attrition rate for students with disabilities, disability disclosure, accommodations, and barriers faced by students with disabilities. This review begins with statistics on the number of people with disabilities and the various approaches taken for context.

Approaches to Adult Students with Disabilities

The estimated number of adults with disabilities varied based on the populations studied, types of disability studied, sampling methods, and definitions of disability. The United States Census Bureau (2012) estimated that "about 56.7 million people — 19% of the population — had a disability in 2010" (para. 1). While the World Health Organization (WHO) reported that "including children, over a billion people (or about 15% of the world's population) were estimated to be living with a disability" (p.29). Huss and Eastep (2016) theorized that these are disabilities that could impact the ability to interact with the web. Several articles noted the

increase in the number of students taking online courses, and the National Education Policy Center (2014) proved that “overall, the proportion of students with disabilities in virtual [K12] schools is around half of the national average, or 7.2% compared with 13.1 %” (p. 65). These statistics reveal a large number of people who could benefit from accommodations.

One group of students who may face increased barriers to accessibility are adult basic education students. Gregg (2012) noted the low number of GED[®] passers who were enrolled in postsecondary education and concluded that “the pathway from adult basic education programs and participation in postsecondary education and the workforce appears to be filled with many barriers for adolescents and adults with LD [learning disabilities]” (p. 48).

Patterson (2018) focused on demographic and background characteristics of Young Adults with Disabilities (YAWD) and what factors impeded or supported their success in postsecondary education and the workplace. The author used the Educational Longitudinal Survey to compare data on high school sophomores as they transitioned out of high school and into the workforce or on to postsecondary education. Patterson found that one in seven high school sophomores had a disability and 81% graduated high school while 6.4% earned a GED[®]. The author also found that the median income was higher for high school graduates and early leavers (those who left high school without graduating) with a GED[®] than it was for those who were early leavers without credentials. The author noted the gender inequality in the overrepresentation of males in special education programs. Patterson mentioned that the socioeconomic status of the parents was not addressed.

Each study had its scope and approach to collecting data. Grimes et al. (2017) conducted an anonymous case study of students at a university in Australia to identify how many students had learning challenges, while Roberts et al. (2011) focused on students at five universities.

Roberts et al. determined how many of the 2,366 students who responded to their survey had a disability and how many of those students with disabilities were enrolled in online courses.

Gregg (2012) focused on adult basic education students and concluded that a large number of these students were learning disabled. White and Polson (1999) also focused on adult basic education students, but from a different perspective. In their study, the providers of adult education in nine states were asked to fill out surveys and estimate the percentage of students in their programs with disabilities, answer questions on the types of disabilities represented, and report how the center became aware of the disability.

Attrition Rate

One aspect of online learning to be cognizant of is the attrition rate for adults with disabilities in comparison to the rest of the online learning population. Frankola (2001) cited the Chronicle of Higher Education, which reported 20% to 50% dropout ranges for distance learners. The dropout rate was estimated to be 10% to 20% higher than reported but those numbers did not include online students with disabilities. Although Roberts et al. (2011) found that the six online master's students with disabilities that were surveyed tended to enroll in a single course and not a full degree program and wanted to explore the reasons that these students tended to enroll in a single course.

Disability Disclosure

Students' disclosure of their disability makes a difference in the kinds of accommodations and support they receive. Massengale and Vasquez (2016) asserted that "it is the individual's prerogative to disclose a disability." The authors noted that most institutions provide disability services but that ultimately, the success of online students with disabilities depends on "whether or not the student has accommodated access to course materials" (p.71).

Roberts et al. (2011) agreed that an institution's ability to meet accommodations requests depends on a student's disclosure of a documented disability.

Postsecondary students have the option to disclose their disability or enroll with disability services if they choose. Verdinelli and Kutner (2016) found that many students did not enroll with disability services or if they did, they did not request accommodations from their instructor. The Betts et al. (2013) case study confirmed that many of the students that they interviewed did not disclose their disability to professors and that one student was unaware that their condition could be considered a disability. One reason for nondisclosure that Roberts et al. (2007) found was that most students held a belief that others had negative perceptions of those with disabilities. To further understand what predicts a student's decision to disclose, Grimes et al. (2017) conducted a study that compared students who disclosed to those who did not. The authors noted that it was the largest known study of non-disclosing students. This study revealed that the non-disclosers were typically under the age of 25 and had a higher propensity for mental health issues. The authors additionally found that these students were likely to have only one learning challenge which would help them to remain hidden.

Students in an online environment may have different reasons for not disclosing than they would have in the face-to-face environment. Non-disclosure in the online environment has implications from both an instructor's perspective and a student's perspective. Massengale and Vasquez (2016) stated that "in the online learning environment, it is difficult for the instructor to identify if any students have disabilities" (p. 71) while Verdinelli and Kutner (2016) reported that participants felt less stress and felt a greater sense of control in the online environment. The authors noted that students with visible disabilities "experienced the opportunity to allow

intellect, skill, and character to become their observed identity rather than their disability” (p.362).

Accommodations

The instructor and institution play an integral role in disclosure and accommodations as well. Dell et al. (2015) declared that it is the instructor’s responsibility to encourage students to disclose a disability and that disclosure of a disability could determine how a student with a disability in an online course is supported and provided with accommodations. Messengale and Vasquez (2016) noted that “accommodations are student-led and modifications are teacher-led; however, both are initiated through letters defining educational needs written by medical professionals” (p.70). Massengale and Vasquez acknowledged that the responsibility for accommodations shifts to the students in post-secondary education, while Huss and Eastep (2016) observed that self-advocacy is a new role for students as they leave the K12 arena.

Gregg (2012) mentioned adult basic education students specifically and noted that there was a lack of literature for accommodating and testing this population. The author listed three ways that accommodations are provided: professional judgment (recognizing the adult LD learner’s uniqueness), legal mandates (The Americans with Disabilities Act and Section 504 of the Rehabilitation Act which offers legal support for adults in a postsecondary and works environment), and professional standards (the types of policies, procedures, and decision-making practices). Gregg also recommended specific types of accommodations for lesson presentation and student response as well as for those with general disabilities, reading disorders, math disorders, written language disorders, and others. Gregg explained that adult learning disabled students often lack access to accommodations and receive little training on how to use the accommodations they are afforded. The lack of access and training for accommodations could be

a barrier to online courses for some adult students with disabilities.

The differences in availability and awareness of disability support services and the timeliness of the accommodations provided to students with disabilities could impact the outcomes for these students. Huss and Eastep (2016) noted that the “willingness of students to enroll in online courses and request accommodations is frequently tied to the quality and prominence of an institution’s distance education goals aimed to improve outcomes for those disabled students” (p. 6). Roberts et al. (2011) found that accommodations generally occurred after a disability was disclosed which requires an existing course to be modified. Betts et al. (2013) stated that this type of approach is reactive rather than proactive.

One way to be proactive and remove barriers is to make ensure the course content is accessible. Massengale and Vasquez (2016) surveyed one course each from six college professors at one university using the Webcourses platform for their courses and evaluated the courses using the WAVE tool which is a tool for detecting accessibility errors. The errors were classified as either an error in the instructional material or an error in the way students are required to submit assignments on the platform. The authors found 13 types of challenges (with five prevalent in all of the courses surveyed) and suggested adaptations to course content and submission based on the challenges that they discovered.

One way to ensure that course content is accessible is to survey all of the documents and media contained in the course. A majority of the accessibility errors found in the Massengale and Vasquez (2016) survey were related to document and media accessibility. Huss and Eastep (2016) further explored document accessibility with a survey of 92 faculty members at one university who were asked if their documents and media (Word, PDF, video, audio, screen capture video, images) were accessible for those with disabilities. They questioned whether those

surveyed were aware of the accessibility process at their university and if they have adequate training to make documents and media accessible. The authors asked the participants to self-report the accessibility of their documents and media using established guidelines. The survey also asked if participants were aware of the accessibility checkers that come with Word and Adobe. Massengale and Vasquez reported that 70% were unaware of the accessibility checker in Word while 80% were unaware of the accessibility checker in Adobe (p.9). This, according to the authors, “suggest[s] that accessibility compliance within online courses has not been achieved, and a lack of familiarity with the requisite expectations is also very much in evidence” (p.13).

Many of the studies mentioned the Universal Design for Learning (see Appendix B) as a way to make courses accessible. Huss and Eastep (2016) stated “Our belief is that UDL can benefit students with disabilities, but also students of varying abilities, including English as a second language” (p. 17). He et al. (2022) recommended using UDL as a guide to creating courses. Rao and Tanners (2011) tested this theory with a small-scale case study of 25 online graduate students at a university in Hawaii. Rao and Tanners designed an online course using the UDL principles and the Institute for Higher Education and Policy’s benchmarks for excellence in online learning. These courses were designed before knowing the student populations or disability status, although this particular school has a high percentage of nontraditional students. Based on the information gained in this study, Rao and Tanners recommended integrating UDL into online courses. For future studies, the researchers would like to study if the use of UDL supports in online courses eliminates the need for disclosure.

Rogers-Shaw and Choi (2018) focused on how Universal Design for Learning principles (UDL) are applied to an online course that teaches communication skills to future teachers. The

authors believed that UDL helps to reduce barriers for disabled learners and focuses on the curriculum rather than the disabled student. By infusing UDL into a course, they created a framework before the start of the course rather than trying to accommodate the diverse needs of each student throughout the course. Knowing the barriers and challenges an adult student with disabilities faces will aid in the design of accessible online media and documents. Dell, et al. (2015) recommended combining the UDL principles with the University of Arkansas “10 Simple Steps” (see Appendix A) as a tool to check the accessibility of a course before it is presented to students. The authors believed that this would eliminate requests for accommodations.

Barriers

Inevitably online students with disabilities will face barriers that their classmates will not and when it comes to accommodations and accessibility, instructors face barriers as well. Huss and Eastep (2016) recommended the “proactive identification and removal of as many barriers to instruction as possible” (p. 1), as Massengale and Vasquez (2016) believed that “professors needed to be aware of the potential barriers to content accessibility that inhibit growth of knowledge and application of content” (p.71). He et al. (2022) noted the barriers that instructors face when providing accommodations and theorized that these barriers are the result of insufficient knowledge and understanding of assistive technologies, lack of or insufficient understanding of Universal Design for Learning (UDL), and lack of training and practice in implementing effective online engagement. He et al. recommended six strategies to help instructors overcome these barriers. They are: using captions and subtitles in Zoom, flexibility, and differentiation, breaking content into smaller chunks, working with the disability office to train teaching assistants to help students with disabilities, using UDL as a guide, and expanding services to support online students with disabilities (pp. 8-9). Massengale and Vasquez (2016)

noted that the faculty members who responded to their survey listed the following limitations to making their course materials accessible: Training and knowledge of ADA issues, time, and tools to make the necessary changes, financial resources to purchase necessary tools (p. 11).

Conclusions

Online courses generally have a higher attrition rate but no studies have been conducted on the attrition rate of adult online students with disabilities and if there is a connection between the attrition rate and course accessibility. Researchers found that some students choose not to disclose their disability status because of potential stigmas. The choice not to disclose has an impact on the services, support, and accommodations students would receive if they disclosed. Once institutions and professors are aware of a student's disability status, they can help to eliminate or mitigate the barriers those students may face so that they can be successful in this learning environment. One way professors can eliminate barriers is to make their courses accessible by using accepted guidelines to evaluate courses. These guidelines can also be used to make documents and media accessible. Adult basic education students face increased barriers to learning and few studies exist on this population. Universal Design is a proactive approach to accessibility that needs more exploration as it may eliminate the need for students to disclose their disabilities.

Methodology

Literature indicates that there are a large number of people with disabilities in the United States (U.S. Census Bureau, 2012; World Health Organization, 2016) which makes it probable that a sizeable population of online students have a disability. While there have been studies on the attrition rate in online courses, the accessibility of online course materials, and adult students with disabilities, none of these studies focused specifically on adult basic education students with

disabilities who are enrolled in online courses. More information is needed to evaluate document and media accessibility in online courses from the perspective of adult basic education students with disabilities.

Some existing frameworks and guidelines for creating an accessible online learning environment include the Worldwide Web Consortium (WC3) web accessibility standards (see Appendix C), the University of Alabama's *Ten Steps Toward Universal Design of Online Learning*, and Universal Design for Learning (UDL). Rao and Tanners (2011) mentioned UDL as a way to make course materials accessible at the start of the course before students need to ask for accommodations. They asserted that doing so makes online courses easily accessible for everyone, not just those with disabilities. They explained that those with disabilities may no longer feel the need to disclose their disability status if accommodations are built into the course.

Research Questions

To address the aforementioned limitations, the proposed study aims to address the following questions:

1. What are adult basic education students' perceptions of media and document accessibility in online courses?
2. What are the perceptions of students with disabilities versus students without disabilities?
3. What are the perceptions of students who disclose versus those students who do not disclose?
4. What are the students' perceptions of individual courses?

Methods and Rationale

This study will use a quantitative non-experimental survey design (see Appendix D). This type of design "provides a quantitative description of trends, attitudes, and opinion" (Creswell &

Creswell, 2018, p. 147) of the target population which is one way to examine the relationships between variables, according to the authors. This study will be longitudinal, and the data will be collected over a period of one year. This method was selected because of its ease and convenience for participants and researchers and the level of anonymity it affords the participants. The quantitative nature of the study uses a Likert scale to capture participant attitudes and can be used to compare the relationship between the variables (Creswell & Creswell).

The population will consist of adult education students enrolled in online courses in an eastern state. The students will be over the age of 18 and without a high school diploma. Every participant in the program who completes an online course will receive an electronic survey at the end of their course. The researchers will receive a list of email addresses for students in all courses and will send the emails, send reminders at appropriate intervals, and collect the survey responses. Included in the survey will be a consent form for potential participants to review and sign. Those who have taken more than one course will be allowed to retake the survey since the study is measuring the accessibility of course materials for all courses. Participants will be reminded that the survey is anonymous and that they can choose to exit the survey at any time without any negative consequences. The anonymous nature of the survey will help to ensure the confidentiality of the participants and help gather information from students who may be reluctant to disclose in other situations.

Variables

Independent variables as those variables that affect the outcome of studies (Creswell & Creswell, 2018). The authors explain that these types of variables can be manipulated. The independent variables in this study are the disability status of the students, the disclosure status

of students with disabilities, and the individual course. Dependent variables are defined by Creswell and Creswell as those variables that are impacted by the independent variable. In this study, the dependent variable is the accessibility perception of the documents and media. This perception may be dependent upon the student's disability status, disclosure status, and individual course. Table 1 shows the relationship between the variables and the research questions.

Table 1

Relationship Between the Variable and Research Question

Variable Name	Research Question
Dependent Variable: Student Perception of Accessibility	What are adult basic education students' perceptions of media and document accessibility in online courses?
Independent Variable 1: Disability Status	What are the perceptions of students with disabilities versus students without disabilities?
Independent Variable 2: Disability Disclosure Status	What are the perceptions of students who disclose versus those students who do not disclose?
Independent Variable 3: Individual Course	What are the students' perceptions of individual courses?

Population

The sample will consist of all online students enrolled in adult basic education courses in adult education programs in an eastern state. Selecting all students will help gather information from those who may not wish to disclose their disability and to not single out those with disabilities. These students will be over the age of 18 and have not completed high school. Permissions will be gained from the Institutional Review Board (IRB), the regional program manager, and school administration if the local program is affiliated with a K12 system or

community college. At the end of each course, all students in the course will receive an email with the survey questions.

Data Collection

Since adult education does not follow the traditional semester-based format of K12 institutions, surveys will be collected over a period of a year. The survey will start first with demographic questions. Participants will be asked their age, gender, the title of their course, disability status, if they had an IEP in K12, whether they have a disability and if they do, the type of disability, and disclosure status. The questions in the survey will be based on WC3 guidelines for document and media accessibility, the University of Alabama's *Ten Steps Toward Universal Design of Online Learning*, and UDL guidelines. These guidelines are already in use and will help to establish content validity and internal consistency. Cronbach's alpha will also help to establish the internal reliability of the questions. The responses will be on a Likert scale scored from 1-to 5 with 1 being strongly disagree and 5 being strongly agree. At the end of the survey will be an open-ended question for participants to answer. The surveys will be emailed at the end of the course and will sent to all students regardless of disability status. This survey will be created in a Google form and researchers will receive the data electronically.

Ethical Considerations

All IRB and local program and school district procedures will be followed. Since the survey is sent to all students, it does not specifically target those with disabilities, but this information is still sensitive and will be treated accordingly. Participants will not be required to provide an email address in order to maintain anonymity. Participants will also be reminded that the survey information is confidential and will only be used in the study and any information presented by researchers will only be in aggregate form so as not to identify individual students.

Permissions will be needed to contact students by personal email as most programs are not associated with a school or district and, as a result, participants are not provided with a school email address.

Data Analysis Plan

The IBM SPSS Statistics 24 Windows will be used to analyze the results of the data collected during this research. Researchers will track the number of surveys sent compared to the number of surveys returned as well as the number of participants who have indicated that they have completed this survey for more than one course. As suggested by Creswell and Creswell (2018) a wave analysis will be used to analyze the response/nonresponse to eliminate response bias.

Based on Creswell and Creswell's (2018) recommendation, a descriptive analysis will be used to indicate the means, standard deviations, and scores for the independent variables of this study: disability status, disclosure status, and individual course. Responses to the open-ended question will be coded into categories based on UDL standards, the WC3 standards, and the *Ten Steps Toward Universal Design*.

Timeline

The surveys will be completed and reviewed by experts by May of 2022. Pilot testing will occur in June of 2022. Revisions based on the results of the pilot tests will be made in July 2022. Since the adult education year does not follow a traditional school calendar, the surveys will be collected from August 2022 until August 2023. Data analysis will be completed by October of 2023 with the results for publication being ready by December of 2023. A detailed timeline is provided in Table 2.

Table 2*Timeline of Research*

Action	Timeline	Complete By
Surveys created	April 2022	April 30, 2022
Surveys reviewed by experts	May 2022	May31, 2022
Pilot Testing	June 2022	June 30, 2022
Revisions	July 2022	July 31, 2022
Data Collection	August 2022-August 2023	August 32, 2023
Data Analysis	September-October 2023	October 31, 2023
Results Reported	November-December 2023	December 31, 2023

Conclusion

It is possible that a large population of adult basic education students in online courses could have disabilities. Frameworks and guidelines are available to help make course materials accessible for those with disabilities, but it is not known how consistently these are applied. While there have been previous studies on accessibility, few have focused on adult basic education students in online courses. This study aims to determine adult basic education students' perceptions of the accessibility of online course materials and determine if there is a difference in perception by disability status, disclosure status, and title of the course. This information will determine the current status of document accessibility, which could help inform the design of accessibility frameworks and guidelines that could lead to changes in policy and shape institutional awareness and training.

References

- Betts, K., Cohen, A., Veit, D., Alphin, H. C., & Broadus, C. (2013). Strategies to increase online student success for students with disabilities. *Online Learning*, 17(3).
<https://doi.org/10.24059/olj.v17i3.324>
- CAST (2018). *Universal Design for Learning guidelines version 2.2*.
<http://udlguidelines.cast.org>
- Creswell, J.W. & Creswell, J.D. (2018). *Research design: Qualitative, quantitative, & mixed methods approaches (5th ed.)*. Sage.
- Dell, C. A., Dell, T., & Blackwell, T. (2015). Applying universal design for learning in online courses: Pedagogical and practical considerations. *The Journal of Educators Online*, 12(2). <https://doi.org/10.9743/JEO.2015.2.1>
- Frankola, K. (2001). Why online learners drop out. *Workforce*, 80(10).
- Gregg, N. (2012). Increasing access to learning for the adult basic education learner with learning disabilities: Evidence-based accommodation research. *Journal of Learning Disabilities*, 45(1), 47–63. <https://doi.org/10.1177/0022219411426855>
- Grimes, S., Scevak, J., Southgate, E., & Buchanan, R. (2017). Non-disclosing students with disabilities or learning challenges: Characteristics and size of a hidden population. *The Australian Educational Researcher*, 44(4–5), 425–441. <https://doi.org/10.1007/s13384-017-0242-y>
- He, W., Zha, S., Watson, S., & He, Y. (2022). Promoting inclusive online learning for students with disabilities in information systems courses. *Journal of Information Systems Education*, 33(1), 7-14.

- Huss, J. A., & Eastep, S. (2016). Okay, our courses are online, but are they ADA compliant? An investigation of faculty awareness of accessibility at a Midwestern university. *i.e.: inquiry in education*: 8(2), Article 2.
- Massengale, L. R., & Vasquez, E. (2016). Assessing accessibility: Are online courses better than face-to-face instruction at providing access to course content for students with disabilities? *Journal of the Scholarship of Teaching and Learning*, 16(1), 69–79.
<https://doi.org/10.14434/josotl.v16i1.19101>
- National Education Policy Center. (2014). *Virtual schools in the U.S. 2014: Politics, performance, policy, and research evidence*. The University of Colorado Boulder.
<https://nepc.colorado.edu/sites/default/files/virtual-2014-all-final.pdf>
- Patterson, M. B. (2018). Transitions out: Young adults with disabilities along career pathways. *New Directions for Adult and Continuing Education*, 2018(160), 113–130.
<https://doi.org/10.1002/ace.20304>
- Rao, K., & Tanners, A. (2011). Curb cuts in cyberspace: Universal instructional design for online courses. *Journal of Postsecondary Education and Disability* 24(3), 211 – 229.
- Roberts, J. B., Crittenden, L. A., & Crittenden, J. C. (2011). Students with disabilities and online learning: A cross-institutional study of perceived satisfaction with accessibility compliance and services. *The Internet and Higher Education*, 14(4), 242–250.
<https://doi.org/10.1016/j.iheduc.2011.05.004>
- Rogers-Shaw, C., Carr-Chellman, D. J., & Choi, J. (2018). Universal design for learning: Guidelines for accessible online instruction. *Adult Learning*, 29(1), 20–31.
<https://doi.org/10.1177/1045159517735530>

United States Census Bureau. (2012, July 25). *Nearly 1 in 5 people have a disability in the U.S., Census Bureau reports.*

<http://www.census.gov/newsroom/releases/archives/miscellaneous/cb12-134.html>

United States Department of Education. (2020). *Percent of students enrolled in distance education courses, by distance education status of student: 2020*. Institute of Education Sciences, National Center for Education Statistics.

University of Arkansas Little Rock-Disability Resource Center. (n.d.). *Ten steps toward Universal Design of online learning.* <https://ualr.edu/disability/online-education/>

Verdinelli, S., & Kutner, D. (2016). Persistence factors among online graduate students with disabilities. *Journal of Diversity in Higher Education*, 9(4), 353–368.

<https://doi.org/10.1037/a0039791>

White, W. J., & Polson, C. J. (1999). Adults with disabilities in adult basic education centers. *Adult Basic Education*, 9(1), 36-45.

World Health Organization. (2011). *World report on disability.*

http://www.who.int/disabilities/world_report/2011/en/index.html

World Wide Web Consortium. (n.d.). *How to meet WCAG3 (quick reference).*

<https://www.w3.org/WAI/WCAG21/quickref/>

Appendix A

Ten Steps Toward Universal Design of Online Learning

1. [Include a welcoming access statement.](#)
2. [Provide simple, consistent navigation.](#)
3. [Choose tools carefully.](#)
4. [Model and teach good discussion board etiquette.](#)
5. [Use color with care.](#)
6. [Make sure text is readable.](#)
7. [Provide accessible document formats.](#)
8. [Describe graphics and visual elements.](#)
9. [Caption videos and transcribe audio clips.](#)
10. [Rethink, redesign PowerPoint presentations.](#)

(University of Arkansas Little Rock-Disability Resource Center, n.d.)

Appendix B

Universal Design for Learning Guidelines

1. [Provide Multiple Means of Engagement](#)
2. [Provide Multiple Means of Representation](#)
3. [Provide Multiple Means of Action and Expression](#)

(CAST, 2018)

Appendix C

How to Meet WCAG (Quick Reference)

1.1 text alternatives

Provide text alternatives for any non-text content so that it can be changed into other forms people need, such as large print, braille, speech, symbols or simpler language.

Guideline 1.2 – Time-based Media

Provide alternatives for time-based media

Guideline 1.4 – Distinguishable

Make it easier for users to see and hear content including separating foreground from background.

Guideline 2.3 – Seizures and Physical Reactions

Do not design content in a way that is known to cause seizures or physical reactions.

Guideline 3.1 – Readable

Make text content readable and understandable.

(World Wide Web Consortium, n.d.)

***Note:** This list contains only those guidelines that pertain to document and media accessibility.

Appendix D

Survey Questions

Thank you for helping us with our research on the accessibility of course materials and media in online courses. We invite students of all ability levels to complete this survey. Doing so will help us improve course materials for future courses. The survey is completely anonymous and you may quit at any time.

Demographic Questions

1. Course Name:
2. Age:
3. Last Grade Completed:
4. Gender:
5. Do you have a disability? If so, what type?
6. If you answered yes to question 5, have you disclosed that disability to your program or instructor?
7. If you answered yes to question 5, do you receive accommodations?
8. If you receive accommodations, what kind do you receive?

When you were in K12, did you have an IEP?

Do you receive accommodations now?

Specific Media	Question	Principle
	All Questions will be scaled 1-5 with 1 being strongly disagree and 5 being strongly agree. There will also be a choice for Do not know (DK) and Not Applicable (NA).	
Questions About Images	I was able to read the image description in alternative text.	<ul style="list-style-type: none"> • Describe graphics and visual elements. (<i>10 Steps Toward UDL</i>, #8) • Text Alternatives (WCAG, 1.1)
Questions About Audio	<p>The audio had transcripts or captions.</p> <p>The rate of speech was the appropriate speed.</p>	<ul style="list-style-type: none"> • Caption videos and transcribe audio clips. (<i>10 Steps Toward UDL</i>, #9) • Provide alternatives for time-based media. (WCAG 1.2) • Provide Multiple Means of Representation (CAST, 2)
	The audio provided was easy to hear and there was no extra background noise.	<ul style="list-style-type: none"> • Make it easier for users to see and hear content including separating foreground from background. (WCAG, 1.4)
Questions About Video	<p>The video used in the course had closed captions or transcripts.</p> <p>The rate of sound and video was an appropriate speed.</p>	<ul style="list-style-type: none"> • Caption videos and transcribe audio clips. (<i>10 Steps Toward UDL</i>, #9) • Provide alternatives for time-based media. (WCAG 1.2) • Provide Multiple Means of Representation (CAST, 2)

Specific Media	Question	Principle
	All Questions will be scaled 1-5 with 1 being strongly disagree and 5 being strongly agree. There will also be a choice for Do not know (DK) and Not Applicable (NA).	
Questions About Documents	I was able to see and read all of the information contained in documents (PDFs, Google Docs, Word, Excel, Power Point).	<ul style="list-style-type: none"> • Provide accessible document formats. (<i>10 Steps Toward UDL</i>, #7) • Rethink, redesign PowerPoint presentations. (<i>10 Steps Toward UDL</i>, #10)
Information about Text	<p>The fonts contained in the website or learning management was large enough to read.</p> <p>The text spaced vertically so that it could easily be read.</p> <p>The documents and written text contained headers and sections so that I could easily find material.</p> <p>The style of font was legible.</p>	<ul style="list-style-type: none"> • Make sure text is readable. (<i>10 Steps Toward UDL</i>, #6). • Make text content readable and understandable. (WCAG 3.1) • Provide Multiple Means of Representation (CAST, 2)
Questions about Visual Presentation	<p>The text colors were too dark to read.</p> <p>The text colors were too light to read.</p> <p>There were no bright or distracting colors in the course materials.</p> <p>Media provided did not have loud flashing lights.</p>	<ul style="list-style-type: none"> • Use color with care. (<i>10 Steps Toward UDL</i>, #5) • Make it easier for users to see and hear content including separating foreground from background. (WCAG, 1.4) • Do not design content in a way that is known to cause seizures or physical reactions. (WCAG, 2.3)
	Any additional software used in the course was easy to use and navigate.	<ul style="list-style-type: none"> • Provide Multiple Means of Action and Expression (CAST, 3)

Additional Comments: Please take a moment to provide additional comments on the materials and documents contained in this course.