ASSOCIATIONS BETWEEN ACCESSIBILITY KNOWLEDGE, PRACTICES, AND SUPPORT IN U.S. ONLINE HIGHER DISTANCE EDUCATION: AN EXPLORATORY FACTOR ANALYSIS

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by
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DEDICATION

I dedicate this work to everyone who has supported and mentored me in this journey. I’d also like to dedicate this to all the first-generation students, especially Latinas, who came before me, who were on this journey with me, and who will follow.
ABSTRACT

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Online distance education is one of the fastest-growing sectors of postsecondary enrollments. As more students take advantage of these opportunities, online course content has increasingly been found to be inaccessible to students with disabilities. As accessibility case law quickly changes the expectations for online course content, postsecondary institutions are struggling to shift to a proactive and systemic approach to accessible design practices.

This study used a descriptive quantitative survey methodology to explore the characteristics of institutions and individuals who are responsible for implementing accessibility within online higher education courses. Using a nonprobability, volunteer convenience sample, this study included 62 U.S. higher education professionals who had a job role in which they were responsible for using, creating, reviewing, or enforcing the use of accessible content in online courses. An adapted survey instrument consisting of 41 questions solicited information about course designers and institutions in two areas. First, data was collected about the characteristics and relevant demographic data for designers and their institutions. Second, information regarding the accessibility practices for each was gathered through 29 Likert-scale questions.

Overall, the findings indicate growth in the implementation of accessible course design practices. While there are still barriers to accessibility, many are reporting fewer limitations and more resources. The results from exploratory factor analysis revealed the presence of two distinct factor structures focused on institutional accessibility support...
and accessibility compliance support. Although no models or inferences can be made from these associations, they do suggest that institutional accessibility practices may have a key role in accessible online course design. Based on the results of this study and related research, five institutional recommendations to improve institutional accessibility practices were made.

KEY WORDS: Accessibility; Online education; Distance education; Higher education; Exploratory factor analysis; Systems theory
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Thank you.
PREFACE

The research presented in this dissertation is the result of my passion for more inclusive and accessible education. As a longtime educator, I have witnessed firsthand how accessible instruction and learning environments can positively impact students’ lives. Conversely, I have also seen how inaccessibility can severely harm learners. As a result, I am deeply committed to being a voice advocating for accessible and inclusive educational experiences.

I am grateful to all my teachers and students, who have challenged me to do better and aim higher in the pursuit of this work. While the research presented in this study is only the beginning, I am hopeful that it will contribute to a larger discussion about how instruction can be designed to benefit everyone meaningfully.

I extend my sincerest thanks to everyone who has inspired and motivated me to pursue this research. I am also grateful to everyone who has affirmed that this work is valuable and important.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEDICATION ................................................................................................................... iii</td>
</tr>
<tr>
<td>ABSTRACT ....................................................................................................................... iv</td>
</tr>
<tr>
<td>ACKNOWLEDGEMENTS ............................................................................................... vi</td>
</tr>
<tr>
<td>PREFACE ....................................................................................................................... viii</td>
</tr>
<tr>
<td>TABLE OF CONTENTS ............................................................................................... ix</td>
</tr>
<tr>
<td>LIST OF TABLES .......................................................................................................... xiii</td>
</tr>
<tr>
<td>LIST OF FIGURES ......................................................................................................... xiv</td>
</tr>
<tr>
<td>CHAPTER I: INTRODUCTION ................................................................................... 1</td>
</tr>
<tr>
<td>Statement of the Problem ............................................................................................. 1</td>
</tr>
<tr>
<td>Purpose of the Study .................................................................................................... 4</td>
</tr>
<tr>
<td>Research Questions ...................................................................................................... 5</td>
</tr>
<tr>
<td>Significance of the Study ............................................................................................. 6</td>
</tr>
<tr>
<td>Theoretical Framework ............................................................................................... 7</td>
</tr>
<tr>
<td>Definition of Terms ................................................................................................... 11</td>
</tr>
<tr>
<td>Assumptions .............................................................................................................. 14</td>
</tr>
<tr>
<td>Limitations ............................................................................................................... 16</td>
</tr>
<tr>
<td>Delimitations .............................................................................................................. 17</td>
</tr>
<tr>
<td>Summary .................................................................................................................... 18</td>
</tr>
<tr>
<td>CHAPTER II: LITERATURE REVIEW ................................................................... 20</td>
</tr>
<tr>
<td>History and Trends Within Distance Education ........................................................ 22</td>
</tr>
<tr>
<td>Legal Considerations of Disability in Higher Education ........................................... 27</td>
</tr>
</tbody>
</table>
## LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Distribution of Survey Questions by Thematic Section</td>
<td>50</td>
</tr>
<tr>
<td>2</td>
<td>Changes to Survey Instrument After Pretesting Measures</td>
<td>66</td>
</tr>
<tr>
<td>3</td>
<td>Methods to Address Survey Validity and Reliability through Instrument Design</td>
<td>81</td>
</tr>
<tr>
<td>4</td>
<td>Instrument Reliability Established Via Cronbach's Alpha</td>
<td>85</td>
</tr>
<tr>
<td>5</td>
<td>Participant Gender Distribution</td>
<td>88</td>
</tr>
<tr>
<td>6</td>
<td>Participant Mean Age and Experience in Years</td>
<td>88</td>
</tr>
<tr>
<td>7</td>
<td>Mean Frequency of Designers' Individual Accessibility Practices for Online Courses</td>
<td>91</td>
</tr>
<tr>
<td>8</td>
<td>Mean Frequency of Designers' Limitations in Implementing Accessibility for Online Courses</td>
<td>92</td>
</tr>
<tr>
<td>9</td>
<td>Type of Higher Education Institutions</td>
<td>93</td>
</tr>
<tr>
<td>10</td>
<td>Mean Frequency of General Institutional Online Course Accessibility Practices</td>
<td>95</td>
</tr>
<tr>
<td>11</td>
<td>Mean Frequency of Designated Responsibility for Online Instructional Content</td>
<td>96</td>
</tr>
<tr>
<td>12</td>
<td>Mean Frequency of Designated Responsibility for Online Course Accessibility Review</td>
<td>98</td>
</tr>
<tr>
<td>13</td>
<td>Mean Frequency of Institutional Accessibility Support and Training</td>
<td>100</td>
</tr>
<tr>
<td>14</td>
<td>Total Variance for Factors Considered for Retention Based on Eigenvalue</td>
<td>103</td>
</tr>
<tr>
<td>15</td>
<td>Summary of Factor Loadings Based on 24 Likert-Scale Items (N = 62)</td>
<td>105</td>
</tr>
</tbody>
</table>
# LIST OF FIGURES

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Representation of Online Education as a System</td>
<td>8</td>
</tr>
<tr>
<td>2</td>
<td>Integrating the Five Spaces of Design in Education to the Systems View of Online Education</td>
<td>9</td>
</tr>
<tr>
<td>3</td>
<td>Constructs (Factors) Considered in This Study</td>
<td>49</td>
</tr>
<tr>
<td>4</td>
<td>Research Justification for the Five-Point Frequency Likert Scale Used in This Study</td>
<td>57</td>
</tr>
<tr>
<td>5</td>
<td>Determination of Analysis Procedure Based on Preliminary Data Analysis</td>
<td>76</td>
</tr>
<tr>
<td>6</td>
<td>Overview of Data Analysis Procedure Using Exploratory Factor Analysis</td>
<td>78</td>
</tr>
<tr>
<td>7</td>
<td>Primary Role Served by Participants at Their Higher Education Institutions</td>
<td>89</td>
</tr>
<tr>
<td>8</td>
<td>Distribution of Frequency of Designer's Accessibility Practices by Number of Responses</td>
<td>90</td>
</tr>
<tr>
<td>9</td>
<td>Distribution of Frequency of Designer's Limitations in Implementing Accessibility Practices by Number of Responses</td>
<td>92</td>
</tr>
<tr>
<td>10</td>
<td>Distribution of Frequency of General Institutional Online Course Accessibility Practices by Number of Responses</td>
<td>95</td>
</tr>
<tr>
<td>11</td>
<td>Distribution of Frequency of Designated Responsibility for Online Instructional Content by Number of Responses</td>
<td>96</td>
</tr>
<tr>
<td>12</td>
<td>Distribution of Frequency of Designated Responsibility for Online Course Accessibility Review by Number of Responses</td>
<td>97</td>
</tr>
<tr>
<td>13</td>
<td>Institutional Requirement to Complete Training to Develop or Deliver Online Courses</td>
<td>99</td>
</tr>
</tbody>
</table>
14 Distribution of Frequency of Institutional Accessibility Support and Training by Number of Responses ........................................................................................................... 99

15 Scree Plot of Factors Based on Eigenvalues .................................................................................. 103

16 Distribution of Designer and Institutional Variables for Each Factor Structure 107

17 Institutional Versus Designer Practices Contributing to the Factor Solutions .. 118
CHAPTER I

Introduction

Online distance education is experiencing a paradigm shift as institutions struggle to adapt to a quickly changing landscape with new expectations while bound to compliance policies. The ubiquity of internet-enabled technology, as well as legislation and learners’ diversity, impacts every aspect of the way postsecondary institutions function and deliver online education. As technology and the internet permeate our lives, the quest to design and deliver accessible online instruction is challenging many institutional structures and practices that have been molded by changing legal and societal expectations. Now, accessibility, especially for learners with disabilities, represents a design challenge for online education.

This study explores systemic factors that currently affect postsecondary online education and institutional ability to implement accessibility practices within their online courses. While limited in scope, this study yields valuable information that supports future research in how these practices impact students, specifically those with disabilities.

Statement of the Problem

Historically designated as a nontraditional pathway to instruction, distance education programs have experienced a steady increase in enrollments throughout the last 20 years (Allen et al., 2016; Seaman et al., 2018). Distance education is defined as instruction delivered through one or more technologies to students separated from their instructors, whereas online education is described as instruction facilitated in an online environment (Seaman et al., 2018). The internet has made online education the fastest-growing sector of and primary format for distance education (Carlsen et al., 2016;
As a result, 6.9 million students have participated in distance education courses in the United States as of 2018 (Seaman et al., 2018; U.S. Department of Education [DOE], 2019). Although no specific data has been found, it has been estimated that up to 19.5% of students enrolled in online distance courses may have one or more disabilities, based on general education statistics (Campbell & Wescott, 2019). While enrollment in primarily online programs increased in 2020–21, the COVID-19 pandemic caused most U.S. universities to shift all instruction online (Miller, 2021). Although concrete data is unavailable, the pandemic has facilitated unprecedented participation in online higher education.

Historically, postsecondary institutions have been legally required to provide accommodations to students with disabilities based on a variety of legislation, including the Americans with Disabilities Act (ADA) of 1990 and the Rehabilitation Act of 1973 (U.S. Government Accountability Office [GAO], 2009). These legal mandates created a system in which students must disclose their disability and be deemed eligible to receive accommodations during their studies (U.S. GAO, 2009). This method of providing accommodations is primarily based on the medical model of disability, in which the individual is required to disclose and submit medical proof of a qualifying disability to receive services (Andrews et al., 2019; Bogart & Dunn, 2019; Siebers, 2013). However, the research shows that accommodations granted through this process present a variety of barriers to higher education instruction at the individual and institutional levels (Black et al., 2015; Cole & Cawthon, 2015; Grimes et al., 2017; Lindsay et al., 2018; Roberts et al., 2011; Sarrett, 2018; Thompson-Ebanks & Jarman, 2018; Toutain, 2019; U.S. GAO, 2009).
Gaining prominence in the 1980s and 1990s, the social model of disability shifted expectations on how laws and institutions addressed disabilities (Shakespeare & Watson, 2002). In this model, the goal is to accommodate the environment so that any person can fully participate in society (Magnus & Tøssebro, 2014; Persson et al., 2015). Consequently, U.S. legislation required accommodations for websites and digital content alongside services and physical environments (Saepa, 2020). Released in 1999, the Web Content Accessibility Guidelines (WCAG) established the expectation that online content should be accessible (Saepa, 2020). While postsecondary institutions are still required to provide accommodations based on a medical model of disability, institutions are also expected to provide accessible content and learning without an accommodation request based on emerging case law and updated legal requirements (McAfee & Taft, 2019; Online Learning Consortium & WICHE Cooperative for Educational Telecommunications [OLC & WCET], 2019).

As lawsuits and complaints increase exponentially across the United States, accessibility has become a significant issue for postsecondary institutions (Francovich, 2017; Taylor, 2020; UsableNet, 2019). Even though the pandemic initially slowed down legal action, there was a significant increase in ADA and accessibility lawsuits in 2020 against universities compared to previous years (Vu et al., 2020; Weissman, 2020). Prior to the pandemic, institutions reported that 69% of their online courses were noncompliant with accessibility legislation (OLC & WCET, 2019). Although no specific data has yet been reported, anecdotal reports indicate that making courses accessible was also not a priority during the shift to online instruction (M. Smith et al., 2020). This means that
higher education institutions are experiencing the pressure of providing accommodations and accessible content at an unprecedented level.

As such, accessibility issues represent a paradigm conflict in higher education. While the traditional disability accommodation process within higher education is based on the medical model of disability, the concept of a universally designed and accessible learning environment is grounded in the social model of disability (Bogart & Dunn, 2019; Toutain, 2019). The primary barrier to implementing effective accessibility practices within online education lays within the struggle of how to best serve the needs of students with disabilities within online higher education. According to Huss and Eastep (2016), there is a lack of ownership over accessibility efforts, which results in disorganized efforts. As a result, there is still an absence of collaborative institutional infrastructure to address accessibility (K. C. Green, 2010b, 2019; Linder et al., 2015; OLC & WCET, 2019).

The literature demonstrates that accessibility is typically approached as a compliance measure that lacks a holistic approach to creating accessible online learning experiences (Phipps & Kelly, 2006). Although many staff have been surveyed on their accessibility responsibilities, knowledge, and practices, little research, if any, has examined how these factors are associated (Frey & King, 2011; K. C. Green, 2010a, 2010b, 2019; Huss & Eastep, 2016; OLC & WCET, 2019; WebAIM, 2014).

Purpose of the Study

The purpose of this descriptive quantitative survey study was to explore the relationship between various characteristics that may contribute to accessibility knowledge, practices, and support in higher education online courses. Specifically,
characteristics comprise the factors of demographic data, knowledge about accessibility, implementation practices, and available training and support. This study surveyed designers including faculty, instructional designers, and those who provide accessibility support for online courses in U.S. higher education. The analysis of and the relationship between factors was based on previous studies that identified constructs that may impact accessibility implementation in higher education online courses (Frey & King, 2011; Huss & Eastep, 2016). The associations amongst factors were used to develop future testable hypotheses regarding accessibility practices within online higher education (Rindskopf, 2011).

**Research Questions**

The following research questions extend existing research on the characteristics of institutions and designers delivering online higher education courses and their accessibility practices. In addition, this study provided an updated view of overall accessibility practices and perceptions within higher education online course design and explores the relationships between them. The research questions addressed in this study were:

1. What are the characteristics of designers who are responsible for implementing accessibility in higher education online courses?
2. What are the accessibility practices used by designers in higher education online courses?
3. What are the characteristics of higher education institutions that offer online courses?
4. What are the accessibility practices of higher education institutions that offer online courses?

5. What are the associations (factor structure) amongst the surveyed characteristics and accessibility practices?
   a. To what extent do the practices of online course designers contribute to the identified factor structure?
   b. To what extent do the practices of the institution contribute to the identified factor structure?

This study used exploratory factor analysis (EFA). The primary goal was to collect data on various characteristics and practices that may impact or be associated with accessibility implementation within U.S. online higher distance education. Characteristics included descriptive data about institutions and designers, while accessibility practices included information about habitual procedures adopted by institutions or designers. These constructs are based on frequently identified factors in the literature regarding accessibility within online higher education, and the questions included in this survey have been previously researched. The EFA determined whether any of these constructs were associated in any way to create groups of factors that may be studied in the future to determine how they are related.

Significance of the Study

Previous research regarding online higher education has been limited to identifying how courses may be inaccessible, who is responsible for course accessibility, and whether practitioners have sufficient knowledge regarding compliance guidelines (Frey & King, 2011; K. C. Green, 2010a, 2010b, 2019; Huss & Eastep, 2016; OLC &
WCET, 2019; WebAIM, 2014). Although there have been calls for institutions to take a holistic, coordinated, and collaborative approach to accessibility that is founded in pedagogical practices such as Universal Design for Learning (UDL), research on how institutional practices may be associated with accessibility has not been undertaken to date (Ascough, 2002; Linder et al., 2015; OLC & WCET, 2019). While the literature has identified barriers such as cost, training, policies and procedures, time for the implementation of accessible design practices, and range of stakeholders involved, the association between these factors and to what extent they may contribute to the current state of accessibility practices has not been examined (Galusha, 1998; Linder et al., 2015; Rowland et al., 2014). Further, the pandemic has magnified the existing issues in making online instruction accessible and highlighted the need for proactive institutional measures (Lazar, 2021).

Therefore, this study's primary significance was to collect current information about institutions’ and designers’ characteristics of delivering online higher education courses and their accessibility practices. Furthermore, this information was analyzed to determine which factors are associated. While exploratory in nature, this study yielded valuable information such as areas of future study.

**Theoretical Framework**

Moore and Kearsley (2012) stated that distance education is a system that affects and is affected by its environment, “the physical, political, economic, and social environments in particular” (p. 9). Subject to these forces, online education is also a system that includes course delivery and development, program and department curriculum, and support for administration, student academics, and instructors (Hemphill
et al., 2019). Tamim (2020) further organized these into three subsystems consisting of macrolevel practices based on theoretical perspectives, mesolevel infrastructure and management, and microlevel instructional practices and learner behaviors, as shown in Figure 1. As a complex and multifaceted system, online education evolves with its environment (Reigeluth, 2019). The age of information and the internet places additional pressure on all education systems to adapt as social conditions push it to reflect community values.

**Figure 1**

*Representation of Online Education as a System*

Through an analysis of the online education components, the subsystems can be further divided into Warr et al.’s (2020) Five Spaces for Design in Education. The interconnected facets of the institutional experience can be represented as components of
a system, as shown in Figure 2. Theoretically, a macrolevel change in culture should elicit mesolevel changes to infrastructure and the instructional experience.

**Figure 2**

*Integrating the Five Spaces of Design in Education to the Systems View of Online Education*

Note. This diagram showcases how the systems regarding distance education, online education, and the Five Spaces of Design in Education are holistically related to one another from a systems perspective.

Likewise, these changes should result in microlevel practices and behaviors. Finally, through an amalgamation of these associated views on educational systems, it is easier to understand how societal beliefs manifest into institutional procedures that impact individual behaviors and practices.

Socially, the way disability is viewed has shifted dramatically since students with disabilities were first welcomed into higher education. The field of disability studies has moved from a medical to a social model. The medical model describes disability as an impairment of the individual, usually tied to a medical diagnosis (Andrews et al., 2019; Siebers, 2013). This has led to current legislation and policies that provide individuals with accommodations based on a medical diagnosis (Bogart & Dunn, 2019). As a result, the existing accommodation process used within higher education is a reactionary method of making instruction accessible to students with disabilities (Shakespeare, 2013; Toutain, 2019). The accommodation process is firmly situated within the mesolevel and microlevel subsystems of educational institutions. Furthermore, accommodations are only granted to eligible individuals who request them.

However, the social disability model is situated within the macrolevel of the system. Bogart and Dunn (2019) asserted that there is a need to shift “to a social model focus highlighting universal design, which would create a new norm of accessibility” (p. 658). This model influences how society fundamentally views and treats disability in any environment. From a systems perspective, this would affect operations in every subsystem so that anyone can access or engage in instruction without having to request an
accommodation. Within the context of online higher education, the movement towards a social model of disability would focus on accessible design promoted by UDL (Toutain, 2019).

The shift from the medical to the social model of disability is a change in paradigms that affects all facets of how disability is addressed in law, policy, and practice. As society places pressure on institutions to adapt to the social model, it creates a conflict between the expectations and the practices created under the previous paradigm. According to Reigeluth (2019), this creates a chaotic type of disequilibrium that moves an institution from “piecemeal change” towards true transformation and adoption of society’s new values. This study explored how various constructs may be associated to identify the key areas in which institutions can potentially improve as they move towards achieving equilibrium in their implementation of accessibility practices within online higher distance education.

Definition of Terms

The following terms and definitions are intended to help the reader understand the context of the terms as used in this research study.

Accessibility Practices

A habitual procedure adopted by institutions or designers regarding accessibility. Examples include reviewing online courses, providing training or support, adding closed captions to videos, and providing alternative text for images.
**Accommodation**

In the U.S. postsecondary context, accommodation refers to any adjustments, modifications, aids, and services that allow a student to fully participate in the educational process based on a disability diagnosis (U.S. DOE, 2020; U.S. GAO, 2009).

**Accessibility**

The ability to access and make use of websites, hardware, software, technology, and content that has been designed in a way that allows people to perceive, understand, navigate, interact with, and contribute to online content and environments (Culp et al., 2005; Huss & Eastep, 2016; Web Accessibility Initiative [WAI] & World Wide Web Consortium [W3C], 2019).

**Characteristics**

The characteristics relevant to this study include descriptive information about institutions and designers such as type, enrollment, number of online courses offered, demographic data, role, and experience.

**Designers**

Designers are professionals who work in U.S. higher education as faculty or instructional designers, or those who provide accessibility support for online courses.

**Distance Education**

Distance education is instruction delivered to students who are separated from their instructors through one or more technologies (Seaman et al., 2018). Distance education includes instruction provided in various formats, including online education (Lee, 2017).
**Higher Education Institutions**

A higher education institution is any accredited college-level institution recognized by the U.S. DOE and that “at least a one-year program of study creditable toward a degree” (National Center for Education Statistics, 2020b). For this study, this term is used synonymously with postsecondary institutions.

**Medical Model of Disability**

The medical model of disability characterizes disability as an impairment or medical diagnosis (Andrews et al., 2019; Siebers, 2013). The model is linked to the ADA process of expecting students to disclose their disability (and medical diagnoses) to request and receive accommodations (Bogart & Dunn, 2019; Toutain, 2019).

**Online Education**

Online education delivers 80% or more of the instructional content through the internet (Carlsen et al., 2016).

**Online Course**

An online course is a course in which 80% or more of instruction is delivered through the internet without face-to-face meetings (Allen et al., 2016)

**Postsecondary Institution**

A postsecondary institution is any type of institution that offers an academic, vocational, or continuing education program for adult students (National Center for Education Statistics, 2020a). For this study, this term is used synonymously with higher education institution.
**Social Model of Disability**

The social model of disability characterizes disability as a construct resulting from societal barriers in which the process of access is the responsibility of the society rather than the individual (Bogart & Dunn, 2019; O’Shea & Kaplan, 2018; Shakespeare, 1996).

**Universal Design for Learning (UDL)**

UDL is a framework used to guide the design of instruction based on multiple means of engagement, representation, action, and expression to improve learning for all learners (CAST, 2020).

**Assumptions**

The foundational assumptions for all research are ontological and epistemological. Quantitative survey research is based on realism and positivism, in which the world is knowable through statistical analysis (Cohen et al., 2011). Further, this type of mathematical analysis is based on the assumption that it can identify connections and relationships between variables (Cohen et al., 2011). Relatedly, there is an assumption that survey respondents will accurately report accessibility practices when there may be issues of compliance and liability involved.

Assurances of anonymity, coupled with a web-based survey's self-administration, can encourage respondents to be truthful in their responses (Callegaro et al., 2015; Fowler, 2002). To preserve anonymity, participant identities were concealed. Thus, while the researcher was able to identify who completed the survey, this information was not linked to survey responses. Further, no identifying information was collected within the survey itself.
Readers were provided with the rationale for how the survey was designed to allow for informed decision-making regarding the study's validity and reliability. This included how the survey and research design limitations were addressed to minimize bias, skewness, and reporting accuracy. It was also assumed that survey respondents were involved to some degree in developing online higher education courses since they were recruited from a professional instructional design organization and from social media. The respondents had to self-report whether they met the participation criteria.

Assumptions related to the research design were also considered. It was assumed that a quantitative survey has the capability of yielding associations among clusters of variables through an EFA (Field, 2013).

The final assumption was that accessibility issues within online higher education are a product of practices at the institutional and individual levels. Accessibility is, therefore, subject to macro-, meso-, and microlevel systems that affect and are affected by the environment in which accessibility operates (Moore & Kearsley, 2012; Tamim, 2020). Further, it was assumed that the accessible design of online courses is the product of a holistic, coordinated, and collaborative approach based on pedagogical practices such as UDL (Ascough, 2002; Linder et al., 2015; Rowland et al., 2014). Previous research has identified many barriers to and practices for accessibility within higher education but has not examined any potential associations between them (Frey & King, 2011; Galusha, 1998; K. C. Green, 2010a, 2010b, 2019; Huss & Eastep, 2016; Linder et al., 2015; OLC & WCET, 2019; Rowland et al., 2014; WebAIM, 2014).
Limitations

This descriptive quantitative survey study aimed to explore the characteristics of institutions and individuals responsible for implementing accessibility within online higher education courses. While the results of this study clarify potential relationships amongst surveyed constructs for future research, these results only provide an estimate of a pattern of associations that cannot be generalized into models or inferences about those relationships (Costello & Osborne, 2005; Hoyle & Duvall, 2011; Tinsley & Tinsley, 1987).

This sample was recruited from an instructional designer professional organization and through social media using hashtags targeting instructional designers and accessibility. As a result, survey respondents will likely have some familiarity and interest in the topic of accessibility within online education. Further, participation will be limited to respondents who work for higher education institutions in the United States due to the specific legal context that guides accessibility compliance. This means that this study is not representative of higher education institutions offering online distance education programs outside the United States. In addition, the small sample size used in this analysis further limits the generalizability of these findings.

As with any methodology, there are reliability and validity limitations associated with self-administered, web-based surveys, which were addressed through the research design. According to Ritter and Sue (2007), online survey limitations can be categorized into the areas of respondent, questionnaire, and evaluator factors.

Respondent factors included internet access, sampling frame, and location (Ritter & Sue, 2007). Questionnaire factors included the type of questions, the nature of the
questions, length of the survey, and delivery format (Fowler, 2002; Ritter & Sue, 2007). The type and nature of questions could pose a variety of limitations through the use of terms, labels, scales, and sequence (Fowler, 2002). Evaluator factors included time frame, budget, and expertise (Ritter & Sue, 2007). Lastly, the results of this exploratory study methodology only estimated underlying factors and cannot be used to draw substantive conclusions (Field, 2013; Osborne et al., 2008). These limitations were addressed through research-based sampling, instrument design, and survey methodology techniques, detailed in Chapter Three.

**Delimitations**

Because the survey addressed accessibility issues in higher education online courses, the sample was limited to respondents who volunteered to participate in this study and met the following criteria:

- were current members of one of the largest instructional designer professional organizations in the world, or were regular participants of social media communities connected to accessibility and instructional design,
- worked for a higher education institution in the United States, and
- held a job role in which they were responsible for using, creating, reviewing, or enforcing the use of accessible content in online courses.

As a result, this sample may not be representative of the larger population that may be involved in accessibility practices within higher education. A larger sample that targets other postsecondary staff involved with accessibility practices may provide additional information and perspective on this subject. This exploratory study was
conducted to determine whether any associations exist within previously identified factors to enable future research regarding potential relationships between these variables.

**Summary**

Higher education institutions have an ethical and legal responsibility to make online learning proactively accessible to all learners. The absence of a holistic, coordinated, and collaborative approach based on pedagogical practices such as UDL has prevented postsecondary institutions from addressing accessibility issues in their online courses (Ascough, 2002; Linder et al., 2015; OLC & WCET, 2019; Rowland et al., 2014). Previous research has identified many barriers and practices for accessibility within higher education but has not examined any potential associations between them (Frey & King, 2011; Galusha, 1998; K. C. Green, 2010a, 2010b, 2019; Huss & Eastep, 2016; Linder et al., 2015; OLC & WCET, 2019; Rowland et al., 2014; WebAIM, 2014). Litigation and case law are exerting pressure on postsecondary institutions to shift from a reactive accommodation process to a proactive design of accessible content (McAfee & Taft, 2019). This has led to a lack of ownership and disorganized efforts to address accessibility through collaboration and infrastructure at the institutional level (K. C. Green, 2010b, 2019; Huss & Eastep, 2016; Linder et al., 2015; OLC & WCET, 2019). As pressure increases for online courses to be accessible without a formal accommodation request, understanding how various factors may be associated will support the development of institutional infrastructure and systems capable of addressing accessible design.
Chapter Two, Literature Review, explores how the historical roots of distance education and disability have led to the current state of accessibility within online higher education. The literature is organized in four main areas: history and trends within distance education, legal considerations of disability in higher education, the impact of disability models on higher education practices, and factors identified for systemic accessibility practices. The four sections review how distance education, disability law, and disability models intersect with postsecondary institutional and pedagogical practices and have led to the factors of the study. The literature review reveals the conflicting pressure faced by higher education institutions to adapt to developing case law while still adhering to outdated legal mandates. In Chapter Three, the descriptive quantitative study is presented as the research methodology for this study. A discussion of support for applying an exploratory web-based survey to this topic is provided. This exploratory study’s procedure is also described, including information on the survey development, sample, data collection, and analysis.
CHAPTER II

Literature Review

Research on the accessibility of online higher education has primarily focused on compliance and university websites. Accessibility is defined as the ability to access and make use of websites, hardware, software, technology, and content that has been designed in a way that allows people to perceive, understand, navigate, interact with, and contribute to online content and environments (Culp et al., 2005; Huss & Eastep, 2016; Web Accessibility Initiative [WAI] & World Wide Web Consortium [W3C], 2019).

Legally, accessibility has been guided in the United States by the Web Content Accessibility Guidelines (WCAG), which were recently adopted as part of Section 508 of the Rehabilitation Act (U.S. General Services Administration [GSA], 2017). Although the United States has many legal mandates that guide accessibility practices, they have been insufficient to make online content widely accessible (Lazar & Jaeger, 2011).

The introduction of computers and the internet precipitated the dawn of the Information Age, defined by access to data (Rouse & Tucci, 2014). As a result, the accessibility of information presented online is necessary to participate in this new era fully. Lazar and Jaeger (2011) stated that the goal of accessibility legislation is to increase access to the online information necessary for all users to access and participate in education, the job market, and the government. Today, about 93% of U.S. adults are online, and a majority own a device (Kemp, 2020; Pew Research Center, 2021). Since the internet and technology are integral to participation in education, lack of accessibility leads to a digital divide that particularly disenfranchises students with disabilities, which became evident in the pandemic shift to remote instruction (G. Anderson, 2020;
Crossland et al., 2016; Mayisela, 2013). While technology alone cannot ensure equitable access, it should be usable, and the accessible design of online higher education can lower other barriers faced by learners (G. Anderson, 2020; Crossland et al., 2016; Office of Educational Technology [OET], 2016).

Previous research regarding postsecondary institutions' accessibility practices has primarily focused on public-facing websites (Cullipher, 2017; Curl & Bowers, 2009; Foley, 2011; Hackett & Parmanto, 2005; Roig-Vila et al., 2014; Shawar, 2015). However, most of this research was conducted using now-outdated WCAG standards. Other studies have reviewed the accessibility of online educational content as one component of a broader educational issue or practice being studied (Al-Azawei et al., 2016; Hall et al., 2014; Kettler et al., 2012). Moreover, some investigations are still focused on simply assessing whether students have access to instruction (Carlsen et al., 2016; Crossland et al., 2016; OET, 2017; Seale, 2006).

This literature review summarizes history and trends within distance education, the legal considerations regarding disability in higher education, the impact of disability models on higher education practices, and factors identified for systemic accessibility practices. The goal is to provide an overview of historical and legal factors that have contributed to the current state of online higher education while examining the current societal and legal pressures that institutions face.

The history of distance education is relevant, as it provides context for the distinct features that characterize online higher education. As nontraditional students access distance education options at increasing rates, online education has become more popular due to its convenience and flexibility (Horn & Carroll, 1996; Ilgaz & Gulbahar, 2017;
Lee, 2017; Mayes et al., 2011). The history of disability rights and legislation in the United States and its impact on higher education is essential to understanding this issue. Historically excluded and segregated, people with disabilities have been granted access and accommodations to higher education through incremental change (Burke et al., 2016; Coleman & Berge, 2018; Cullipher, 2017; D’Amant, 2012; Golden, 2008; U.S. Government Accountability Office [GAO], 2009). As online higher education programming increases and compliance responsibilities evolve in response to case law, postsecondary institutions face a rapidly changing landscape. Finally, the accessibility landscape in online education is reviewed within the contexts of systems theory and the conflicting theories of disability that have impacted higher education practices.

**History and Trends Within Distance Education**

When distance education options first became available in the 1700s, it was primarily to increase access to education (Kentnor, 2015). That tradition continued over time as different people and groups gained access to higher education (Brown et al., 2012). The conventional profile of distance learners has been that of a nontraditional student. While heterogeneous by nature, this group has been characterized as “disadvantaged” by their socioeconomic status, language, culture, or perceived abilities (Levin, 2007). Distance learners are predominantly female, older, returning or part-time students, parents, veterans, full-time workers, people with disabilities, and those living in rural communities (Carlsen et al., 2016; Doe et al., 2017; Latanich et al., 2001). However, this has proven to be a limited view as new and more diverse students favor online education due to its flexibility (Latanich et al., 2001; Lee, 2017).
Distance Education Enrollment Trends

Since 1995, online education programs have become a growing segment of postsecondary offerings (Miller, 2021; Scagnoli, 2001). As overall enrollments in higher education decrease, students are turning to distance education at higher rates (Allen et al., 2016). Although distance education has a centuries-old history that has included correspondence, home, independent, off-campus, and other forms of studies, the term is now synonymous with online education (Harting & Erthal, 2005; Keegan, 1980; Kentnor, 2015; Lee, 2017). Because technology has provided flexible learning environments, the fast-growing online education sector has become an essential component of postsecondary institutions’ long-term strategy (Allen et al., 2016; Fink, 2007; OET, 2016; Scagnoli, 2001).

More than 6.9 million students participated in distance education courses in 2018, which was 35.3% of all higher education enrollments in the United States (U.S. Department of Education [DOE], National Center for Education Statistics, 2019). Data from 2016 indicates that about half of distance education students were exclusively taking distance courses (Seaman et al., 2018). While distance education programs have been concentrated in public institutions, there has been a steady increase of offerings from all types of institutions, including new online-only higher education providers in what has become a multi-billion dollar industry (Allen et al., 2016; Harting & Erthal, 2005; Seaman et al., 2018). As the number of students participating in distance education continues to increase and online education programs become more popular with students, the trend of increased enrollment in distance education is expected to continue (Allen et al., 2016; Kentnor, 2015; Seaman et al., 2018).
Further, it is estimated that 11 to 19% of students participating in online distance education may have one or more disabilities (Campbell & Wescott, 2019; Huss & Eastep, 2016). However, it is unknown exactly how many students with disabilities participate in online programs. Several studies indicate that only a small percentage of enrolled students choose to disclose their disability status to institutions (Gabel & Miskovic, 2014; McGregor et al., 2016; Newman et al., 2011; Roberts et al., 2011). Based on the known data, students with disabilities are likely present at similar or higher proportions within online settings.

The pandemic has also affected instructional offerings. Most U.S. universities shifted all instruction to an online format due to COVID-19 during the spring 2020 semester (Miller, 2021). As of spring 2021, most institutions are still offering courses through various online formats that include hybrid options, which means that current data on voluntary online program participation is unavailable (Miller, 2021). Anecdotal data also suggests that many students receiving appropriate in-person accommodations were thrust into inaccessible online learning environments (G. Anderson, 2020). Moreover, the number of students who needed accommodations in the online setting appeared to increase during the pandemic (G. Anderson, 2020). As the full scope of how to best serve students with disclosed and undisclosed disabilities is revealed, accessibility has become a high-priority issue in higher education as institutions consider the learning options they will continue to offer.

**Opportunities and Barriers in Distance Education**

While distance programs have increased access to education, online education has provided learners with new opportunities and barriers. No longer restricted by time or
place, online learners can now choose distance programs based on quality and institutional reputation rather than availability alone (Garrison & Kanuka, 2008). As diversity in higher education has increased, students have reported less bias, discrimination, and prejudice in online learning environments (Ascough, 2002). While the growth of distance enrollment indicates that students are taking advantage of online higher education, there are still many barriers to overcome.

Distance education has been criticized for its inadvertent exclusion of students who do not have access to technology or the internet, have disabilities, are new to online learning, and are limited by cultural and political factors (Brown et al., 2012; Carlsen et al., 2016; Galusha, 1998; A. Gaskell & Mills, 2014; Muilenburg & Berge, 2001). From this perspective, these students may be able to participate in distance programming but may not necessarily derive the benefits of higher education due to institutional barriers (Levin, 2007).

Opportunities. Distance education provides access to higher education to students who have typically not been afforded the opportunity (Brown et al., 2012). Online education has made it easier for students to access these opportunities because communicating with instructors has improved (Carlsen et al., 2016). Furthermore, accessible online courses provide students, particularly those with disabilities, the chance to select a learning format that works best for them (Roberts et al., 2011). The flexibility and convenience of online learning options have led to increased demand for distance education programs (Mayes et al., 2011).

Barriers. Lee (2017) asserted that increasing authentic access to online higher education is complex and challenging. While there is still a digital divide in terms of
those who lack access to technology and the internet, the significant barriers in distance education reside with institutional factors (Berge & Muilenburg, 2001; Catalano, 2014; Moore, 1994; Muilenburg & Berge, 2001, 2005). These factors include organizational structures and roles, ability to change, quality of social interaction with peers and faculty, technical support and infrastructure, and student support services (Berge et al., 2002; Berge & Muilenburg, 2001; Galusha, 1998; Gaytan, 2015; Moore, 1994; Muilenburg & Berge, 2001; A. Smith, 2004). Many of these factors align with the systems of online education that are currently under pressure to change (Hemphill et al., 2019; Moore & Kearsley, 2012; Tamim, 2020). Furthermore, these factors can prevent distance education from becoming fully integrated into institutional programming (Berge & Muilenburg, 2001). Postsecondary institutions in the United States are not alone. The same trends and themes are present in global higher education as access and inclusion are prioritized as an economic enabler (Carlsen et al., 2016).

**Pandemic Impact.** While those participating in online instruction have long known the possibilities and challenges, these issues were brought to the forefront as students worldwide continued their studies online during COVID-19. In a survey conducted in spring 2020, all students reported challenges and barriers in accessing remote online instruction (Scott & Aquino, 2020). However, students with disabilities experienced issues at higher rates in having access to appropriate equipment, internet, technical support, instructional materials, and accommodation (those already in place and additional ones necessitated by the new learning environment) (Scott & Aquino, 2020). While many of these issues were well documented in pre-pandemic online learning environments, the rapid scaling to online remote instruction has exacerbated many of
these issues. In a follow-up survey in early 2021, students reported improvements in all areas even though barriers still existed to some degree (Scott & Aquino, 2021).

Further, disability resource professionals reported that more students were requesting accommodations while disability office budgets were being cut during COVID-19 (Scott & Aquino, 2021). Though the lasting impact of COVID-19 is unknown, the opportunities and challenges of online learning for students with disabilities has been documented at a scale that was never possible before. As the data and information from this period continue to emerge, institutions will better understand how to address these issues moving forward.

**Legal Considerations of Disability in Higher Education**

The field of education has a long history of exclusion, which is why the opportunities and challenges of including nontraditional students are still being discussed today. Although many have been denied educational opportunities for different reasons, the experiences of students with disabilities are representative of many other groups. In the past, people with disabilities were usually excluded and segregated from the traditional educational process (D’Amant, 2012). In the 1940s, efforts to include students with disabilities in U.S. higher education began in earnest as wounded war veterans began returning home (Madaus, 2011; Pace & Schwartz, 2008). In the 1950s, the United States began enacting policies, standards, and legislation to ensure that physical spaces would be accessible to people with disabilities (Persson et al., 2015).

In many ways, veterans were the catalyst for disability rights legislation in the United States. Since then, several pieces of legislation have been passed that have specifically impacted postsecondary institutions. These include the Higher Education Act
of 1965, the Rehabilitation Act of 1973, and the Americans with Disabilities Act (ADA) of 1990 (Cullipher, 2017; Pace & Schwartz, 2008; U.S. GAO, 2009). Collectively, this legislation addresses several policies that provide people with disabilities access to and accommodations for higher education in the physical and digital space (Burke et al., 2016; Coleman & Berge, 2018; Cullipher, 2017; Golden, 2008; U.S. GAO, 2009).

According to Pace and Schwartz (2008), higher education institutions have responded by providing “add-ons” using programs or accommodations instead of redesigning their practices. These add-ons are in line with the piecemeal approach, identified by Reigeluth (2019), as a precursor to paradigm shifts within systems. In this case, the online education system is experiencing significant pressure from more recent legislative events. Although the Rehabilitation Act and ADA have recently been reauthorized, critics argue that the foundational legislation is insufficient to deal with the impact of the internet on higher education (Burke et al., 2016; Carlsen et al., 2016; Coleman & Berge, 2018; Kuykendall, 2017; U.S. GAO, 2009). Furthermore, these laws come with little enforcement or oversight. As a result, most policies and practices in higher education are based on ever-evolving case law, which results in unplanned reactionary institutional changes in response to lawsuits or civil rights complaints (Bogart & Dunn, 2019; Coleman & Berge, 2018; Parry, 2010).

**Accessibility, Legal Issues, and Online Higher Education**

The realities of this type of legal compliance approach are evident in accessibility practices in online distance education programs. Although physical access has long been established as a disability right, web accessibility emerged with the internet (Catalano, 2014). In 1999, the first draft of WCAG was published, and it has guided web
development and accessibility practices since (Kingman, 2018). However, it was not until 2017 that WCAG became an enforceable component of Section 508 of the Rehabilitation Act (Kingman, 2018; Kuykendall, 2017; U.S. GSA, 2017). Huss and Eastep (2016) included hardware, software, and content as components applicable to web accessibility. Some have taken it a step further and defined accessibility as the ability to access and use content (Culp et al., 2005). With reference to instruction, Quality Matters states that accessibility is the ability of students to “perceive, understand, navigate, interact, and contribute to their Web-based courses” (Frey et al., 2012). However, accessibility is still not clearly codified, which has led to case law setting those boundaries little by little.

The first significant lawsuit regarding accessibility issues was filed against a university in 2009 (Cheng, 2010). Since then, state and federal lawsuits, civil rights complaints, and demand letters against educational institutions in the United States have surged. As of 2018, there were more than 2,000 known lawsuits and more than 12,000 accessibility complaints filed in the United States (Albee, 2020; Francovich, 2017; Jones, 2016; Launey & Aristizabal, 2017; McAfee & Taft, 2019; UsableNet, 2019; Vu et al., 2019). The U.S. DOE has also stated that their Office of Civil Rights has investigated hundreds of complaints since 2016 (Albee, 2020; Francovich, 2017; Jones, 2016; McAfee & Taft, 2019). However, most of this information has been compiled manually, which means that the real impact of legal action against higher education institutions is unknown (Accessibility Works, 2017; Launey & Aristizabal, 2017).

The only certainty is that legal action against postsecondary institutions is rising across the country and that 75% of federal cases specifically reference WCAG (McAfee & Taft, 2019; UsableNet, 2019, 2020). Although COVID-19 initially led to an overall
decrease in accessibility lawsuits due to closed courts, students with disabilities are increasingly suing institutions due to the move towards online learning (Vu et al., 2020; Weissman, 2020). Most of these lawsuits target accessibility issues, which has given prominence to institutional improvement of accessibility in a “digital-first” learning environment (Weissman, 2020).

While postsecondary institutions have primarily been targeted for their inaccessible websites, attention is now turning toward online course content. For years, U.S. institutions of all sizes and types have been engaged in litigation over public websites not usable for individuals with specific disabilities or with assistive technology (McAfee & Taft, 2019; Vu et al., 2019). Now, online course content, learning management systems (LMS), and content management systems are being scrutinized when students are unable to effectively use them for learning with or without accommodations (Carnevale, 2005; Hastings & Kane, 2018; Huss & Eastep, 2016; Linder et al., 2015; McAfee & Taft, 2019; Parry, 2010; Rowland et al., 2014).

Presently, the trend is for institutions to settle cases, although there have been some landmark judgments. Due to the high cost of litigation and potential judgments, many institutions agree to settlements that include voluntary corrective actions (D. D. Burke et al., 2016; Cullipher, 2017; Rowland et al., 2014; U.S. DOE, 2016). For example, in 2017, the University of California-Berkeley removed 20,000 audio and video files after determining that it would be too costly to make them accessible (Cullipher, 2017; McAfee & Taft, 2019). After litigating for several years, Harvard and the Massachusetts Institute of Technology also settled in early 2020 by consenting to a robust digital accessibility policy for video content (Chaidez & Ryan, 2019; Leduc, 2020).
Although there have been some cases where judges have ruled that universities have provided reasonable accommodations, the case law seems split (D. D. Burke et al., 2016; Kumar & Owston, 2016). Experts warn that postsecondary institutions should be concerned about accessibility, as most websites and online courses are reported as noncompliant with current guidelines (Carnevale, 2005; Roig-Vila et al., 2014). Despite conflicting case law, the general case law consensus is that postsecondary institutions are expected to ensure that their online content is accessible (D. D. Burke et al., 2016; Cullipher, 2017; Iglesias et al., 2014; McAfee & Taft, 2019).

Some institutions are proactively addressing accessibility by using automated tools. These tools evaluate websites (e.g., Bobby and WAVE), LMS content (e.g., Blackboard Ally, Canvas accessibility checker, Udoit), and product-specific accessibility checkers (e.g., Adobe, Apple, and Microsoft) (Centeno et al., 2006; Lieberman, 2018; Mancilla & Frey, 2021a). While these tools effectively identify easy-to-fix accessibility issues, they are often unable to detect complex problems that typically require the review or intervention by a person (Lieberman, 2018). While automated tools can be one component of an institutional accessibility strategy, they cannot be the only solution for accessibility issues (Lalonde, 2019). While automated testing tool data seems to show overall accessibility improvements, critics have argued that progress has been slow and that there is a growing gap in accessible versus inaccessible course content (Straumsheim, 2017).

**Impact of Disability Models on Higher Education Practices**

The current interplay of accessibility, disability, and higher education is complex and problematic. Rooted in the moral premise that distance education promotes access to
schooling for everyone, the question arises whether institutional practices are serving this purpose for all underserved groups (B. Anderson & Simpson, 2007; OET, 2016). While there is no doubt that online education has created opportunities for more diverse participation in higher education, there has also been the inadvertent exclusion of people with disabilities (Doe et al., 2017; U.S. DOE, 2016). Historically, there has been a worldwide pattern of people with disabilities being excluded from educational opportunities (Harpur & Stein, 2019). Moreover, Kumar and Owston (2016) stated that legislation has not necessarily increased access to online higher education for all students.

**Medical Model of Disability and the Accommodation Process**

The issue of access for students with disabilities is based on how disability has been perceived by society. For most of the 20th century, the medical model of disability has prevailed (Andrews et al., 2019). This model casts disability as an impairment or medical diagnosis (Andrews et al., 2019; Siebers, 2013). Bogart and Dunn (2019) explained that this view places disability as the purview of the individual and manifests in the accommodation process in higher education. The medical model is linked to the ADA process of expecting students to disclose their disability to request and receive accommodations (Bogart & Dunn, 2019; Toutain, 2019). This is a reactive process in which the institution determines what constitutes a reasonable accommodation on an individualized basis (Black et al., 2015; Golden, 2008; U.S. GAO, 2009). This process represents two challenges at the student and institutional levels.

**Student Barriers to Accessing Accommodations.** The first challenge is the expectation for students to disclose their own disability. Several studies have revealed that only a small percentage of enrolled students choose to disclose their disability status
to higher education institutions (Gabel & Miskovic, 2014; McGregor et al., 2016; Newman et al., 2011; Roberts et al., 2011). Identified as barriers to disclosing their disability status, students have cited stigma, discrimination, lack of clarity about what accommodations were available to them, disability labels, stereotypes, and an intermittent need for supports (Grimes et al., 2017; Lindsay et al., 2018; Roberts et al., 2011; Thompson-Ebanks & Jarman, 2018; Toutain, 2019; U.S. GAO, 2009). On the other hand, students who chose to disclose tended to cite having an awareness of disability services, the desire to use them, and previous positive experiences with disclosure (Cole & Cawthon, 2015; Lindsay et al., 2018; O’Shea & Meyer, 2016; Thompson-Ebanks & Jarman, 2018). Moreover, the decision to disclose is highly personal, as students are expected to reveal private information to strangers, not just once, but repeatedly throughout their education (Barnard-Brak et al., 2010; Cole & Cawthon, 2015).

Furthermore, an accommodation process based on disclosure places the burden on students to incur medical expenses for documentation, to manage the institutional bureaucracy, and to manage accommodations during their courses (Bogart & Dunn, 2019; Harpur & Stein, 2018; Roberts et al., 2011; U.S. GAO, 2009). During the COVID-19, many students had difficulties providing documentation for disabilities to receive disability service (Scott & Aquino, 2020). As a result of all these factors, while students are legally entitled to support and accommodations throughout their studies, many students choose not to access them.

**Institutional Barriers in Providing Accommodations.** While statistics and general factors for disability disclosure provide part of the story, they do not fully convey the student experience. For example, many students have negative experiences with
faculty who treat accommodations as an inconvenience and technical requirement (Lindsay et al., 2018; Quinlan et al., 2012). Students also report difficulty using accommodations, inconsistent implementation, and inappropriate types of supports (Black et al., 2015; Cole & Cawthon, 2015; Sarrett, 2018).

**Student Perceptions of the Accommodation Process.** In addition, students have varying views about their accommodations and how their disability impacts their achievement (Catalano, 2014; Erickson & Larwin, 2016; McGregor et al., 2016; Muilenburg & Berge, 2005; Roberts et al., 2011; Slater et al., 2015). For example, Roberts et al. (2011) found that many students with disabilities believed that their disability did or could impact their ability to succeed in an online class regardless of whether they had ever participated in one. Another study found that 6% of all students felt their learning was negatively affected by prejudices due to a disability or other characteristics (Muilenburg & Berge, 2005).

The negative perceptions students have towards the accommodation process extend to the rest of the higher education experience as well. In 2016, McGregor et al. reported that students with learning disabilities experienced more academic difficulties and were overall less satisfied with all aspects of the university experience. As postsecondary institutions strive to increase the inclusivity of their practices, many students say these efforts exist at the surface (Hyder & Tissot, 2013). Quinlan et al. (2012) found that accommodations can be limited and do not require that students receive “individual attention or valuation” (p. 227). Even when granting accommodations, many faculty may vary greatly in their willingness to provide them to students (Custodio, 2020; Rao & Gartin, 2003; U.S. GAO, 2009). As COVID-19 data for emergency remote
learning was gathered, many students with disabilities reported having issues receiving and requesting accommodations for preexisting and newly emerging needs (Scott & Aquino, 2020, 2021). This revealed a difference between needs that are essential to access instruction and “enhancements” that improve the learning environment (Custodio, 2020). In addition, emergency remote instruction has also revealed how some disabilities lead to unpredictable needs and accommodations in online learning environments (G. Anderson, 2020). These examples highlight the assertions from students that there are barriers to obtaining and receiving consistent implementation of accommodations (Sarrett, 2018).

**Research on Disability Impact on Achievement.** Further, the literature supports the perception that a disability negatively impacts achievement. Erickson and Larwin (2016) found a pattern of students with disabilities being most likely to attain two-year post-secondary degrees compared to higher-level degrees. A longitudinal survey found that only 38.4% of students with disabilities completed any postsecondary program compared to 51.2% of non-disabled peers (Sanford et al., 2011). This suggests that students with disabilities are not achieving the same educational outcomes as peers, which could be attributed in part to students’ accounts of navigating their disability in an academic setting.

White (2005) stated that “to understand the student experience it is necessary to pay attention to the context of delivery, which includes all the systems which impact on the degree of benefit that students derive from their experiences” (p. 175). For example, for many students with disabilities, the COVID-19 shift to emergency remote instruction decreased access to accessible course materials and instruction due to the loss of
accommodations from an in-person setting (G. Anderson, 2020). According to Roberts et al. (2011), satisfaction with the accommodation process is insufficient to address these perceived and actual losses, which indicates that other factors contribute to the student experience. Grimes et al. (2017) suggested that student support should be focused on improved academic outcomes, retention, and completion rather than on a medical and legal framework.

In summary, the medical model of disability places students as the beneficiaries of postsecondary services only upon request and eligibility. This body of research highlights the barriers to and limitations of the academic experience cultivated under the current legislation and legal practices. Whereas the organizations are still bound to provide services as specified by law, the social model of disability challenges institutions to provide students with equal access to instruction without the burden of disclosure.

**Social Model of Disability and Accessibility**

The social model establishes disability as a construct in which the process of access is the responsibility of the society rather than the individual (Bogart & Dunn, 2019; O’Shea & Kaplan, 2018). Through this lens, disability results from barriers set in place by a “discriminatory society” (Shakespeare, 1996). Further, this type of discrimination places the issue of access within the realm of civil and human rights (Olkin & Pledger, 2003; Persson et al., 2015). This naturally leads to the assertion that the goal is not to accommodate the individual but rather the environment so that all people can fully participate in society (Magnus & Tøssebro, 2014; Persson et al., 2015).

The concept of accommodating the environment is in line with the principles of accessibility and accessible design. According to Coleman and Berge (2018), the concept
of accessibility has gone by many different names, including universal, inclusive, accessible, and barrier-free design. Within the broader definition of accessibility, this means that all products and services should be usable “by a population with the widest range of characteristics and capabilities” (Persson et al., 2015, p. 524). As a result, accessibility should be embedded within the development and design process for physical and virtual environments from the beginning (deMaine, 2014; OET, 2016). In the context of distance education, accessibility should affect every aspect of how a postsecondary institution provides resources and instruction to students.

**Accessible Resources.** First, resources can include information, communication tools, administrative services, courseware, library services, and other supports provided online (Golden, 2008; Schmetzke, 2011). These resources also include the workforce and processes needed to acquire appropriate hardware, software, training, and support for the online learning environment (Crossland et al., 2016; Galusha, 1998; Linder et al., 2015; Raue & Lewis, 2011). At the institutional level, accessibility begins to emerge as an organizational process for proactively acquiring, developing, auditing, monitoring, and fixing online content (Ascough, 2002; Coleman & Berge, 2018; Golden, 2008). As a result, an accessible online environment is based on the institutional infrastructure (Ascough, 2002; Linder et al., 2015).

**Accessible Instruction.** Second, accessible instruction is a complex process that goes beyond the role of faculty. Like students, faculty are bound to the institutional infrastructure, policies, and procedures determining how online courses and instructional materials are acquired, produced, and delivered (Linder et al., 2015). The accessibility of online courses is also a proactive aspect of the instructional design process (Coleman &
Berge, 2018; Roberts et al., 2011). As a result, accessible online courses are the product of a team approach that includes faculty, instructional designers, information technology specialists, service providers, and leadership (Foley, 2011; Frey et al., 2012; Linder et al., 2015).

**Conflict Between Accommodation and Accessibility.** Online higher education in the United States currently manifests the historical, legal, and practical approaches now coming into conflict with modern interpretations of disability rights, law, and instruction. Institutions are still legally required to accommodate students upon request; however, they are also expected to proactively provide a learning environment that meets legal accessibility guidelines (McAfee & Taft, 2019; Online Learning Consortium & WICHE Cooperative for Educational Telecommunications [OLC & WCET], 2019). An accommodation is an adjustment made to meet the needs of an individual based on a request and eligibility, while accessibility addresses the needs of a group of users proactively (OLC & WCET, 2019). While a student could formally request an accommodation for an accessibility need, they theoretically should not have to do so. In fact, 40% of students who chose not to disclose their disability simply needed accessibility adjustments (OLC & WCET, 2019). Students also have a growing expectation that instruction should be designed to meet the diverse needs of learners with different abilities and learning preferences (Quinlan et al., 2012). This suggests an emergent trend in law and societal expectations for proactive approaches to handling the needs of students with disabilities in an academic environment.
**Accessible Online Instruction: Pedagogy and Responsibility**

According to D. D. Burke et al. (2016), there “should be a reasonable, coordinated, and consistent [effort] by institutions of higher education to make programming reasonably accessible” (p. 179). Based on a 2019 survey by WCET, only a third of institutions said their courses were accessible, and less than half had processes to address accessibility issues. Although the focus on accessibility is usually defined in terms of legal requirements for making online content, software, or hardware compliant with WCAG, what is often not discussed is how these barriers impact the learner.

**Accessibility Barriers Impact Learning.** Students in several studies indicated that accessibility barriers negatively impacted their ability to understand instruction or fully participate in the learning experience (Black et al., 2015; Fuller et al., 2004; Kumar & Owston, 2016; Roberts et al., 2011). This may be exacerbated by the view held by some faculty that modifications to their courses constitute a lowering of academic standards (U.S. GAO, 2009). Erickson and Larwin (2016) conducted a meta-analysis in which they found that students with disabilities performed better in online courses compared to traditional classes. While there were still performance gaps between those with and without disabilities, distance education yielded higher performance for some students with disabilities (Erickson & Larwin, 2016). Although there is some promising data, few studies to date have examined the impact of online higher education for students with disabilities (Erickson & Larwin, 2016).

**Benefits of Accessible Design.** Although accessibility is usually rooted in discussion on how to serve the disability community, the reality is that accessible practices promote better designs that benefit everyone. Research indicates that all
distance students (with and without disabilities) benefit from accessibly designed instruction (Al-Azawei et al., 2016; deMaine, 2014; Hackett & Parmanto, 2005; Sarrett, 2018). While accessible design certainly benefits the student, the institution also sees a return on investment. Even though cost is often cited as prohibitive in accessibility implementation, proactive design of accessible courses is always more cost-effective (Rowland et al., 2014). While the proactive accessible design can be expensive, it is estimated to be far less than the cost of litigation and retrofitting instructional content and courses, which could nearly a million dollars for a single accessibility case (Rowland et al., 2014). Moreover, pedagogically focused frameworks such as Universal Design for Learning (UDL) already provide a roadmap for designing quality and accessible instruction.

Providing accessible content and learning environments is at the heart of UDL, which is grounded in optimizing instruction for everyone (Al-Azawei et al., 2016; Harpur & Stein, 2018; OLC & WCET, 2019). As a proactive approach to designing online instruction, UDL provides a holistic approach to accessibility as a pedagogical practice (Catalano, 2014; Linder et al., 2015; Phipps & Kelly, 2006; Quinlan et al., 2012). As pedagogy, the accessible design of online courses is no longer about accommodating learners with specific needs but instead designing a high-quality learning experience for all students.

By using UDL as a framework, faculty are able to proactively address the variability of all students’ needs even if a need requiring accommodation may still surface at some point (Lieberman, 2018). For example, one college has chosen to serve students with disabilities exclusively and has a growing online program (L. Burke, 2020).
In addition to specific supports, the university uses UDL as a framework to flexibly design for diverse student needs, which has led to positive student outcomes (L. Burke, 2020). In fact, many U.S. institutions have used the UDL framework as one of several effective strategies to address the needs of students with disabilities during the COVID-19 (Scott & Aquino, 2020, 2021).

**Barriers in Implementing Accessibility.** Although pedagogical and legal enablers for accessible design and instruction exist, institutions may struggle to shift their practices to consistently provide accessible content systemically. The costs, training, and time needed to implement accessible design practices are often cited as barriers (Galusha, 1998; Linder et al., 2015; Rowland et al., 2014). While many accessibility practices are concrete in nature, the organizational strategies needed for systemic and sustained cultural and institutional change are often overlooked. Systemic cultural transitions occur when a shift in the language is used to discuss the values and beliefs regarding disability and instruction (O’Shea & Kaplan, 2018). This also includes integrating different perspectives into distance education that go beyond the traditional narratives that tend to dominate (White, 2005).

These types of systemic shifts only occur when there is strong leadership (Shaw, 2012). To create a holistic culture of accessibility, institutions must incorporate accessibility into how they conduct business, including staff roles and administrative structures (Moore, 1994). Presently, many higher education staff in various roles report that accessibility implementation is a component of their job description (OLC & WCET, 2019; WebAIM, 2014). Usually, faculty and departments are responsible for addressing accessibility; however, the onus of who oversees these efforts is shifting towards a
centralized department such as a disability office (K. C. Green, 2010b, 2019). Regardless, systematic institutional practices can become more comprehensive, strategic, and collaborative (Ascough, 2002; Linder et al., 2015; OLC & WCET, 2019).

While higher education faculty possess subject matter expertise, they are often not trained to the same degree in teaching practices (L. Burke, 2020). Adopting institutional accessibility policies that clearly outline practices, procedures, roles, and responsibilities is a critical first step in developing an organizational commitment to accessible design (Mancilla & Frey, 2020). However, building an institutional culture committed to accessibility is predicated on strong leadership, cross-departmental collaboration, and resource prioritization (Mancilla & Frey, 2020). While the path toward accessible instruction may seem straightforward, research has shown that strong institutional accessibility practices are not always linked to specific factors. Whereas accessibility policies may be an indicator of good practices, the size of the institution and the training of key staff also may have varying levels of impact (Thompson et al., 2013).

**Factors Identified for Systemic Accessibility Practices**

Since accessibility guidelines were provided for the web, various data on accessibility responsibilities, knowledge, and practices have been collected. Surveys have shown that institutions lack policies and procedures that address the accessibility of university websites and online courses, which has left institutions vulnerable to accessibility and ADA complaints and lawsuits (K. C. Green, 2010a, 2010b). According to K. C. Green (2019), universities are still struggling to address ADA and accessibility issues, and 40% of surveyed institutions still did not have formal methods to address these needs. These issues persist, as 70% of institutions report that their online courses
are still not fully accessible, and less than half have systems to address accessibility issues (OLC & WCET, 2019). Further, K. C. Green (2019) found that these issues were a mid-level priority for most institutions.

In a 2014 WebAIM survey, accessibility practitioners from various fields indicated several organizational factors that hindered accessibility. These factors included support from leadership, knowledgeable staff, clear policies and guidelines, budget, and time. In addition, almost 50% of respondents indicated that addressing accessibility was only a small or self-directed component of their official job duties (WebAIM, 2014). These findings were echoed in a 2019 survey of higher education online learning leaders, which indicates that these are persistent issues (OLC & WCET, 2019). Even though lack of knowledge is often cited as a factor for inaccessibility, a staff survey revealed that while many universities offer courses or trainings on how to serve students with disabilities and ADA, accessibility, or related issues, they are often not mandatory (R. A. Green & Huprich, 2009).

**Accessibility Constructs Central to This Study**

Central to this research were two studies that surveyed faculty and institutions offering online distance education on their accessibility practices. First was the Frey and King (2011) Quality Matters™ Accessibility Survey, which focused on institutional disability policies, responsibility for implementation, technology resources, and training. While most institutions who were surveyed were aware of their responsibility to provide accessible online courses, 25% of institutions did not have anyone designated to enforce these standards (Frey & King, 2011). Respondents also stated that the resources needed to create accessible materials were not always used and that training was not offered...
Updated findings for this survey indicated that 13% of institutions still did not have a person responsible for accessibility (Mancilla & Frey, 2020). While there was an improvement, the survey also showed that many institutions still lacked formal policies and budget allocations to support accessibility (Mancilla & Frey, 2020). Notable progress has been made in the amount of training available to faculty and staff (Mancilla & Frey, 2021b).

Second, Huss and Eastep (2016) surveyed online faculty regarding the types of materials used in courses, accessibility practices, and institutional compliance practices. Overall, most faculty reported that they did not use accessible content and cited lack of training and knowledge as the primary barrier (Huss & Eastep, 2016). The faculty also stated that accessibility was usually implemented because of an accommodation request and that institutions lacked a coordinated approach. Together, these studies have used surveys to address the primary barriers to accessible instruction in online distance education identified in the literature.

The survey instrument used in this study was adapted from the Quality Matters™ Accessibility Survey by Frey and King (2011) and the survey measuring faculty awareness of accessibility used by Huss and Eastep (2016). According to Fowler (2002), using survey questions from previous studies provides the opportunity to collect comparable data across different samples that can aid in generalizing results. As an adapted instrument, best practices for survey design, reliability, and validity were used and will be detailed in Chapter Three.
Summary

The purpose of this chapter was to present a literature review summarizing the history and trends within distance education, the legal considerations of disability in higher education, and the impact of disability models on higher education practices. The historical factors, trends in enrollment, opportunities, and barriers of distance education were presented (Berge et al., 2002; Berge & Muilenburg, 2001; Galusha, 1998; Gaytan, 2015; Kentnor, 2015; Muilenburg & Berge, 2001; Scagnoli, 2001; Seaman et al., 2018; A. Smith, 2004). The legal basis for the accommodation process and accessibility practices within higher education practices was reviewed in the context of how serving students with disabilities is evolving (Cullipher, 2017; Culp et al., 2005; McAfee & Taft, 2019; Pace & Schwartz, 2008; U.S. GAO, 2009). The medical model of disability and its link to the higher education accommodation process, which places the burden on students, was described (Black et al., 2015; Bogart & Dunn, 2019; Golden, 2008; Toutain, 2019; U.S. GAO, 2009). This model was contrasted with the social model of disability, which promotes the proactive and accessible design of physical and digital spaces, services, tools, and instruction, which requires a concerted team approach at the institutional level (Coleman & Berge, 2018; Foley, 2011; Golden, 2008; Linder et al., 2015; Roberts et al., 2011; Schmetzke, 2011). Finally, the accessible design of online instruction was examined as a pedagogical principle that is the responsibility of postsecondary institutions and staff (Ascough, 2002; D. D. Burke et al., 2016; Catalano, 2014; Linder et al., 2015; OLC & WCET, 2019; Phipps & Kelly, 2006; Quinlan et al., 2012). The literature indicates that there is a focus on accessibility as a compliance measure that lacks a holistic approach to creating accessible online learning experiences.
(Phipps & Kelly, 2006). Although many staff have been surveyed on their accessibility responsibilities, knowledge, and practices, there are no studies that have examined how these factors are associated (Frey & King, 2011; K. C. Green, 2010a, 2010b, 2019; Huss & Eastep, 2016; OLC & WCET, 2019; WebAIM, 2014). Lastly, the selection of accessibility constructs central to this study was summarized.

In Chapter Three, the descriptive quantitative study is presented as the research methodology for this study. A discussion of support for applying an exploratory web-based survey of this topic is provided. This exploratory study's procedure is also described, including information on the survey development, sample, data collection, and analysis.
CHAPTER III

Research Methods

This study used a descriptive quantitative survey research design. A descriptive research methodology is useful for exploring multiple variables and determining whether there are any correlations while using quantitative methods (Knupfer & McLellan, 2001). In addition, surveys are useful tools for collecting data to describe existing conditions and determine potential relationships (Cohen et al., 2011; Knupfer & McLellan, 2001). Using a statistical method such as descriptive analysis and exploratory factor analysis (EFA), quantitative surveys can be used to explore the relationships among many variables (Cohen et al., 2011; Knupfer & McLellan, 2001; Punch, 2003). Therefore, a descriptive quantitative survey using EFA is an appropriate research design to explore the characteristics of institutions and individuals who are responsible for implementing accessibility within online higher education courses.

The purpose of this chapter is to introduce the methodology of the descriptive quantitative survey using EFA. In this chapter, the research questions, survey development, sample, data collection, analysis, and other research elements are explained.

Research Questions

The purpose of this descriptive quantitative survey study was to explore the relationship between various characteristics that may contribute to accessibility knowledge, practices, and support in higher education online courses. Specifically, characteristics comprise the factors of demographic data, knowledge about accessibility, implementation practices, and available training and support. For the purposes of this
study, instructional designers were surveyed. Instructional designers include professionals who work as faculty, instructional designers, and those who provide accessibility support for online courses in U.S. higher education. The analysis of and relationship between factors was based on previous studies that identified variables that may impact accessibility implementation in higher education online courses (Frey & King, 2011; Huss & Eastep, 2016). The association amongst factors was used to develop future testable hypotheses and lines of inquiry regarding accessibility practices within online higher education (Rindskopf, 2011).

For this study, information was collected on current overall accessibility practices and perceptions within higher education online course design and used to explore the relationships between them. The research questions that were addressed in this study are:

1. What are the characteristics of designers who are responsible for implementing accessibility in higher education online courses?
2. What are the accessibility practices used by designers in higher education online courses?
3. What are the characteristics of higher education institutions that offer online courses?
4. What are the accessibility practices of higher education institutions that offer online courses?
5. What are the associations (factor structure) amongst the surveyed characteristics and accessibility practices?
   a. To what extent do the practices of online course designers contribute to the identified factor structure?
b. To what extent do the practices of the institution contribute to the identified factor structure?

A descriptive analysis and EFA was used in this study. As such, the primary goal was to collect data on a variety of characteristics and practices that may be associated with and impact accessibility implementation within U.S. online higher distance education. The constructs addressed in this study included institutional and designer characteristics and practices, as shown in Figure 3. Characteristics encompassed descriptive data about institutions and designers. Accessibility practices consisted of information about habitual procedures adopted by institutions or designers. These constructs were based on frequently identified factors in the literature regarding accessibility within online higher education, and the questions included in this survey had been previously addressed in the literature in various capacities.

**Figure 3**

*Constructs (Factors) Considered in This Study*

![Study Constructs (Factors)](image)

- **Characteristics**
  - Descriptive data about institutions: 3 MC (RQ1)
  - Descriptive data about designers: 2 MC (RQ1), 4 WI (RQ1)

- **Accessibility Practices**
  - Procedures and systems used by institutions: 1 MC (RQ1), 17 LS (RQ4 & 5)
  - Procedures and systems used by designers: 12 LS (RQ2 & 5)

*Note.* MC = Multiple choice; WI = Write in, LS = Likert scale. These factors represent 39 of 41 questions used in the final survey. The two questions not represented here represent filter questions used to determine survey eligibility and were not considered in the analysis.
The EFA determined which constructs were associated, and this information was used to create groupings of factors called factor structures.

**Research Methods**

This study extended existing research through a descriptive quantitative methodology using a web-based survey consisting of 41 closed-ended and write-in questions. The survey instrument used in this study was adapted from the Quality Matters™ Accessibility Survey by Frey and King (2011) and the survey measuring faculty awareness of accessibility used by Huss and Eastep (2016). The instrument was organized into seven sections which progressed from general descriptive information about the participant and institution to specific information about accessibility practices for each, as shown in Table 1. This sequence was selected because Fowler (2002) recommended that surveys begin with more straightforward questions and progress to more sensitive or difficult questions in the middle or end of the survey.

**Table 1**

*Distribution of Survey Questions by Thematic Section*

<table>
<thead>
<tr>
<th>Survey Section</th>
<th>Number of Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Background information (participant)</td>
<td>8</td>
</tr>
<tr>
<td>Information about the institution</td>
<td>3</td>
</tr>
<tr>
<td>Institutional practices (accessibility)</td>
<td>4</td>
</tr>
<tr>
<td>Institutional responsibility for online instructional content</td>
<td>9</td>
</tr>
<tr>
<td>Institutional training and support</td>
<td>5</td>
</tr>
<tr>
<td>Individual practices (accessibility)</td>
<td>8</td>
</tr>
<tr>
<td>Limitations</td>
<td>4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>41</strong></td>
</tr>
</tbody>
</table>
Using a quantitative web-based survey, data was collected on the characteristics and practices regarding accessibility in higher education online course design. Due to this study's purpose, the descriptive quantitative methodology was selected as the best method for analyzing the research questions. A descriptive analysis was the ideal statistical analysis for the first four research questions, while an EFA was best for identifying any potential associations amongst the variables. Because of the lack of research in this area, a descriptive exploratory study was useful in developing an understanding of variables, developing hypotheses, and identifying future areas of study (Field, 2013; Hoyle & Duvall, 2011; Rindskopf, 2011).

A web-based survey is an effective tool for measuring attitudes and perceptions that can be statistically analyzed (Cohen et al., 2011). Anonymous and self-administered, web-based surveys also increase the validity and level of factual reporting by respondents (Callegaro et al., 2015; Fowler, 2002). When this format is coupled with minimal risks and anonymity, this format is likely to induce respondents to honestly give socially undesirable answers on topics such as accessibility, which carries a risk of liability (Callegaro et al., 2015; Fowler, 2002).

**Instrument Development**

When using a survey, it is important to operationalize it by defining the purpose, which includes the necessary items to answer the research questions, and asking the right types of questions that solicit the right types of empirical data (Cohen et al., 2011; Fowler, 2002). The purpose of this survey was to facilitate an exploratory analysis of the characteristics of institutions and designers delivering online higher education courses, programs, and their accessibility practices.
**Benefits of Adapted Instruments**

There are many benefits to using an adapted instrument based on existing surveys. The survey instrument used in this study was adapted from the Quality Matters™ Accessibility Survey by Frey and King (2011) and the survey measuring faculty awareness of accessibility used by Huss and Eastep (2016). According to Fowler (2002), adopting survey questions used in previous studies provides the opportunity to collect comparable data across different samples, which can aid in generalizing results. Because the instruments have already been tested, there is a higher level of confidence in the validity of the questions and quality of data even when these questions are adapted (Hyman et al., 2006). Since previous studies have addressed the methodological considerations to measure these constructs, the subsequent researcher has guidance on how to use the existing survey questions to complement and extend the existing research (Hyman et al., 2006).

**Methodology of Source Instruments**

Because these instruments were used some time ago and with different populations, the instrument for this study was based on a selection of adapted questions. According to Korb (2012), adaptation occurs when “the researcher follows the general design of another instrument but adds items, removes items, and/or substantially changes the content of each item” (para. 9). Further, it is appropriate to adapt questions for different samples to different response types, use different wording that is more meaningful, and change phrasing to make it more applicable (Hyman et al., 2006; Korb, 2012).
Adapted Instruments. Selecting appropriate existing instruments for this study involved several steps. The first step was to begin with the research questions to focus the search for an appropriate instrument (Bastos et al., 2014). Next, existing instruments related to the study were identified (Bastos et al., 2014). Finally, an instrument that met the goals of the study was selected and evaluated for quality based on reliability and validity (Bastos et al., 2014). This process was used to identify and select the two instruments adapted in this study. Each of the selected instruments contained items that addressed the different elements of the research questions in this study.

The instrument used in the Huss and Eastep (2016) study was conceptualized to evaluate progress towards accessibility practices and compliance among faculty and staff who taught online higher education courses. The instrument was developed based on topics recommended by the Office of Civil Rights, which oversees legal monitoring of educational institutions (Huss & Eastep, 2016). Used for an initial study, Huss and Eastep (2016) did not detail how the instrument was tested for validity and reliability.

Frey and King (2011) developed their instrument to address the accessibility components of the Quality Matters™ process for reviewing online courses. As a benchmarking survey, the instrument collected data on institutional policies, practices, and processes regarding online course accessibility for universities using the Quality Matters™ framework (Frey & King, 2011). Information about how the instrument was tested for validity and reliability was not provided in the study (Frey & King, 2011). However, this survey was subsequently used in 2020 to provide updated results for most questions (Mancilla & Frey, 2020, 2021a, 2021b).
Adapting Survey Questions

For the original draft of the adapted survey instrument, 27 of the 50 items were selected from these two surveys based on the items’ relevance in addressing the identified research questions. In addition, four demographic questions were included to collect information about the institutions’ and designers’ characteristics and ensure they met participation requirements. To ensure that all survey items corresponded appropriately to the phenomenon under study, each question was evaluated and mapped to specific research questions using a survey protocol matrix, as shown in Appendix A. This matrix was adapted from an interview protocol matrix used to ensure that research questions were fully addressed and that any gaps could be addressed in the research design phase (Castillo-Montoya, 2016). Once relevant questions were identified from the instruments, they were adapted to develop a cohesive instrument that adhered to survey methodology principles, validity, and reliability.

Survey Question Format. Quality survey instruments are designed for reliability and validity by standardizing the presentation, using familiar terms that can increase the likelihood of understanding, and using unidimensional questions (Cohen et al., 2011; Fowler, 2002). Unidimensional means that only one issue is addressed per question (Fowler, 2002). As a result, selected survey questions were modified to provide participants with a consistent question format and use of terminology. References to the Americans with Disabilities Act (ADA) and specific software applications were changed to accessibility and generic applications, respectively. Questions were also reviewed and revised to ensure that only one construct was addressed at a time (Fowler, 2002).
Furthermore, the language was revised to increase clarity and reduce vagueness to ensure the reliability of questions (Cohen et al., 2011; Fowler, 2002; Friedman & Amoo, 1999).

**Adapting Survey Response Formats.** Some survey question response choices were adapted to a write-in or Likert-scale format. Questions that solicited information, such as years of experience, were changed to write-in responses to facilitate increased accuracy of the descriptive statistics analysis. Questions that solicited an ordinal response, such as the frequency of behaviors, were changed to a five-point Likert scale, as that is within the range of optimal points (Friedman & Amoo, 1999). The type of response scale, including label descriptors and numerical values, has been shown to affect the reliability, validity, and bias of a survey based on design choices (Cohen et al., 2011; Fowler, 2002; Friedman & Amoo, 1999).

**Write-In Response Format.** The draft instrument contained four write-in or ratio data questions that collected information about age, experience, and number of online courses offered. The write-in format is appropriate when there are too many potential response options and when the survey is exploratory (Bailey, 1994; Cohen et al., 2011; Fowler, 2002; Schuman & Presser, 1996). Further, ratio data questions support the collection of continuous data with a true zero, which increases accuracy and allows for more types of statistical analyses (Cohen et al., 2011). This format is ideally suited for demographic data. In addition, the collection of nominal data can also reduce response rate errors, increase reliability, and provide opportunities for secondary data analysis (Colorado State University, n.d.; Fowler, 2002).

**Likert-Scale Response Format.** A Likert scale measures respondent attitudes and perceptions through discrete response categories (Cohen et al., 2011). Limitations of
rating scales include respondent interpretation of labels and questions, positive or negative skewness, presentation biases, and omission of categories that force responses (Cohen et al., 2011; Friedman & Amoo, 1999; G. D. Gaskell et al., 1994; Schwarz et al., 1991). Choosing the appropriate scale can help respondents estimate acceptable answers that support framing and understanding of the question (Cohen et al., 2011; Fowler, 2002). These issues can be mitigated by the use of the following techniques (Cohen et al., 2011; Fowler, 2002; Friedman & Amoo, 1999; Schwarz et al., 1991):

- using a scale with five to seven options;
- aligning response labels to a numerical scale;
- using numerical and verbal labels that increase consistency of respondents’ interpretation of meaning;
- including alternate response options such as “Not Applicable” or “Don’t Know”;
- using a scale that excludes extreme language;
- providing equal intervals;
- offering a balanced scale with an equal number of positive and negative options; and
- orienting the labels appropriately to the type of scale (i.e., unipolar or bipolar).

**Selection of Frequency Scale.** This instrument used a five-point frequency Likert scale. This is a unipolar and discrete rating scale since frequency variables only occur in a positive direction and there are fixed number of options (Chyung et al., 2018; Cohen et
al., 2011; Menold & Bogner, 2016; Schwarz et al., 1991). As a unidimensional scale, only frequency is being measured (Cohen et al., 2011).

**Figure 4**

*Research Justification for the Five-Point Frequency Likert Scale Used in This Study*

<table>
<thead>
<tr>
<th>Scale Option</th>
<th>Justification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Almost Always</strong> (More than 90% of the time)</td>
<td>• Unipolar scale measure the degree of a variable, such as frequency, in one direction (Chyung et al., 2018)</td>
</tr>
<tr>
<td><strong>Often</strong> (About 75% of the time)</td>
<td>• Discrete rating scales offer a specific number of options, which are easier to use and have higher completion rates (Chyung et al., 2018)</td>
</tr>
<tr>
<td><strong>Half the Time</strong> (About 50% of the time)</td>
<td>• Unidimensional scale that is only measuring one thing: frequency (Cohen et al., 2011)</td>
</tr>
<tr>
<td><strong>Occasionally</strong> (About 25% of the time)</td>
<td>• Only positive numbers are used because participants are less likely to choose negative options (Schwarz et al., 1991)</td>
</tr>
<tr>
<td><strong>Almost Never</strong> (Less than 10% of the time)</td>
<td>• Descriptors are precise, comprehensible, balanced, and suggest equidistant ranges (Menold &amp; Bogner, 2016)</td>
</tr>
<tr>
<td><strong>Not Applicable</strong></td>
<td>• Extreme word choices such as always or never were avoided to reduce bias (Cabooter et al., 2016; Cohen et al., 2011; Friedman &amp; Amoo, 1999)</td>
</tr>
<tr>
<td><strong>Don't Know</strong></td>
<td>• Verbal labelling of categories increases reliability and validity, improves understanding of meaning, and is preferred by respondents (Cohen et al., 2011; Menold &amp; Bogner, 2016)</td>
</tr>
<tr>
<td></td>
<td>• The numeric label is attached verbal labels to support understanding (Schwarz et al., 1991)</td>
</tr>
<tr>
<td></td>
<td>• Scale begins with the highest number and positive label to further enhance clarity (Hartley &amp; Betts, 2010)</td>
</tr>
<tr>
<td></td>
<td>• Balanced scales include an equal number of positive and negative options (Cohen et al., 2011; Friedman &amp; Amoo, 1999)</td>
</tr>
<tr>
<td></td>
<td>• Reduces bias by eliminating forced choice responses (Friedman &amp; Amoo, 1999)</td>
</tr>
<tr>
<td></td>
<td>• Improves valid data collection and subsequent statistical analysis results (Chyung et al., 2018).</td>
</tr>
<tr>
<td></td>
<td>• Alternate response categories reduce limitations of a five-point scale that includes a midpoint (Chyung et al., 2017)</td>
</tr>
</tbody>
</table>

*Note.* This figure depicts response scale options provided to survey participants with the research-based justifications for the choices made.

As shown in Figure 4, the scale begins with “5—Almost Always (More than 90% of the time),” proceeds to “1—Almost Never (Less than 10% of the time),” and includes “Not Applicable” and “Don’t Know” options. This frequency scale was based on a seven-point scale proposed by Vagias (2006). It was modified to reduce the scale to five options, which is considered best for measuring behavior and optimizes reliability,
validity, and degree of differentiation (Cohen et al., 2011; Friedman & Amoo, 1999; Menold & Bogner, 2016). The reduction of the scale also served to eliminate the extreme scale anchors, to avoid the use of extreme choices (Cohen et al., 2011; Friedman & Amoo, 1999).

**Numerical Labelling.** One limitation of Likert scales is that respondents often have different interpretations of what labels mean, especially when they are worded vaguely (Fowler, 2002; Friedman & Amoo, 1999). The numerical category was attached to a category label that describes the level of frequency in this instrument (see Figure 4). Because respondents are less likely to choose negative options, only positive numbers were used (Schwarz et al., 1991).

A scale-numbering of one through five was used to match the unipolar nature of the frequency scale (Chyung et al., 2018; Schwarz et al., 1991). The numeric label is often used by respondents to make meaning of any attached verbal labels (Schwarz et al., 1991). Hartley and Betts (2010) recommended that the higher numerical label should be attached to the most positive descriptor to improve scale clarity for respondents. As a result, the “Almost Always” descriptor was attached to category 5 while the “Almost Never” descriptor was attached to category 1. When presented to respondents, the scale began with the highest number and positive label to further enhance clarity (Hartley & Betts, 2010).

**Category Label and Descriptors.** This instrument used a frequency scale with a short category label (i.e., almost always and often) followed by a descriptive label (i.e., more than 90% of the time). The categories and descriptors used were selected carefully to provide equal intervals within the scale or support parametric statistical analysis
(Friedman & Amoo, 1999). Because respondents tend not to choose extreme choices, the use of extreme language (i.e., always or never) was avoided to reduce respondent bias (Cabooter et al., 2016; Cohen et al., 2011; Friedman & Amoo, 1999).

Respondents have a variable interpretation of frequency scale labels (Cohen et al., 2011; Friedman & Amoo, 1999; Schriesheim & Novelli, 1989). Therefore, descriptors should be precise, comprehensible, balanced, and suggest equidistant ranges (Menold & Bogner, 2016). Quality descriptors support respondent estimation of answers (Cohen et al., 2011; Fowler, 2002). Consequently, appropriate verbal labelling of categories increases reliability and validity, improves understanding of meaning, and is preferred by respondents (Cohen et al., 2011; Menold & Bogner, 2016).

The verbal labels were modified to reflect these practices. For example, category 5 used the “Almost Always” label with the “More than 90% of the time” descriptor (see Figure 4). The word “almost” diminishes the absolute extreme of the word “always.” To reduce variance of interpretation, the descriptor further defined this label as “More than 90% of the time.” This labelling practice was applied to all scale categories.

**Ensuring a Balanced Scale.** In addition, the scale was reviewed to ensure that it was properly balanced by including an equal number of positive and negative options (Cohen et al., 2011; Friedman & Amoo, 1999). There were two positive options of “Almost Always” and “Often.” There were two negative options of “Almost Never” and “Occasionally.” In addition, the scale included a neutral midpoint of “Half the Time.”

In unipolar scales, the midpoint typically represents an opinion of “to some extent” (Menold & Bogner, 2016, p. 5). For this instrument’s scale, the midpoint specifically represented a frequency of about half the time. The descriptor was labelled to
accurately capture a midmost level of frequency (Chyung et al., 2017). The inclusion of scale midpoints is recommended to ensure that respondents have a neutral or midlevel choice represented in the scale. This reduces data distortions caused by respondents who choose alternative responses because their behavior is not represented on the scale (Croasmun & Ostrom, 2011; Menold & Bogner, 2016).

Odd-numbered scales that include a midpoint are limited by providing respondents with a middle option that is often used for indecision (Croasmun & Ostrom, 2011). In addition, satisficing respondents who lack motivation or are fatigued tend to choose the central option (Chyung et al., 2017; Menold & Bogner, 2016). These limitations can be reduced by providing alternate response categories (Chyung et al., 2017).

Alternate Response Categories. The “Not Applicable” and “Don’t Know” options were added as alternate response categories to the five-point frequency scale. This was done to reduce bias caused by forcing participants to choose a response when other responses do not apply to them (Friedman & Amoo, 1999). The mean and media also tend to shift during statistical analysis when alternate options are not present since uncertain respondents tend to choose the middle option (Friedman & Amoo, 1999). The inclusion of these alternate response categories ensures that the instrument will collect valid data that will improve the results derived from statistical analysis (Chyung et al., 2018). Scales that include alternate responses also tend to have increased validity and decreased error variances (Menold & Bogner, 2016).

Scale Presentation. When presented to respondents, a scale should begin with the highest number and positive label on the left-hand side to further enhance clarity (Hartley
Consequently, the scale was presented to respondents beginning with category 5 and proceeding to category 1. The alternate response categories were displayed after category 1.

**Survey Layout and Design**

Fowler (2002) recommended that surveys begin with the most straightforward questions, while sensitive or more difficult questions should be placed towards the middle or end of the survey. The context effect of items presented earlier in a survey should also be considered when determining the question order (Friedman & Amoo, 1999). As a result, the survey items were reordered to ensure that the order and grouping of questions increased the instrument's reliability and validity. Furthermore, the question order was designed to progress logically through four general topics regarding the institution and designer's characteristics and accessibility practices.

Surveys should include an introduction with the purpose of the study, informed consent, efforts to ensure anonymity, contact information, and expected time to complete the survey (Callegaro et al., 2015). Respondents were asked to indicate whether they understood the terms of the study and whether they chose to participate voluntarily, as shown in Appendix B. Those who agreed to participate were given access to the full survey.

**Ethical Considerations of Survey Research**

The primary ethical consideration in survey research is designing an instrument that does not intentionally bias results (Nardi, 2014). While also considering issues of reliability and validity, the ordering, wording, and framing of survey questions have the potential to skew results (Nardi, 2014). The question format and wording were modified
to ensure unidimensionality and presented in a standardized format (Cohen et al., 2011; Fowler, 2002). To achieve this, questions were reviewed to ensure clarity and that only one variable was addressed at a time (Cohen et al., 2011; Fowler, 2002; Friedman & Amoo, 1999).

Question response formats were also adapted to a 5-point Likert-scale format or write-in format as appropriate. The unipolar, ratio-data, Likert-scale response format that was used in the survey was designed to increase consistency of respondents’ interpretation of meaning, eliminate forced-choice responses, use an equal scale that excluded extreme language, and align scale labels to a numerical scale (Cohen et al., 2011; Fowler, 2002; Friedman & Amoo, 1999; Schwarz et al., 1991). Context order effects were minimized by ensuring questions were ordered and grouped logically to increase understanding (Fowler, 2002; Friedman & Amoo, 1999).

The survey instrument was pretested in the form of expert reviews and field testing. This instrument review also provided the opportunity to identify potential areas of bias (Fowler, 2002; Groves et al., 2009; Ornstein, 2013). Any issues of concern were addressed prior to the dissemination of the instrument to the target population.

**Instrument Pretesting and Finalization**

Pretesting for quality assurance helps detect and fix survey issues before any data is collected (Ornstein, 2013). The type and degree of pretesting that needs to be conducted vary based on the degree of newly created survey content (Punch, 2003). Because this instrument was adapted from existing instruments, a less rigorous pretesting format could be used.
Pretesting measures were granted approval by the Institutional Review Board (IRB) in January 2020 (see Appendix C). Pretesting consists of a variety of techniques that can be used to ensure the validity and reliability of new or modified instruments (Fowler, 1995; Groves et al., 2009; Kimberlin & Winterstein, 2008). Further, these techniques serve to ensure the quality of the instrument while providing the opportunity to correct issues with the instrument prior to deployment (Ornstein, 2013).

**Expert Review**

Content validity is established when an instrument measures what is intended, and it can be established by experts (Kimberlin & Winterstein, 2008; Taherdoost, 2016). Experts reviewed the instrument for clarity, appropriate use of terminology, understanding of meaning, and appropriateness for the intended audience (Fowler, 2002; Groves et al., 2009). Expert reviewers provided content and construct validity by ensuring that the instrument addressed the intended phenomena to be researched and that the variables were operationalized, respectively (Cohen et al., 2011). Reviewers also established face validity by ensuring that the instrument measured the target phenomenon linguistically (Taherdoost, 2016). Temporal stability through degree of reviewer agreement was also established through inter-observer reliability (Bastos et al., 2014).

First, the instrument was reviewed by three accessibility experts who are based in the United States and are well-versed with accessibility practices and guidelines within higher education. Reviewers were recruited via social media during spring 2021 (see Appendix D). As expert subject matter reviewers, they were asked to review the instrument for clarity, appropriate use of terminology, comprehensibility of meaning, and appropriateness for the intended audience (Fowler, 2002; Groves et al., 2009).
Reviewers were provided with an online version of the instrument in which they indicated that the items were acceptable as they were or with revisions (see Appendix E). Expert reviews were completed in March 2021. Adjustments to the instrument were made based on the revision comments provided. The changes made included the following:

- Adding specificity to language, e.g., changing role to primary role;
- Adjusting language for inclusiveness, e.g., not limiting types of accessibility practices;
- Deletion of redundant questions;
- Splitting existing questions into multiple ones to ensure unidimensionality of question;
- Reformatted multiple-choice questions into Likert-scale response format; and
- Changed question stems to provide consistency.

**Field-Testing and Group Debrief**

Pretesting of surveys is commonly used to test the data collection process, establish usability of the instrument, determine the amount of time needed to complete the survey, and identify issues with questions (Fowler, 1995; Groves et al., 2009; Ornstein, 2013; Punch, 2003). As such, testers participated in a field test of the instrument and a group debrief to provide feedback on the instrument. The group debrief focused on clarity of directions and meaning within survey questions and responses (Fowler, 1995).

The revised instrument was field tested for validity with a purposeful convenience sample of nine online course designers outside the higher education population but who
otherwise had similar characteristics (Callegaro et al., 2015; Fowler, 1995, 2002; Nardi, 2014). Social media recruitment solicited field testers who were based in the United States and designed online courses for professional learning outside of the higher education environment (see Appendix F). The revised survey (see Appendix G) was administered using the same data collection methods that would be used for the study. The identity of field testers was not connected to their survey responses. This portion of the field test was completed in April 2021.

The field test respondents also participated in a debrief to collect information on whether the instrument was understandable and usable (Groves et al., 2009; Ornstein, 2013). As shown in Appendix H, open-ended questions focused on whether respondents understood the instructions, questions, response format, and participant comments (Fowler, 2002; Ornstein, 2013). To document the feedback, the focus group debrief was recorded and transcribed. As such, participants were provided with confidentiality assurances. The transcribed debrief anonymized participant comments by designating each with a number. All data with participant identities was stored separately from anonymized data.

The information collected from the debrief was used to make final adjustments to the survey before the final validated survey instrument was administered to the target population. The changes made included the following:

- Splitting one question into two to increase clarity and ensure unidimensionality of question, e.g., addressing the characteristics of the institution;
• Systematizing formatting in Likert questions by bolding questions and italicizing notes for clarification;
• Deletion of one redundant question regarding webinars; and
• Adding a question about software tools to evaluate accessibility.

Finalized Instrument Used in Study

After incorporating feedback from the expert review and field test, the survey instrument was finalized. The overall changes to survey questions are summarized in Table 2. The final instrument used for the study consisted of 41 total questions. The Qualtrics platform estimated that the survey would take respondents approximately 10 minutes to complete.

Table 2
Changes to Survey Instrument After Pretesting Measures

<table>
<thead>
<tr>
<th>Question Response Type</th>
<th>Initial Survey Instrument</th>
<th>Survey After Expert Review</th>
<th>Survey After Field Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write-In</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Multiple Choice</td>
<td>16</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>Frequency Likert Scale</td>
<td>11</td>
<td>29</td>
<td>29</td>
</tr>
<tr>
<td>Total</td>
<td>31</td>
<td>40</td>
<td>41</td>
</tr>
</tbody>
</table>

Survey Deployment Procedures

The survey was deployed in two phases. In the initial phase, participants were recruited from a professional learning organization. Due to low participation, a second phase was conducted using social media recruitment. The procedures for each phase included participant recruitment and sampling methods.
Sample

The target population included U.S. higher education professionals who have a job role in which they are responsible for using, creating, reviewing, or enforcing the use of accessible content in online courses. According to Osborne et al. (2008), there are no standardized guidelines for deriving a sample size for EFA.

The literature has identified several methods that can be used to determine an adequate sample size to conduct an EFA. These recommendations can generally be classified into three categories: absolute, ratio, and critical effect. First, an absolute recommendation specifies an ideal sample size regardless of other factors. Next, ratio recommendations compare two aspects of the study to determine an ideal size. Last, statistical recommendations require the review of various statistical data.

**Absolute Sample Recommendations.** An absolute minimum of at least 100 was recommended for an EFA (Gorsuch, 1997). Hair et al. (2006) stated that while a sample of 50 is the absolute minimum, 100 is preferable. Meanwhile, Comrey and Lee (1992) identified a sample size of 300 to be good for an EFA. However, they indicated that a sample size of 500 and 1,000 were considered very good and excellent, respectively. Generally, larger sample sizes are considered more ideal as they minimize error and increase the generalizability of results (Osborne et al., 2008).

**Ratio Recommendations.** There are two types of ratios used to determine sample size recommendations. The first ratio compares the number of observations to the number of variables (Hair et al., 2006). Using this method, ratios as low as 2:1 and 3:1 have been adequate in certain cases (de Winter et al., 2009; Guadagnoli & Velicer, 1988). Hair et al. (2006) stated that while a minimum sample should maintain a 5:1 ratio, a 10:1 ratio is
more acceptable. In some instances, recommended ratios go as high as 15:1, 20:1, and 30:1 (de Winter et al., 2009; Guadagnoli & Velicer, 1988; Osborne et al., 2008). While lower ratios may be prone to higher levels of error, a 20:1 ratio can still produce incorrect solutions 30% of the time (Costello & Osborne, 2005).

The second type of ratio recommendation entails the comparison of the number of variables that load on a factor (de Winter et al., 2009; Mundfrom et al., 2005). The minimum sample size for this type of ratio also considers the level of communalities found in the factored solution (Guadagnoli & Velicer, 1988; Maccallum et al., 1999). With these considerations, a minimum sample size of 40 can yield a good factorization with a ratio of 7:1 and high communalities (> .6) (Mundfrom et al., 2005). Unlike the previous recommendation, the adequacy of the sample and solution can only be examined after the EFA is conducted.

**Critical Effect Recommendations.** This type of recommendation has the researcher determine an adequate sample size by determining a target effect size and statistical power (Whitley, 2002). Depending on the type of research being conducted, these targets can be determined by the literature or by goal of the study (Whitley, 2002). While there are a host of considerations in determining an adequate sample size, Whitley (2002) suggested that sample sizes as small as 23 can detect large effects. However, larger sample sizes are capable of detecting much smaller effects (Whitley, 2002).

**Sample Sizes for EFA.** While there are no strict guidelines for EFA sample sizes, the adequacy of the sample is heavily dependent on other elements of the analysis such as communalities, factor loadings, and cross loadings (Costello & Osborne, 2005). Under the right conditions, a reliable factor solution can be found for very small sample sizes.
even though there is an increased risk of error and incorrect solutions (de Winter et al., 2009; Whitley, 2002). While small sample sizes may suffice under specific conditions, larger samples tend to minimize various types of error and increase the reliability and generalizability of the results (Cohen et al., 2011; Field, 2013; Osborne et al., 2008; Whitley, 2002).

However, research has found that many EFA sample size recommendations produce inconsistent results (Guadagnoli & Velicer, 1988). Moreover, Guadagnoli and Velicer (1988) reported that while any sample size choice can be supported in the literature, the adequacy of the sample is determined by the conditions used in the study. The researchers recommend a focus on factors in which four or more variables load at .6 or higher regardless of sample size. In addition, replication has been suggested for sample sizes below 300 (Guadagnoli & Velicer, 1988).

**Sampling for This Study.** Based on the literature, the smallest allowable sample size for this study was 58, based on an observation to variable ratio of 2:1. Using the common 5:1 ratio, the suggested sample size would have been 145. Using the absolute recommended ranges, a sample of size of 300 was also recommended. While this study aimed for a sample size of 300, there was an increased probability of survey fatigue due to decreased data collection methods during COVID-19 (United Nations High Commissioner for Refugees, 2020).

As a result, the design of this study included options to respond to the limits of the data collected based on several factors, including sample size. While the target sample size was 300, the minimum sample size was 58 respondents. Because the sample size...
impacted key study parameters, all data analysis decisions were reported and aligned with recommendations from the literature.

**Phase 1: Participants and Recruitment via AECT**

Based on the nature of accessibility laws and the study's exploratory nature, a nonprobability sample was used for Phase I. A nonprobability, volunteer convenience sample was used to target participants that were most likely to possess the desired respondent characteristics (Cohen et al., 2011). Because the survey addressed accessibility issues in higher education online courses, the sample was limited to respondents who met the following criteria:

- were members of Association for Educational Communications and Technology (AECT),
- worked for a higher education institution in the United States, and
- had a job role in which they were responsible for using, creating, reviewing, or enforcing the use of accessible content in online courses.

The web-based survey was targeted for distribution to AECT’s more than 2,000 professionals who work in higher education as faculty, instructional designers, and other learning technology staff (AECT, 2020). Using a closed population, such as that of a professional organization, can ensure that respondents possess the desired characteristics (Cohen et al., 2011; Gwartney, 2007). This group of participants was selected for this study based on the likelihood that they were involved in online higher education course design and had some knowledge of accessibility issues. Furthermore, identifying the appropriate respondents helps to mitigate validity issues with factual reporting (Fowler,
Survey response rates also tend to increase when the respondents are interested in the subject of the research (Fowler, 2002).

Conditional IRB approval was provided to submit an AECT research participation request for dissemination of the study to organization members (see Appendices K and L). Once AECT approved the request to disseminate the study, full IRB approval was provided to begin data collection (see Appendices M and N).

Beginning June 3, 2021, AECT sent a research participation request and a survey invitation to members of the target population (see Appendix O). Once members agreed to participate in the survey, they were provided with the link to the survey, where they were provided with an option to indicate their informed consent. The survey was available for 30 days or until a minimum sample size of 58 was met, whichever came first. At the end of 30 days, 26 Phase 1 participants had submitted responses. Surveys that were incomplete (n = 3) or that did not meet the study criteria (n = 1) were removed from analysis. Consequently, 22 surveys were retained for analysis.

At the 15-day mark of the survey collection period, only 23 responses had been completed. Although periodic reminders were used to increase respondent participation, it is likely that the low participation rate was due to survey fatigue. Not only was survey research growing in popularity, but the COVID-19 pandemic increased research survey use due to limited face-to-face data collection opportunities (Menon & Muraleedharan, 2020). Survey fatigue is likely to increase when prospective respondents receive many participation requests (Porter et al., 2004). Due to the low prospect of reaching the ideal sample size, an IRB modification request was submitted to expand participation recruitment.
Phase 2: Participants and Recruitment via Social Media

Based on the Phase 1 participation rate, additional survey participation was solicited using social media. Using strategic hashtags and social media forums, a nonprobability, volunteer convenience sample was used to target participants who were most likely to possess the desired respondent characteristics (Cohen et al., 2011). Because the survey addressed accessibility issues in higher education online courses, the sample was expanded to respondents who met the following criteria:

- worked for a higher education institution in the United States and
- had a job role in which they were responsible for using, creating, reviewing, or enforcing the use of accessible content in online courses.

The web-based survey was targeted for distribution on a variety of social media platforms for users who followed the #InstructionalDesign, #accessibility, #HigherEducation, and #A11y hashtags (see Appendix P). This group of participants was selected based on the likelihood that they met the study criteria, which increased the likelihood of factual reporting and increased response rates (Fowler, 2002).

Social media recruitment began on July 3, 2021, once the IRB modification was granted (see Appendix Q). Prospective respondents who clicked on the social media link were directed to a website with the purpose and criteria for study participation and survey link (see Appendix P). The survey was available for 30 days, and 47 Phase 2 participants submitted responses. Surveys that were incomplete \( n = 1 \) or from respondents who did not meet the study criteria \( n = 6 \) were removed from analysis. As a result, 40 responses were retained for analysis.
Survey Procedures

To increase participation, all prospective respondents were provided with information about the survey's purpose with assurances of their anonymity, privacy, and confidentiality during the recruitment and informed consent (Callegaro et al., 2015; Fowler, 2002). As a result, no identifying information about their location, institution, or selves was collected during the survey.

Although Phase 1 and 2 participants were introduced to the study through different channels, all respondents were provided access to the same anonymous survey link. Once respondents clicked on the survey link, the survey began with the informed consent. Participants who agreed to participate in the study proceeded to the remainder of the survey, while those who did not agree were directed to a thank-you screen.

In the first section of the survey, respondents answered demographic and filter questions to determine their eligibility for participation. The filter questions included participant job duties and country of residence to ensure that respondents met the participant criteria while also readying respondents to retrieve relevant information (Schaeffer & Dykema, 1994). Participants who did not meet participation requirements were directed to a screen thanking them for their participation. Respondents who met the target population criteria continued to the remainder of the survey. A total of 62 participants met all study criteria and completed the survey.

Data Collection

This study was approved by the IRB prior to data collection. Data was collected through the Qualtrics online survey platform. Data relating to background information, information about the institution, information about training and support, and information
about individual practices was collected with a self-administered, web-based quantitative survey. The survey was delivered to potential participants through an anonymized survey link made available to AECT members and on social media. Once the survey administration was completed, the quantitative data was entered into Statistical Package for the Social Sciences (SPSS), Version 26.0 for Mac software and prepared for statistical analysis.

In the request to participate in the research study, participants were assured that no identifying information would be collected and that the online survey platform would maintain confidentiality (see Appendix I). To protect confidentiality, no identifying information about the participant or their institution was collected and therefore was not presented in the research report. The participation request also included a section on informed consent that included an explanation of the research study, procedures, eligibility, risk, and estimated time to complete the survey. The Qualtrics digital ExpertReview estimated that the survey would take about 10 minutes to complete.

Participation was voluntary, and respondents who consented to participate were directed to the first section of the survey. This section collected background information and included filter questions that ensured respondents met participation criteria. Those who were not eligible were thanked for their participation and told they were not eligible to complete the survey. Those who were eligible proceeded to the remainder of the survey.

Data security was ensured by having raw data files encrypted and stored on a password-protected device belonging to the researcher. Furthermore, only the researcher had access to the raw data. Immediately following committee and IRB approval, the
survey was administered during summer 2021 semester. The survey was available for 30
days during each recruitment phase. By the end of both phases, a total of 73 survey
responses had been collected. Of those, 62 were retained for analysis based on study
criteria eligibility and survey completion.

Based on the low sample size, the analysis of this study adhered to stricter
guidelines for acceptable communalities, factor loadings, and number of factors (de Winter et al., 2009). While smaller sample sizes are more prone to increased error, an
EFA is designed to be exploratory and not inferential (Costello & Osborne, 2005).
Though the results of this analysis will not be generalizable, they can be used in future
studies with a confirmatory analysis to determine generalizability (Costello & Osborne,
2005).

Data Analysis

The collected quantitative data was analyzed using the SPSS software.
Descriptive statistics were generated for survey data before running the EFA. The
assumptions for an EFA including normality, linearity, sampling adequacy, and
capability of being factored were checked (Cohen et al., 2011). During this analysis,
Cronbach’s alpha, $\alpha$, was calculated to determine the reliability of the survey (Field,
2013). Suitability for factorization was tested using Bartlett’s test of sphericity and the
Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy (Cohen et al., 2011).

Once assumptions were met, an EFA, a statistical technique of identifying
associations between clusters of constructs, was run (Field, 2013; Hoyle & Duvall, 2011).
The results of the initial EFA determined the data analysis procedure, as shown in Figure
5 (Osborne et al., 2008).
With assumptions met, an initial EFA using Principal Axis Factoring (PAF) and a Promax rotation was conducted. According to Allen and Seaman (2007), Likert-scale data is ordinal and therefore not suitable for parametric tests based on normality of the data. When the assumption of multivariate normality cannot be met, an EFA using PAF is recommended (Osborne et al., 2008). In addition to an extraction method, a rotation of factors should also be considered. In the social sciences, correlations between survey items are expected (Osborne et al., 2008). Oblique rotations assume that variables are correlated and is an appropriate choice for EFAs in the social sciences (Osborne et al., 2008). A Promax rotation is commonly used oblique in EFA (Guadagnoli & Velicer, 1988; Watkins, 2018). As a result of these considerations, this study used an EFA with PAF and Promax rotation for analysis, as shown in Figure 6.
As indicated in Figure 5, if the factors failed to load after the initial EFA, a principal component analysis was considered as a data reduction method to eliminate problematic variables (Costello & Osborne, 2005; Osborne et al., 2008). The results from the initial analysis were used to assess the integrity of the data and analysis.

Once the factor extraction loaded, the data was analyzed to determine factor structures. One of the primary concerns with EFA is the number of factors to retain in the analysis (Hoyle & Duvall, 2011). Factor retention was based on Kaiser’s criterion and scree test. Only factors with eigenvalues greater than one were considered for the factor structure according to the Kaiser criterion (Cohen et al., 2011; Kaiser, 1958). However, this method often overestimates the number of factors to be retained (Costello & Osborne, 2005). As a result, a scree plot can be used to verify or reduce the number of viable factor structures (Whitley, 2002). A scree test uses a visual inspection of eigenvalue graphs to identify the number of points that occur above a bend or break in the data (Costello & Osborne, 2005). This data was used to constrain and rerun the analysis to the specified number of factor structures suggested by the data (Whitley, 2002).

Using EFA, the factor structure of the survey items was determined using the PAF procedure shown in Figure 6. Typically, factor loadings greater than or equal to .3 are used to identify structures with at least three factors that were not duplicated in multiple structures (Cohen et al., 2011; Field, 2013; Osborne et al., 2008; Tinsley & Tinsley, 1987). Factor loadings of .3 represented a minimum that allows for the retention of the maximum number of factors in each identified structure (Cohen et al., 2011). This factor retention strategy is typically ideal for exploratory studies.
However, due to the small sample size of this study, stricter guidelines were applied to increase the reliability of the solution. For small sample sizes, it is recommended to have fewer factor structures, with at least five factor loadings above .5 (Costello & Osborne, 2005; de Winter et al., 2009). The range of communalities present in the factor structures coupled with the ratio of variables per factor were used to determine the sample size appropriateness (Mundfrom et al., 2005). Identified factor structures were reviewed for thematic associations. The results were reported in the results section of the dissertation to explain how the factor structures were interpreted.

**Figure 6**

*Overview of Data Analysis Procedure Using Exploratory Factor Analysis*

- **Constructs Measured by the Instrument**
  - Characteristics of Course Designers (RQ1)
  - Practices of the Course Designers (RQ2)
  - Characteristics of the Institution (RQ3)
  - Practices of the Institutions (RQ4)

- **Data Analysis (Assuming Nonparametric Data)**
  - Descriptive Statistics
  - Principal Component Analysis for data reduction, *if needed*
  - Exploratory Factor Analysis
  - Promax Rotation
  - Principal Axis Factoring
  - Cronbach's Alpha
  - Kaiser-Meyer-Olkin

- **Resulting Factor Structure(s) (if any)**
  - For each structure of associated factors:
    - Retain factors with eigenvalues >1
    - Retain factors based on scree test
    - Include only factors with factor loadings ≥ .5
    - Report range of communalities
    - Must have minimum of five factors
    - Given thematic name
Summary

The purpose of this chapter was to introduce the methodology of the descriptive quantitative survey using EFA. This chapter explained the research questions, instrument development and pretesting, sampling, participant recruitment, survey procedures, data collection, data analysis, and other research elements. A descriptive quantitative survey research methodology was determined to be most appropriate for exploring multiple variables and determining whether there are any correlations using quantitative methods (Knupfer & McLellan, 2001). In addition, surveys were determined to be an appropriate method of collecting data to describe existing conditions and determine potential relationships (Cohen et al., 2011; Knupfer & McLellan, 2001). The methods used to select and adapt existing survey instruments for the purposes of this study were also described. Using EFA, quantitative surveys were likewise determined to be an appropriate method to explore the relationships among many variables (Cohen et al., 2011; Knupfer & McLellan, 2001; Punch, 2003). Considerations for reliability, validity, ethics, and issues specific to this study were also discussed. The chapter closed with a description of the data analysis method.

In Chapter Four, the instrument validity and reliability analysis and survey response rate are presented. Next, the descriptive statistics analysis is provided in the context of the first four research questions. Then, the preliminary data analysis used to test assumptions and determine the suitability of the EFA are summarized. Finally, the factor structures determined by the EFA are presented.
CHAPTER IV

Results

A descriptive quantitative survey research design was used to explore the relationship between various characteristics that may contribute to accessibility knowledge, practices, and support in higher education online courses. Specifically, a quantitative electronic survey instrument was used to collect information about characteristics, which included demographic data, knowledge about accessibility, implementation practices, and available training and support. This chapter presents the instrument validity and reliability analysis followed by the survey response rate. Next, the results of the descriptive statistics analysis are provided, which addresses the first four research questions. The exploration of the fifth research question begins with a preliminary data analysis that was used to test assumptions and determine the suitability of Exploratory Factor Analysis (EFA) as the appropriate statistical analysis technique. Finally, the factor structures determined by the EFA are presented.

Instrument Validity and Reliability Analysis

Validity refers to an instrument’s ability to represent what it was designed to measure (Cohen et al., 2011; Kimberlin & Winterstein, 2008). Reliability is established when an instrument achieves consistent results over time (Cohen et al., 2011). Depending on the research methodology and instrumentation used, there are various types of validity and reliability that can be established.

Internal Validity

Internal validity is established when the data adequately supports the results and can be established with a reliable instrument (Cohen et al., 2011). As summarized in
Table 3, the instrumentation used in this study was carefully designed to mitigate common validity issues in survey research. These measures included techniques to reduce bias and increase the accuracy of the data (Cohen et al., 2011).

Table 3

Methods to Address Survey Validity and Reliability through Instrument Design

<table>
<thead>
<tr>
<th>Survey Design Feature</th>
<th>To Address Validity</th>
<th>To Address Reliability</th>
<th>To Address Bias</th>
</tr>
</thead>
<tbody>
<tr>
<td>Survey format and design</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anonymous survey</td>
<td>(Fowler, 2002)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adapted questions</td>
<td>(Fowler, 2002; Hyman et al., 2006)</td>
<td>(Bastos et al., 2014)</td>
<td></td>
</tr>
<tr>
<td>Standardized presentation</td>
<td>(Fowler, 2002)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clear instructions</td>
<td>(Chyung et al., 2018)</td>
<td>(Chyung et al., 2018)</td>
<td></td>
</tr>
<tr>
<td>Familiar terms</td>
<td>(Fowler, 2002)</td>
<td></td>
<td>(Cohen et al., 2011)</td>
</tr>
<tr>
<td>Question format and design</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unidimensional questions</td>
<td>(Cohen et al., 2011; Fowler, 2002)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Order, wording, and framing</td>
<td>(Nardi, 2014)</td>
<td>(Nardi, 2014)</td>
<td>(Nardi, 2014)</td>
</tr>
<tr>
<td>Widely understood language</td>
<td>(Fowler, 2002)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reduction of ambiguity</td>
<td>(Fowler, 2002)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Response scale format and</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>design</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Survey Design Feature | To Address Validity | To Address Reliability | To Address Bias
--- | --- | --- | ---
Likert scale | (Chyung et al., 2018) | | |
Scale with 5–7 options | (Menold & Bogner, 2016) | (Chyung et al., 2017; Cohen et al., 2011; Menold & Bogner, 2016; Schwarz et al., 1991) | (Friedman & Amoo, 1999)
Verbal and numerical labels | (Fowler, 2002; Menold & Bogner, 2016) | (Menold & Bogner, 2016) | (Cohen et al., 2011)
Inclusion of alternate response options | (Chyung et al., 2018; Menold & Bogner, 2016) | | (Friedman & Amoo, 1999)
Scale with equal intervals | | | (Friedman & Amoo, 1999)
Balanced scale with equal number of positive and negative options | (Menold & Bogner, 2016) | (Menold & Bogner, 2016) | (Friedman & Amoo, 1999)
Inclusion of scale midpoint | (Menold & Bogner, 2016) | (Menold & Bogner, 2016) | |
Orientation of labels to match the scale | | | (Schwarz et al., 1991)
Labelling of each scale point | | | (Krosnick & Berent, 1993)

**Content Validity**

Content validity is established when the instrument is found to measure what it was designed to cover (Cohen et al., 2011; Kimberlin & Winterstein, 2008). This type of validity is often established through the literature review and by consulting experts in the field (Kimberlin & Winterstein, 2008; Taherdoost, 2016). As identified in the literature
review, the factors connected to systemic accessibility issues at the institutional and designer levels were addressed in the source instruments used to create the adapted survey used in this study. Further, all questions included in the final instrument were mapped to each research question to ensure relevance (see Appendices A and J). Lastly, expert reviewers were used to ensure that the instrument addressed the intended topic. As a result, content validity has been established through the literature review and expert review.

**Face Validity**

The expert review can also be used to determine whether an instrument measures the intended constructs (Taherdoost, 2016). As a result, this type of validity “evaluates the appearance of the questionnaire in terms of feasibility, readability, consistency of style and formatting, and the clarity of the language used” (Taherdoost, 2016, p. 29). As elaborated upon in the description of pre-testing methods, the expert review solicited expert review feedback on all topics. Expert reviewers provided consistent and similar feedback on the instrument. Face validity was established based on this criterion.

**Construct Validity**

Construct validity ensures that the operationalization of variables is generally accepted in the applicable field (Cohen et al., 2011; Taherdoost, 2016). This type of validity can be established by comparing data from multiple studies that used a specific instrument (Kimberlin & Winterstein, 2008). Because this study used an adapted instrument designed for descriptive exploratory research, construct validity cannot be established. However, if this instrument is subsequently used in another study, a principal
component analysis or confirmatory factor analysis could be used to establish construct validity (Costello & Osborne, 2005; Wee & Quazi, 2005)

**External Validity**

External validity is established when results can be generalized to a larger population (Cohen et al., 2011). According to Fowler (2002), adopting survey questions used in previous studies provides the opportunity to collect comparable data across different samples that can aid in generalizing results. Because these instruments have already been tested, there is a higher level of confidence in the validity of the questions and quality of data even when these questions are adapted (Hyman et al., 2006).

The study’s source instruments targeted related, but different, populations. This study included both populations in the target sample. Although this was an exploratory study, the results from this study are in line with those reported in the literature, which will be discussed in detail in Chapter Five.

**Reliability**

Reliability is established when an instrument achieves consistent results over time (Cohen et al., 2011; Taherdoost, 2016). It ensures that an instrument has obtained internal consistency (Kimberlin & Winterstein, 2008). Reliability is established through Cronbach’s alpha, $\alpha$ (Cohen et al., 2011; Field, 2013; Kimberlin & Winterstein, 2008). Further, Cronbach’s $\alpha$ is considered to be particularly appropriate for Likert scales (Whitley, 2002).

While the minimum coefficient is usually .70 or higher, a Cronbach’s $\alpha$ of .60 or above is allowable for exploratory studies (Straub et al., 2004). As reported in Table 4, an $\alpha$ coefficient of .78 was established for all Likert-scale items. According to Hinton et al.
(2004), the reliability of the instrument is high based on the $\alpha$ coefficient (see Table 4).

The $\alpha$ coefficients for the instrument as a whole and its subsections were all within the acceptable range for exploratory research.

**Table 4**

*Instrument Reliability Established Via Cronbach's Alpha*

<table>
<thead>
<tr>
<th>Likert scale items</th>
<th>$\alpha$</th>
<th>$n$/items</th>
<th>$n$/valid cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>.78</td>
<td>29</td>
<td>20</td>
</tr>
<tr>
<td>Institutional practices</td>
<td>.63</td>
<td>4</td>
<td>45</td>
</tr>
<tr>
<td>Institutional responsibility for online instructional content</td>
<td>.71</td>
<td>5</td>
<td>38</td>
</tr>
<tr>
<td>Institutional responsibility for accessibility review</td>
<td>.63</td>
<td>3</td>
<td>45</td>
</tr>
<tr>
<td>Institutional training and support</td>
<td>.84</td>
<td>5</td>
<td>41</td>
</tr>
<tr>
<td>Individual practices</td>
<td>.80</td>
<td>8</td>
<td>55</td>
</tr>
<tr>
<td>Limitations</td>
<td>.78</td>
<td>4</td>
<td>56</td>
</tr>
</tbody>
</table>

*Note.* Cronbach’s $\alpha$ was computed using Likert-scale survey item data that excluded the responses of “Don’t Know” and “Not Applicable.”

**Response Rate the Survey Research**

Quantitative data were collected from designers who included professionals working as faculty and instructional designers, and those who provide accessibility support for online courses in U.S. higher education. Survey responses were collected in two consecutive 30-day phases. Phase 1 targeted designers belonging to the Association for Educational Communications and Technology (AECT), and 26 submissions were received. Phase 2 targeted designers in public social media spaces, and 47 submissions were received. At the end of the 60-day window, a total of 62 eligible respondents had completed the survey. A total of four submissions were deleted due to incomplete
submission. A total of seven submissions were deleted due to respondent ineligibility. This resulted in a sample of 62 (N = 62) for the study.

Data Analysis Procedures

The survey was deployed from June through August 2021 for a total of 60 days. The populations consisted of designers (N = 62) who included professionals working as faculty and instructional designers and those who provide accessibility support for online courses in U.S. higher education. Designers likely to meet the participation criteria were recruited from AECT and through social media. Respondents received a request to participate either through an AECT email or a public social media posting.

Data Preparation

Data was collected through the Qualtrics online survey platform through an anonymized survey link. In the first phase, collected data was prepared for analysis using a detailed process that included the following:

- removal of incomplete surveys,
- removal of surveys from respondents who did not meet the study criteria, and
- removal of data that would not be analyzed (i.e., start dates, progress, or user language).

The second phase of preparation consisted of coding and data transformation. The coding process consisted of changing respondents’ names to numerical codes, which are detailed in Appendix R. In addition, three questions pertaining to years and months of experience were transformed into a decimal format. The third phase of data preparation included a review of data to ensure accuracy. This review resulted in the deletion of two age entries
(0 and 9999) that did not correspond to an actual age. Further, four text entries were recoded under the appropriate category.

The original data was preserved and secured so that no data could be altered. The data was also regularly saved in separate files after each preparation phase. As a result, any irregularities or inconsistencies could be investigated and corrected if necessary.

The data was then entered for analysis into the Statistical Package for the Social Sciences (SPSS), Version 26.0 for Mac, software. The data was analyzed using descriptive statistics to report means, medians, standard deviations, and frequencies for all data. After this analysis, the data was prepared for the EFA by removing Likert scale responses of “Not Applicable” and “Don’t Know.” Using SPSS, an EFA was run to determine whether any associations between factors existed. This analysis also included the testing of assumptions and suitability for EFA.

**Descriptive Analysis**

The survey instrument included specific questions to solicit information about designers and institutions in two areas. First, data was collected about the characteristics and relevant demographic data for each. Second, information regarding the accessibility practices for each was gathered. This descriptive data analysis corresponded to the first four research questions. This analysis was used to report means, standard deviations, standard errors, and percentages.

**Designer Characteristics: Research Question 1**

The first research question addressed the characteristics of designers who are responsible for implementing accessibility in higher education settings. The applicable
survey questions related to gender, age, role, and years of experience. Participants provided information through multiple-choice and write-in responses.

**Table 5**  
*Participant Gender Distribution*

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>44</td>
<td>71.0</td>
</tr>
<tr>
<td>Male</td>
<td>14</td>
<td>22.6</td>
</tr>
<tr>
<td>Other</td>
<td>2</td>
<td>3.2</td>
</tr>
<tr>
<td>Prefer not to answer</td>
<td>2</td>
<td>3.2</td>
</tr>
<tr>
<td>Total</td>
<td>62</td>
<td>100.0</td>
</tr>
</tbody>
</table>

**Table 6**  
*Participant Mean Age and Experience in Years*

<table>
<thead>
<tr>
<th>Characteristic in Years</th>
<th>n</th>
<th>Min</th>
<th>Max</th>
<th>Mdn</th>
<th>Mode</th>
<th>M</th>
<th>SE</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>60</td>
<td>26</td>
<td>71</td>
<td>43.50</td>
<td>37</td>
<td>44.07</td>
<td>1.32</td>
<td>10.22</td>
</tr>
<tr>
<td>Higher Education Experience</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teaching</td>
<td>62</td>
<td>0</td>
<td>30</td>
<td>7.83</td>
<td>0</td>
<td>10.00</td>
<td>1.04</td>
<td>8.22</td>
</tr>
<tr>
<td>Teaching online</td>
<td>62</td>
<td>0</td>
<td>20</td>
<td>4.75</td>
<td>0</td>
<td>6.84</td>
<td>0.82</td>
<td>6.44</td>
</tr>
<tr>
<td>Non-instructional support of online education program</td>
<td>62</td>
<td>0</td>
<td>22</td>
<td>4.00</td>
<td>0</td>
<td>5.30</td>
<td>0.63</td>
<td>5.00</td>
</tr>
</tbody>
</table>
As shown in Table 5, the respondents predominantly identified as female, comprising 71% of participants. Respondents had an average age of 44.07 ($SD = 10.22$) and 10 years of experience teaching in higher education ($SD = 8.22$). Participants had taught online an average of 6.84 years ($SD = 6.44$) and had spent 5.3 years ($SD = 5.00$) supporting online higher education programs non-instructionally (see Table 6). It is important to note that these figures do not account for corresponding experience in other settings. Most respondents’ primary role was that of faculty or instructional designer (see Figure 7).

**Figure 7**
*Primary Role Served by Participants at Their Higher Education Institutions*

![Pie chart showing the primary roles of participants.](chart.png)

*Note.* This data represents the primary role served by respondents within their institution

**Designers’ Accessibility Practices: Research Question 2**

The second research question addressed the accessibility practices used by designers in higher education online courses. The applicable survey questions related to designers’ individual accessibility practices and limitations they had experienced.
Participants provided information through a five-point frequency Likert scale. A numerical response of 1 represented a frequency of almost never or less than 10% of the time, while a 5 indicated almost always or more than 90% of the time. Participants were also provided with an option to indicate that they did not know or that the question was not applicable to them.

**Figure 8**

*Distribution of Frequency of Designer’s Accessibility Practices by Number of Responses*

<table>
<thead>
<tr>
<th>Practice</th>
<th>Frequency</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Not applicable</th>
<th>Don't know</th>
</tr>
</thead>
<tbody>
<tr>
<td>Using multimedia in courses</td>
<td></td>
<td>4</td>
<td>13</td>
<td></td>
<td></td>
<td>45</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Formatting documents with text styles</td>
<td></td>
<td>1</td>
<td>3</td>
<td>8</td>
<td>17</td>
<td></td>
<td>32</td>
<td>1</td>
</tr>
<tr>
<td>Including alt text with images</td>
<td></td>
<td>4</td>
<td>3</td>
<td>8</td>
<td>16</td>
<td></td>
<td>31</td>
<td></td>
</tr>
<tr>
<td>Identifying headers on tables</td>
<td></td>
<td>1</td>
<td>8</td>
<td>7</td>
<td>11</td>
<td></td>
<td>31</td>
<td>2</td>
</tr>
<tr>
<td>Including closed captions with videos</td>
<td></td>
<td>5</td>
<td>4</td>
<td>11</td>
<td>10</td>
<td></td>
<td>31</td>
<td>1</td>
</tr>
<tr>
<td>Including transcripts with videos</td>
<td></td>
<td>13</td>
<td>6</td>
<td>8</td>
<td>8</td>
<td></td>
<td>25</td>
<td>1</td>
</tr>
<tr>
<td>Complying with accessibility guidelines</td>
<td></td>
<td>4</td>
<td>8</td>
<td>15</td>
<td>13</td>
<td></td>
<td>18</td>
<td>4</td>
</tr>
<tr>
<td>Using an accessibility evaluation tools</td>
<td></td>
<td>13</td>
<td>4</td>
<td>11</td>
<td>14</td>
<td></td>
<td>20</td>
<td></td>
</tr>
</tbody>
</table>

**Individual Accessibility Practices.** The distribution of responses for designers’ individual accessibility practices within their online courses is shown in Figure 8, while the mean frequency is shown in Table 7. Course designers reported that they almost always use some type of multimedia in their online courses ($M = 4.66$, $SD = 0.60$). Designers often formatted documents with appropriate text styles ($M = 4.25$, $SD = 0.98$), used alt text for images ($M = 4.08$, $SD = 1.19$), labelled headers in tables ($M = 4.09$, $SD = 1.17$), and included captions with videos ($M = 3.95$, $SD = 1.31$). However, including transcripts with videos ($M = 3.43$, $SD = 1.62$), complying with overall accessibility
guidelines \( (M = 3.57, SD = 1.26) \), and using accessibility evaluation tools \( (M = 3.39, SD = 1.52) \) were only practiced about half the time.

**Table 7**

*Mean Frequency of Designers' Individual Accessibility Practices for Online Courses*

<table>
<thead>
<tr>
<th>Accessibility Practice</th>
<th>( n )</th>
<th>Min</th>
<th>Max</th>
<th>Mdn</th>
<th>Mode</th>
<th>M</th>
<th>SE</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Using multimedia in courses</td>
<td>62</td>
<td>3</td>
<td>5</td>
<td>5.00</td>
<td>5.00</td>
<td>4.66</td>
<td>.08</td>
<td>0.60</td>
</tr>
<tr>
<td>Formatting documents with text styles</td>
<td>61</td>
<td>1</td>
<td>5</td>
<td>5.00</td>
<td>5.00</td>
<td>4.25</td>
<td>.13</td>
<td>0.98</td>
</tr>
<tr>
<td>Including alt text with images</td>
<td>62</td>
<td>1</td>
<td>5</td>
<td>4.50</td>
<td>5.00</td>
<td>4.08</td>
<td>.15</td>
<td>1.19</td>
</tr>
<tr>
<td>Identifying headers on tables</td>
<td>62</td>
<td>1</td>
<td>5</td>
<td>5.00</td>
<td>5.00</td>
<td>4.09</td>
<td>.15</td>
<td>1.17</td>
</tr>
<tr>
<td>Including closed captions with videos</td>
<td>62</td>
<td>1</td>
<td>5</td>
<td>5.00</td>
<td>5.00</td>
<td>3.95</td>
<td>.17</td>
<td>1.31</td>
</tr>
<tr>
<td>Including transcripts with videos</td>
<td>62</td>
<td>1</td>
<td>5</td>
<td>4.00</td>
<td>5.00</td>
<td>3.43</td>
<td>.21</td>
<td>1.62</td>
</tr>
<tr>
<td>Complying with accessibility guidelines</td>
<td>62</td>
<td>1</td>
<td>5</td>
<td>4.00</td>
<td>5.00</td>
<td>3.57</td>
<td>.17</td>
<td>1.26</td>
</tr>
<tr>
<td>Using accessibility evaluation tools</td>
<td>62</td>
<td>1</td>
<td>5</td>
<td>4.00</td>
<td>5.00</td>
<td>3.39</td>
<td>.19</td>
<td>1.52</td>
</tr>
</tbody>
</table>

*Note.* To report accurate means of frequencies, responses of “Not applicable” and “Don’t know” were omitted from this data. As a result, \( n \) is reported to account for these omissions.

**Limitations in Implementing Accessibility Practices.** The distribution of responses for limitations experienced by designers when implementing accessibility practices in their online courses shown in Figure 9, while the mean frequency is shown in Table 8. Course designers reported that time \( (M = 3.28, SD = 1.51) \) was the most limiting
factor in implementing accessibility. While most respondents reported that accessibility knowledge ($n = 24, 38.7\%$), access to tools and software ($n = 21, 33.9\%$), and budgetary reasons ($n = 21, 33.9\%$) were almost never a limiting factor, a similar number of respondents found they were limited often or almost always ($n = 19, 30.7\%; n = 21, 33.9\%; n = 18, 29.1\%) .

**Figure 9**

*Distribution of Frequency of Designer’s Limitations in Implementing Accessibility Practices by Number of Responses*

**Table 8**

*Mean Frequency of Designers’ Limitations in Implementing Accessibility for Online Courses*

<table>
<thead>
<tr>
<th>Accessibility Limitation</th>
<th>$n$</th>
<th>Min</th>
<th>Max</th>
<th>Mdn</th>
<th>Mode</th>
<th>$M$</th>
<th>$SE$</th>
<th>$SD$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time</td>
<td>62</td>
<td>1</td>
<td>5</td>
<td>4.00</td>
<td>5.00</td>
<td>3.28</td>
<td>.19</td>
<td>1.51</td>
</tr>
<tr>
<td>Knowledge about accessibility</td>
<td>62</td>
<td>1</td>
<td>5</td>
<td>2.00</td>
<td>1.00</td>
<td>2.47</td>
<td>.19</td>
<td>1.46</td>
</tr>
<tr>
<td>Access to tools or software</td>
<td>62</td>
<td>1</td>
<td>5</td>
<td>2.00</td>
<td>1.00</td>
<td>2.58</td>
<td>.19</td>
<td>1.49</td>
</tr>
<tr>
<td>Budgetary resources</td>
<td>62</td>
<td>1</td>
<td>5</td>
<td>2.00</td>
<td>1.00</td>
<td>2.57</td>
<td>.21</td>
<td>1.57</td>
</tr>
</tbody>
</table>

*Note.* To report accurate means of frequencies, responses of “Not applicable” and “Don’t know” were omitted from this data. As a result, $n$ has been reported to account for these omissions.
Higher Education Institution Characteristics: Research Question 3

The third research question addressed the characteristics of higher education institutions that offer online courses. The applicable survey questions related to information about type of institution and student enrollment. Participants provided information through multiple-choice responses.

Table 9
Type of Higher Education Institutions

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type of institution</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Two-year</td>
<td>11</td>
<td>17.7</td>
</tr>
<tr>
<td>Four-year</td>
<td>48</td>
<td>77.4</td>
</tr>
<tr>
<td>Technical or trade</td>
<td>2</td>
<td>3.2</td>
</tr>
<tr>
<td>Does not apply</td>
<td>1</td>
<td>1.6</td>
</tr>
<tr>
<td><strong>Profit status of institution</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Public</td>
<td>52</td>
<td>83.9</td>
</tr>
<tr>
<td>Private non-profit</td>
<td>8</td>
<td>12.9</td>
</tr>
<tr>
<td>Private for-profit</td>
<td>1</td>
<td>1.6</td>
</tr>
<tr>
<td>Does not apply</td>
<td>1</td>
<td>1.6</td>
</tr>
<tr>
<td><strong>Total student enrollment</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 999</td>
<td>4</td>
<td>6.5</td>
</tr>
<tr>
<td>1,000 – 2,999</td>
<td>2</td>
<td>3.2</td>
</tr>
<tr>
<td>3,000 – 9,999</td>
<td>13</td>
<td>21.0</td>
</tr>
<tr>
<td>More than 10,000</td>
<td>38</td>
<td>61.3</td>
</tr>
<tr>
<td>Don’t know</td>
<td>5</td>
<td>8.1</td>
</tr>
</tbody>
</table>

*Note.* Respondents reported total student enrollment for the previous term, which would have corresponded to spring 2021.
The demographics of higher education institutions included their classification and student enrollment, as shown in Table 9. The higher education institutions were classified primarily as 4-year, at 77.4%, with 2-year and technical or trade, respectively, following. Most institutions were described as public, at 83.9%, followed by private non-profit. Enrollment was classified in ranges, with most institutions reporting having more than 10,000 students (63%).

**Institutional Accessibility Practices: Research Question 4**

The fourth research question addressed the accessibility practices of the higher education institutions that employed the designers who participated in this survey. The applicable survey questions related to institutional online course programming in the following areas:

- general course practices;
- responsibility for creating, building, or selecting instructional content;
- responsibility for reviewing courses for accessibility compliance; and
- training and support for the development of accessible courses or content.

Participants provided information through a five-point frequency Likert scale. A numerical response of 1 represented a frequency of almost never or less than 10% of the time, while a 5 indicated almost always or more than 90% of the time. Participants were also provided with an option to indicate that they did not know or that the question was not applicable to them. In addition, one question included a multiple-choice format.

**General Online Course Practices.** The distribution of responses for institutional online course practices is shown in Figure 10, while the mean frequency is shown in Table 10. Institutions often offered online courses as a learning option \( M = 4.07, SD = \)
1.31). Institutional systems or policies were often used to ensure the accessibility of online courses ($M = 3.84, SD = 1.21$), and courses often included disability statements or policies in course syllabi or materials ($M = 4.17, SD = 1.55$). However, reviews of online courses for accessibility were only conducted less than half the time ($M = 2.80, SD = 1.49$).

**Figure 10**

Distribution of Frequency of General Institutional Online Course Accessibility Practices by Number of Responses

<table>
<thead>
<tr>
<th>General Online Accessibility Course Practice</th>
<th>$n$</th>
<th>Min</th>
<th>Max</th>
<th>$Mdn$</th>
<th>$Mode$</th>
<th>$M$</th>
<th>$SE$</th>
<th>$SD$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Offering of online courses*</td>
<td>59</td>
<td>1</td>
<td>5</td>
<td>5.00</td>
<td>5.00</td>
<td>4.07</td>
<td>.17</td>
<td>1.31</td>
</tr>
<tr>
<td>Using systems or policies</td>
<td>57</td>
<td>1</td>
<td>5</td>
<td>4.00</td>
<td>5.00</td>
<td>3.84</td>
<td>.17</td>
<td>1.29</td>
</tr>
<tr>
<td>Requiring course disability statements or policies</td>
<td>60</td>
<td>1</td>
<td>5</td>
<td>5.00</td>
<td>5.00</td>
<td>4.17</td>
<td>.20</td>
<td>1.55</td>
</tr>
<tr>
<td>Reviewing courses</td>
<td>50</td>
<td>1</td>
<td>5</td>
<td>3.00</td>
<td>1.00</td>
<td>2.80</td>
<td>.21</td>
<td>1.49</td>
</tr>
</tbody>
</table>

*Online courses refer to courses specifically designed to be delivered online (in whole or part) and not as an emergency response to the COVID-19 pandemic.

**Note.** Respondents reported the frequency of practices they had observed in the previous term, which would have corresponded to spring 2021. *Online courses refer to courses specifically designed to be delivered online (in whole or part) and not as an emergency response to the COVID-19 pandemic.*
Figure 11

*Distribution of Frequency of Designated Responsibility for Online Instructional Content by Number of Responses*

<table>
<thead>
<tr>
<th>Responsible Staff or Department</th>
<th>n</th>
<th>Min</th>
<th>Max</th>
<th>Mdn</th>
<th>Mode</th>
<th>M</th>
<th>SE</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faculty or instructor</td>
<td>61</td>
<td>1</td>
<td>5</td>
<td>5.00</td>
<td>5.00</td>
<td>4.36</td>
<td>.12</td>
<td>0.97</td>
</tr>
<tr>
<td>Instructional technologist or designer</td>
<td>53</td>
<td>1</td>
<td>5</td>
<td>3.00</td>
<td>2.00</td>
<td>2.74</td>
<td>.18</td>
<td>1.33</td>
</tr>
<tr>
<td>Administrator or leader</td>
<td>53</td>
<td>1</td>
<td>5</td>
<td>1.00</td>
<td>1.00</td>
<td>1.91</td>
<td>.17</td>
<td>1.24</td>
</tr>
<tr>
<td>Production staff</td>
<td>43</td>
<td>1</td>
<td>5</td>
<td>1.00</td>
<td>1.00</td>
<td>1.95</td>
<td>.19</td>
<td>1.27</td>
</tr>
<tr>
<td>Designated online course builders</td>
<td>46</td>
<td>1</td>
<td>5</td>
<td>2.00</td>
<td>1.00</td>
<td>2.41</td>
<td>.22</td>
<td>1.50</td>
</tr>
</tbody>
</table>

*Note.* Respondents reported the frequency of practices they had observed in the previous term, which would have corresponded to spring 2021. Responsibility refers to the staff or department accountable for creating, building, or selecting content for online courses.

Table 11

*Mean Frequency of Designated Responsibility for Online Instructional Content*

*Note.* To report accurate means of frequencies, responses of “Not applicable” and “Don’t know” were omitted from this data. As a result, n has been reported to account for these omissions. *Online courses refer to courses specifically designed to be delivered online (in whole or part) and not as an emergency response to the COVID-19 pandemic.*

Institutional Responsibility for Online Instructional Content. The distribution of responses for institutional online course practices is shown in Figure 11, while the
mean frequency is shown in Table 11. Responses in this section related to how often specific staff or departments were responsible for creating, building, or selecting content for online courses. Overall, institutions usually assigned this responsibility to faculty or instructors ($M = 4.36, SD = 0.97$). Instructional technologists or designers ($M = 2.74, SD = 1.33$) and designated online course builders ($M = 2.41, SD = 1.50$) were responsible for online course content less than half the time. Further, the administrators or leaders ($M = 1.91, SD = 1.24$) and production staff ($M = 1.95, SD = 1.27$) were the least likely to be responsible for online course content.

**Institutional Responsibility for Course Accessibility Review.** The distribution of responses for institutional responsibility of reviewing online courses for accessibility compliance is shown in Figure 11, while the mean frequency is shown in Table 11. Responses in this section related to how often specific staff or departments were responsible for reviewing online courses for compliance with accessibility guidelines. Overall, institutions usually assigned this responsibility to individuals more than half the time ($M = 3.69, SD = 1.48$).

**Figure 12**

*Distribution of Frequency of Designated Responsibility for Online Course Accessibility Review by Number of Responses*

<table>
<thead>
<tr>
<th></th>
<th>1 Almost never</th>
<th>2 Occasionally</th>
<th>3 Half the time</th>
<th>4 Often</th>
<th>5 Almost always</th>
<th>Not applicable</th>
<th>Don't know</th>
</tr>
</thead>
<tbody>
<tr>
<td>Institutional office or department*</td>
<td>16</td>
<td>11</td>
<td>4</td>
<td>6</td>
<td>11</td>
<td>2</td>
<td>12</td>
</tr>
<tr>
<td>Individual academic departments, schools, or colleges</td>
<td>17</td>
<td>7</td>
<td>7</td>
<td>9</td>
<td>7</td>
<td>1</td>
<td>14</td>
</tr>
<tr>
<td>Individuals**</td>
<td>7</td>
<td>9</td>
<td>5</td>
<td>11</td>
<td>26</td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

*Note.* Respondents reported the frequency of practices they had observed in the previous term, which would have corresponded to spring 2021. Responsibility refers to the staff or department accountable for reviewing online courses for accessibility compliance. *Such as departments for disability or distance education. **Such as faculty, instructional designers, compliance officers, or supervisors.
Table 12

Mean Frequency of Designated Responsibility for Online Course Accessibility Review

<table>
<thead>
<tr>
<th>Responsible Staff or Department</th>
<th>n</th>
<th>Min</th>
<th>Max</th>
<th>Mdn</th>
<th>Mode</th>
<th>M</th>
<th>SE</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Institutional office or department*</td>
<td>48</td>
<td>1</td>
<td>5</td>
<td>2.00</td>
<td>1.00</td>
<td>2.69</td>
<td>.23</td>
<td>1.60</td>
</tr>
<tr>
<td>Individual academic departments, schools, or colleges</td>
<td>47</td>
<td>1</td>
<td>5</td>
<td>2.00</td>
<td>1.00</td>
<td>2.62</td>
<td>.22</td>
<td>1.51</td>
</tr>
<tr>
<td>Individuals**</td>
<td>58</td>
<td>1</td>
<td>5</td>
<td>4.00</td>
<td>5.00</td>
<td>3.69</td>
<td>.19</td>
<td>1.48</td>
</tr>
</tbody>
</table>

Note. To report accurate means of frequencies, responses of “Not applicable” and “Don’t know” were omitted from this data. As a result, n has been reported to account for these omissions. *Such as departments for disability or distance education. **Such as faculty, instructional designers, compliance officers, or supervisors.

Accessibility Training and Support Offered by the Institution. Overall, respondents indicated that institutions did not require the completion of training to develop or deliver an online course (see Figure 13). The distribution of responses for institutional accessibility support and training is shown in Figure 11, while the mean frequency is shown in Table 11. Responses in this section related to how often specific types of accessibility training or support were offered to respondents in the previous term. Overall, institutions most frequently provided support or assistance ($M = 4.02$, $SD = 1.30$) and online resources ($M = 3.88$, $SD = 1.39$) to promote online course accessibility. External courses or workshops ($M = 2.07$, $SD = 1.37$) were the least frequently provided.
**Figure 13**

*Institutional Requirement to Complete Training to Develop or Deliver Online Courses*

![Pie chart showing the distribution of responses to institutional requirement to complete training for developing or delivering online courses.]

- **Yes**: 29.0% (n = 18)
- **No**: 61.3% (n = 38)
- **Don't know**: 9.7% (n = 6)

**Note.** Respondents reported the frequency of practices they had observed in the previous term, which would have corresponded to spring 2021. Support and training are in reference to accessibility compliance. *Specifically for the development of accessible online courses or content.*

**Figure 14**

*Distribution of Frequency of Institutional Accessibility Support and Training by Number of Responses*

<table>
<thead>
<tr>
<th>Service Type</th>
<th>1: Almost never</th>
<th>2: Occasionally</th>
<th>3: Half the time</th>
<th>4: Often</th>
<th>5: Almost always</th>
<th>Not applicable</th>
<th>Don't know</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mentoring program</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Internal course or workshop</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>External course or workshop</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Online resources</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Support or assistance*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. Respondents reported the frequency of practices they had observed in the previous term, which would have corresponded to spring 2021. Support and training are in reference to accessibility compliance. *Specifically for the development of accessible online courses or content.*
Table 13

Mean Frequency of Institutional Accessibility Support and Training

<table>
<thead>
<tr>
<th>Accessibility Support or Training</th>
<th>n</th>
<th>Min</th>
<th>Max</th>
<th>Mdn</th>
<th>Mode</th>
<th>M</th>
<th>SE</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mentoring program</td>
<td>51</td>
<td>1</td>
<td>5</td>
<td>2.00</td>
<td>2.00</td>
<td>2.57</td>
<td>.19</td>
<td>1.38</td>
</tr>
<tr>
<td>Internal course or workshop</td>
<td>61</td>
<td>1</td>
<td>5</td>
<td>4.00</td>
<td>5.00</td>
<td>3.61</td>
<td>.19</td>
<td>1.49</td>
</tr>
<tr>
<td>External course or workshop</td>
<td>45</td>
<td>1</td>
<td>5</td>
<td>2.00</td>
<td>1.00</td>
<td>2.07</td>
<td>.20</td>
<td>1.37</td>
</tr>
<tr>
<td>Online resources</td>
<td>60</td>
<td>1</td>
<td>5</td>
<td>5.00</td>
<td>5.00</td>
<td>3.88</td>
<td>.18</td>
<td>1.39</td>
</tr>
<tr>
<td>Support or assistance*</td>
<td>58</td>
<td>1</td>
<td>5</td>
<td>5.00</td>
<td>5.00</td>
<td>4.02</td>
<td>.17</td>
<td>1.30</td>
</tr>
</tbody>
</table>

Note. To report accurate means of frequencies, responses of “Not applicable” and “Don’t know” were omitted from this data. As a result, n has been reported to account for these omissions. *Specifically for the development of accessible online courses or content.

Exploratory Factor Analysis (EFA)

An EFA is used to identify latent variables or clusters of variables (Field, 2013).

The EFA with a principal axis factoring extraction and Promax rotation was used to analyze associations between 29 Likert-scale items. Suitability for factorization was tested using Bartlett’s test of sphericity (Cohen et al., 2011). The Kaiser-Meyer-Olkin (KMO) procedure was used to measure sampling adequacy (Cohen et al., 2011).

Associations Amongst Surveyed Items: Research Question 5

Research question 5 addresses the associations, or factor structures, amongst the surveyed characteristics and accessibility practices. This analysis included two sub questions that analyzed the extent to which institutions’ and designers’ characteristics and practices contributed to the identified factor structures. The analysis was conducted on a
data set of 29 Likert-scale items that excluded answers of “Not applicable” and “Don’t know.”

**Assumptions of the EFA.** The assumptions for an EFA, including normality, linearity, sampling adequacy, and capability of being factored, were checked (Cohen et al., 2011). During this analysis, Cronbach’s alpha, $\alpha$, was calculated to determine the reliability of the survey (Field, 2013). Suitability for factorization was tested using Bartlett’s test of sphericity and the KMO measure of sampling adequacy (Cohen et al., 2011). To test the assumptions, an EFA with PAF and Promax oblique rotation was conducted on 29 Likert-scale items. Missing values were replaced with means.

**Normality.** Likert-scale data is ordinal and therefore not suitable for parametric tests based on normality of the data (Allen & Seaman, 2007). An EFA using principal axis factoring is recommended for analysis when multivariate normality cannot be satisfied (Osborne et al., 2008).

**Linearity.** The assumption of linearity was evaluated through a review of the correlation matrix. This review consisted of checking that each variable correlated with at least one other variable with an $r \geq 0.3$. All Likert-scale variables met this requirement, and this assumption was met.

**Sampling Adequacy.** The KMO procedure was used to measure adequacy of the sample (Cohen et al., 2011). In the initial analysis, the overall KMO value was 0.58, which is considered miserable (Kaiser, 1974). Anti-image matrices were reviewed for any individual KMO values below 0.50, and these variables were removed from the analysis (Laerd Statistics, 2015). The five variables removed from the analysis were the following:
• Institution requires a disability statement or policy,
• Individuals are responsible for reviewing online courses or accessibility,
• The institution offers external courses or workshops as a training support,
• Designers use multimedia, and
• Designers use videos that include captions.

The analysis was rerun. The resulting KMO was 0.66, which is considered mediocre (Kaiser, 1974). For KMOs between 0.5 and 0.6, the researcher can determine whether the sampling adequacy is appropriate with caution (Glen, 2016). Due to the small sample size, the sampling adequacy was considered adequate for this exploratory study. This assumption was met.

**Suitability for Factorization.** Suitability for factorization was tested using Bartlett’s test of sphericity, which was significant ($\chi^2 [276] = 351.04, p = .001$). This assumption was met.

**Factorization.** The factor structure analysis was based on an EFA with a principal axis factoring extraction and Promax oblique rotation conducted on 24 Likert-scale items from the survey. The factor structures were reviewed based on eigenvalues and a scree test.

**Determination of Factors to Retain.** Only factors with eigenvalues greater than one were considered for the factor structure according to the Kaiser criterion (Cohen et al., 2011; Kaiser, 1958). Five potential factors had eigenvalues that exceeded Kaiser’s criterion of 1 and represented 53.3% of the variance, as shown in Table 14.

As shown in Figure 15, the scree plot inflection indicated that two factors should be retained (Hair et al., 2006). As a result, the analysis was rerun to retain only two
factors (Whitley, 2002). The rotated factors accounted for 32.8% of the variance, as shown in Table 15.

**Table 14**  
*Total Variance for Factors Considered for Retention Based on Eigenvalue*

<table>
<thead>
<tr>
<th>Factor</th>
<th>Initial Eigenvalue</th>
<th>% of Variance</th>
<th>Rotated Eigenvalue</th>
<th>% of Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5.31</td>
<td>22.12</td>
<td>4.95</td>
<td>20.64</td>
</tr>
<tr>
<td>2</td>
<td>3.83</td>
<td>15.94</td>
<td>3.43</td>
<td>14.28</td>
</tr>
<tr>
<td>3</td>
<td>2.11</td>
<td>8.81</td>
<td>1.79</td>
<td>7.46</td>
</tr>
<tr>
<td>4</td>
<td>1.90</td>
<td>7.93</td>
<td>1.49</td>
<td>6.19</td>
</tr>
<tr>
<td>5</td>
<td>1.42</td>
<td>5.90</td>
<td>1.13</td>
<td>4.70</td>
</tr>
<tr>
<td>6</td>
<td>1.21</td>
<td>4.43</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>1.06</td>
<td>4.43</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note.* Only factors with eigenvalues greater than 1 are shown.

**Figure 15**  
*Scree Plot of Factors Based on Eigenvalues*
Determination of Factor Solutions. Once the number of factors was determined, factor loadings ≥ .5 were used to identify structures with at least five factors that were not duplicated in multiple structures (Costello & Osborne, 2005; de Winter et al., 2009; Guadagnoli & Velicer, 1988). When factor loadings are negative, the absolute value is used to determine inclusion (Asnawi et al., 2012). In addition, negative factor loadings are interpreted in the opposite direction (Asnawi et al., 2012).

The first factor structure retained nine variables, and the second structure retained five variables based on a rotated factor loading above an absolute value of .5. These factor structures met the requirements for low sample sizes. Table 15 shows the factor loadings and communalities after rotation. See Appendix S for a report of all unrotated and rotated factor loadings and communalities.

The communalities were also examined to ensure appropriateness given the small sample size. The range of communalities was from .25 to .50, which represents a wide pattern (Mundfrom et al., 2005). Based on a ratio of variables per factor, a good sample size based on two factors ranges between 40 and 60 participants (Mundfrom et al., 2005). Given these parameters, the adequacy of the sample size for this analysis was verified.

The variables clustered on factor 1 suggest a thematic association in which accessibility is impacted by the institution’s distribution of responsibility for creating and reviewing accessible online course content while also providing training and support. Therefore, factor 1 has been designated as Institutional Accessibility Support.
Table 15

*Summary of Factor Loadings Based on 24 Likert-Scale Items (N = 62)*

<table>
<thead>
<tr>
<th>Variables</th>
<th>Factor Loading</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td><strong>Institutional Distributes Responsibility and Provides Support</strong></td>
<td></td>
</tr>
<tr>
<td>Institutional office or department responsible for reviewing</td>
<td>.711</td>
</tr>
<tr>
<td>online courses for accessibility*</td>
<td></td>
</tr>
<tr>
<td>Online course builders responsible for online course development*</td>
<td>.626</td>
</tr>
<tr>
<td>Institution reviews online courses for accessibility*</td>
<td>.608</td>
</tr>
<tr>
<td>Internal course or workshop provided as training support*</td>
<td>.577</td>
</tr>
<tr>
<td>Instructional technologist or designer responsible for online course</td>
<td>.536</td>
</tr>
<tr>
<td>development*</td>
<td></td>
</tr>
<tr>
<td>Administrator or leader responsible for online course development*</td>
<td>.517</td>
</tr>
<tr>
<td>Online resources provided as training support*</td>
<td>.514</td>
</tr>
<tr>
<td>Mentoring program provided as training support*</td>
<td>.513</td>
</tr>
<tr>
<td>Individual academic department, schools, or college review</td>
<td>.505</td>
</tr>
<tr>
<td>online courses for accessibility*</td>
<td></td>
</tr>
<tr>
<td><strong>Accessibility Compliance Supported by Resources</strong></td>
<td></td>
</tr>
<tr>
<td>Designers used tables that contained headers**</td>
<td>.673</td>
</tr>
<tr>
<td>Designers used documents with proper text formatting styles**</td>
<td>.664</td>
</tr>
<tr>
<td>Access to tools or software was considered a limitation*</td>
<td>-.581</td>
</tr>
<tr>
<td>Courses complied with accessibility guidelines**</td>
<td>.560</td>
</tr>
<tr>
<td>Budgets were considered a limitation*</td>
<td>-.517</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Eigenvalue</th>
<th>4.66</th>
<th>3.21</th>
</tr>
</thead>
<tbody>
<tr>
<td>% of variance</td>
<td>19.42</td>
<td>13.39</td>
</tr>
</tbody>
</table>

*Note. h^2 = communality for rotated factors. Loadings < .5 suppressed. Factors converged after three iterations. Extraction used principal axis factoring with a Promax rotation. *Institutional practices **Course designer practices.*
On the other hand, the variables loaded onto factor 2 suggest an association between online courses complying with accessibility guidelines and sufficient resources. As a result, factor 2 has been designated as Accessibility Compliance Support. Based on the negative factor loading of the limitations, these have been interpreted as resources consistent with the recommendations by Asnawi et al. (2012).

**Designers’ Practices Identified in Factor Structures.** The first sub question explored the extent to which the practices of online course designers contributed to the identified factor structures. Of the 14 variables that comprised the two factor structures identified within the EFA, only three variables corresponding to designer practices contributed to the second factor solutions (see Table 15 and Figure 16). The second identified factor structure from the analysis was designated as resource support for online course compliance. This factor structure consisted of five associated variables. The following designer practices contributed to this solution:

- tables that contain headers,
- documents with proper text formatting styles, and
- courses that comply with accessibility guidelines.

**Institutional Practices Identified in Factor Structures.** The second sub question explored the extent to which the practices of the institution contributed to the identified factor structures. Of the 14 variables that comprised the two factor structures identified within the EFA, 11 variables corresponding to institutional practices contributed to both factor solutions (see Table 15 and Figure 16).
Figure 16

*Distribution of Designer and Institutional Variables for Each Factor Structure*

<table>
<thead>
<tr>
<th>Number of Variables</th>
<th>Factor 1: Institutional Accessibility Support</th>
<th>Factor 2: Accessibility Compliance Support</th>
</tr>
</thead>
<tbody>
<tr>
<td>Designer Practices</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Institutional Practices</td>
<td>9</td>
<td>2</td>
</tr>
</tbody>
</table>

Factor 1 was designated as institutional support for accessible online course practices. All nine factors that comprised the factor 1 solution were related to institutional practices. Factor 2 was designated as resource support for online course compliance. Of the five variables that comprised Factor 2, two of them related to instructional practices.

**Summary**

Chapter Four included a description of the data analysis procedures used to answer the research questions of the study. Descriptive statistics were presented in response to the first four research questions, which addressed the institutional and designers’ characteristics and accessibility practices. Demographic data for institutions and designers was reported as a component of these questions.

Respondents had an average age of 44.07 and 10 years of experience teaching in higher education. Participants had taught online an average of 6.84 years and had 5.3
years of supporting online higher education programs non-instructionally. Course
designers reported that they almost always use some type of multimedia in their online
courses. Designers reported using accessible practices half the time or more. Course
designers reported that time was the most limiting factor in implementing accessibility.

Respondents worked primarily at public 4-year higher education institutions with
enrollments of more than 10,000 students. Most institutions regularly offered online
courses and had systems or policies to ensure the accessibility of online courses.
Individuals, specifically instructors and faculty, were most often responsible for
developing online course content and ensuring its accessibility. While most institutions
offered training and support for accessibility, it was often not required.

This descriptive analysis was followed by an EFA with principal axis factoring
and Promax rotation. This analysis addressed research question 5 and revealed two
factors. Factor 1 revealed a thematic association in which accessibility is impacted by the
institution’s distribution of responsibility for creating and reviewing accessible online
course content while also providing training and support. Factor 2 suggested an
association between online courses complying with accessibility guidelines coupled with
sufficient resources. Institutional practices comprised most variables contributing to both
factor structures.

In Chapter Five, the key findings are presented. Next, the contributions of this
study in connection to the literature are discussed. Then, the implications and
recommendations for practice are summarized. Finally, the limitations and
recommendations for future research are presented.
CHAPTER V

Discussion

The purpose of this descriptive quantitative survey study was to explore the relationship between various characteristics that may contribute to accessibility knowledge, practices, and support in higher education online courses. Specifically, characteristics comprise the factors of demographic data, knowledge about accessibility, implementation practices, and available training and support. This study surveyed designers including faculty, instructional designers, and those who provide accessibility support for online courses in U.S. higher education. The analysis of and the relationship between factors was based on previous studies that identified constructs that may impact accessibility implementation in higher education online courses (Frey & King, 2011; Huss & Eastep, 2016). The associations amongst factors were used to develop future testable hypotheses regarding accessibility practices within online higher education (Rindskopf, 2011).

Chapter Five includes key findings from the analysis for each research question. Then, the contributions of this research are explored with a discussion of the relationship between the findings and the literature. Next, implications and recommendations for future research are considered. Finally, limitations of the findings are presented.

Key Findings

This study consisted of five research questions designed to extend existing research on institutions and designers’ characteristics for delivering online higher education courses and their accessibility practices. The goal of this study was to provide
an updated view of overall accessibility practices and perceptions within higher education online course design and explore the relationships between them.

A survey instrument consisting of 41 questions solicited information about designers and institutions in two areas. First, data was collected about the characteristics and relevant demographic data for designers and their institutions. Second, information regarding the accessibility practices for each was gathered. A descriptive data analysis was used to answer the first four research questions.

The fifth research question addressed the associations, or factor structures, amongst the surveyed characteristics and accessibility practices. An exploratory factor analysis was used to identify latent variables or clusters of variables. This analysis was conducted on 29 Likert-scale items included in the survey.

**Designer Characteristics: Research Question 1**

The first research question addressed the characteristics of designers who are responsible for implementing accessibility in higher education settings. The applicable survey questions related to gender, age, role, and years of experience. Participants provided information through multiple-choice and write-in responses.

Most respondents who participated in this study identified as female, with an average age of 44 years old. Participants indicated that they had an average of 5 years of experience supporting online programs in a non-instructional capacity. They also indicated an average of almost 7 years teaching online higher education courses and an average of 10 years teaching in higher education. Since most respondents indicated that their primary role was faculty, instructor, or instructional designer, the high rate of experience reported is understandable.
These results indicated that participants in this sample were more likely to be familiar with accessibility and institutional practices regarding online courses that course designers with less experience. In addition, the overall findings of this study will not be representative of all potential online course contributors.

The results of this study support previous research that indicated that faculty and instructional designers are typically responsible for online course accessibility (K. C. Green, 2010b, 2019; Online Learning Consortium & WICHE Cooperative for Educational Telecommunications [OLC & WCET], 2019). Other studies, however, have not reported information regarding the experience level of respondents.

**Designers’ Accessibility Practices: Research Question 2**

The second research question addressed the accessibility practices used by designers in higher education online courses. The applicable survey questions related to designers’ individual accessibility practices and limitations they had experienced. Overall, the findings indicate growth in the implementation of accessible course design practices. While there are still barriers to accessibility, many are reporting fewer limitations and more resources.

**Individual Accessibility Practices.** Course designers overwhelmingly reported using some type of multimedia in their online courses, which highlights the relevance of accessibility. Since many course designers have experience supporting and teaching online courses, it is appropriate for course designers to be familiar with basic accessibility practices. As a result, it is appropriate for designers to employ fundamental accessible practices related to text formatting, images, and videos. However, it is concerning that other accessible practices such as including transcripts with videos, complying with
overall accessibility guidelines, and using accessibility evaluation tools are practiced only half the time. This implies that designers are familiar with accessible practices and that they tend to use the ones that are easier to implement with greater frequency.

These findings corroborate previous studies. Compared to the findings of the 2016 Huss and Eastep survey, these results indicate that there has been growth in the use of multimedia and accessible practices. This progress, however, is not surprising given the growth trend of distance education offerings (Seaman et al., 2018). The Huss and Eastep (2016) survey indicated that most participants were not or did not know whether they were using accessible media practices. This study indicates that most respondents knew about accessibility practices and that they implemented them with far greater frequency.

These findings are corroborated by Mancilla and Frey (2021a), who updated the findings of the original 2011 Frey and King survey. Mancilla and Frey also reported a high frequency of the implementation of the accessible practices discussed in this study. In addition, they found that most of these practices were considered medium to low effort, while practices such as including transcripts were deemed high effort (Mancilla & Frey, 2021a). This suggests that course designers are more likely to implement practices that require less effort.

**Limitations in Implementing Accessibility Practices.** Course designers reported that time was the most limiting factor in implementing accessibility, but only about half the time. Respondents appeared to be split regarding the perceived impact of the other potential limitations, which included accessibility knowledge, access to tools and software, and budgetary resources. A large number of respondents reported that these
limitations rarely affected them, while a similar amount felt that their accessibility practices were often or always impacted by them.

The findings of this study suggest that these common barriers to accessibility implementation are being reduced, which is a marked change from previous studies. When looking at the literature, costs, resources, and time were often cited in earlier studies as barriers to accessibility implementation (Frey & King, 2011; Galusha, 1998; Linder et al., 2015; Rowland et al., 2014). The findings of this study suggest that these common barriers to accessibility implementation are no longer perceived as a limitation to the same degree. Although the reason for why these barriers may not be as limiting cannot be inferred from this study, recent findings may shed light on the subject. Mancilla and Frey (2020) recently reported that 27% of institutions have designated a portion of their budget to digital accessibility. This implies that some institutions are allocating resources to support accessible course design, which may account for more designers not experiencing these types of limitations. However, these barriers still exist for some.

**Higher Education Institution Characteristics: Research Question 3**

The third research question addressed the characteristics of higher education institutions that offer online courses. The applicable survey questions related to information about type of institution and student enrollment. Participants provided information through multiple-choice responses.

Most participants in this study worked for public, four-year higher education institutions with enrollments of more than 10,000 students. This pattern is consistent with patterns reported in other recent accessibility surveys (Mancilla & Frey, 2020, 2021a,
Mancilla and Frey (2021a) reported that 46% of institutions have an enrollment higher than 10,000. This indicates that the sample of this study, although smaller, is comparable to samples used in previous research on this topic.

**Institutional Accessibility Practices: Research Question 4**

The fourth research question addressed the accessibility practices of the higher education institutions that employ the designers who participated in this survey. The applicable survey questions related to institutional online course practices and support.

In general, the findings of this study are consistent with other research in this area by Frey and King (2011) and Mancilla and Frey (2020). While faculty and instructional designers are still largely responsible for accessibility practices, the results indicate a growing role of the institution in accessibility practices through policy, training, and support.

**General Online Course Practices.** The survey results showed that online courses are frequently offered as a learning option. In addition, institutions often use systems or policies to ensure course accessibility, and they often require the inclusion of a disability statement or policy in course syllabi or materials. However, institutions are only responsible for conducting accessibility course reviews less than half the time.

The increased inclusion of online courses is in line with the growth of distance education offerings (Seaman et al., 2018). Further, most U.S. universities shifted instruction online due to COVID-19, and many were still operating online to some degree during spring 2021 (Miller, 2021). This study was conducted during the summer of 2021, and participants were asked to respond based on their experiences in the previous term.
This survey specifically asked participants to focus on practices used for intentionally designing online courses, and not those created in response to the COVID-19 pandemic.

In 2011, Frey and King reported that most institutions were aware of their responsibility to provide accessible online courses, but few institutions had anyone designated to enforce accessibility standards (Frey & King, 2011). In 2020, Mancilla and Frey reported updated findings for this survey that indicated that 13% of institutions still did not have a person responsible for accessibility (Mancilla & Frey, 2020). Faculty and instructional designers were most frequently responsible for reviewing online courses for accessibility, while institutional responsibility greatly varies (Mancilla & Frey, 2020). As such, the findings of this study on the frequency of institutions being responsible for online course accessibility are likely accurate.

**Institutional Responsibility for Online Instructional Content.** Results in this section related to how often specific staff or departments were responsible for creating, building, or selecting content for online courses. Overall, institutions usually assigned this responsibility to faculty or instructors, while instructional technologists or designers and designated online course builders were responsible for online course content less than half the time.

Since instructional content is typically the purview of the instructor, it is not surprising that they are responsible for creating, building, or selecting content online content. While instructional technologists or designers and designated online course builders were reported to be involved less than half the time, it is encouraging that faculty may have access to additional personnel when building online courses.
**Institutional Responsibility for Course Accessibility Review.** Responses in this section related to how often specific staff or departments were responsible for reviewing online courses for compliance with accessibility guidelines. Overall, institutions usually assigned this responsibility to individuals more than half the time. While a specific person may be responsible for accessibility compliance, this signifies that this responsibility is rarely considered the purview of an entire institutional department. Moreover, this question solicited the most “Don’t know” answers from respondents, which indicates that university employees may not even be aware of institutional practices in this area.

According to Mancilla and Frey (2020), faculty and instructional designers are most frequently responsible for reviewing online courses for accessibility, which corroborates the findings of this study. While institutional responsibility greatly varies, many institutional departments have varying roles in overseeing accessibility of online courses (Mancilla & Frey, 2020). As such, the findings of this study on the extent to which institutions are involved with online course accessibility is likely accurate.

**Accessibility Training and Support Offered by the Institution.** Overall, respondents indicated that institutions offer course accessibility and training, but do not require completion to develop or deliver and online course. Generally, institutions most frequently provide training in the form of online resources, internal courses, and internal workshops.

In addition, this survey showed that institutions frequently provide support or assistance in developing accessible online courses. The availability of this type of support confirms survey findings that instructional technologists and designers are frequently
responsible for creating, developing, or selecting accessible instructional content. It also corroborates that they are frequently responsible for reviewing courses for accessibility.

The results of this study are upheld by Mancilla and Frey’s 2021 survey on accessibility and professional development. They found that 76% of institutions offered some type of accessibility training. They also reported that internal courses and online resources were the most frequently provided form of training.

One study showed that accessibility training was conducted by half of the surveyed institutions and that these trainings were more likely to be offered by larger institutions (OLC & WCET, 2019). However, the 2011 Frey and King revealed that only 13% of institutions required accessibility training. While current findings are consistent with the literature, the findings indicate that more institutions than before are requiring accessibility training as a condition of developing or teaching online courses.

**Associations Amongst Surveyed Items: Research Question 5**

Research question 5 addressed the associations, or factor structures, amongst the surveyed characteristics and accessibility practices. This analysis included two sub questions that analyzed the extent to which institutional and designers’ characteristics and practices contributed to the identified factor structures.

**Factor Solutions of this Study.** The exploratory factor analysis revealed the presence of two factor structures. Factor 1 suggested a thematic association in which accessibility is impacted by the institution’s distribution of responsibility for creating and reviewing accessible online course content while also providing training and support. Factor 1 was designated as Institutional Accessibility Support. On the other hand, the variables loaded onto Factor 2 suggested an association between online courses
complying with accessibility guidelines coupled with sufficient resources. Factor 2 was designated as Accessibility Compliance Support.

**Figure 17**

*Institutional Versus Designer Practices Contributing to the Factor Solutions*

**Note.** 1Variables contributing to Factor 1: Institutional Accessibility Support. 2Variables contributing to Factor 2: Accessibility Compliance Support.

**Contributing Extent of Institutional and Designer Practices.** The distribution of institutional and designer practices contributing to the factor solutions is shown in Figure 17. As depicted, institutional practices contribute heavily to the variables associated with accessibility compliance. However, the results also indicated that there is an association between course designers who engage in accessible course design and access to tools, software, or budgetary resources. These findings imply that the
institutions can positively influence accessibility practices of individual course designers. Further, this suggests that while designers contribute to the accessibility of individual courses, this accessibility may not always extend to all courses across an institution.

**Reliability and Validity of the Survey Instrument**

Many measures were taken during the design of this study to ensure the reliability and validity of the survey instrument. Because the survey instrument was adapted from existing instruments, there was a higher likelihood that the instrument would be reliable and valid. Although validity and reliability were established through several methods, the results were the key to establishing external validity. The findings of this study are consistent with those reported in the literature (Frey & King, 2011; Huss & Eastep, 2016; Mancilla & Frey, 2020, 2021a, 2021b).

Reliability is established through Cronbach’s alpha, $\alpha$, and is considered appropriate for Likert scales (Cohen et al., 2011; Field, 2013; Kimberlin & Winterstein, 2008; Whitley, 2002). While the minimum coefficient is usually .70 or higher, a Cronbach’s $\alpha$ of .60 or above is allowable for exploratory studies (Straub et al., 2004). Validity measures included a multitude of techniques to reduce bias and increase the accuracy of the data (Cohen et al., 2011). The instrumentation was carefully designed to mitigate common validity issues in survey research, as summarized in Table 3.

Accordingly, this survey instrument can be used in future studies with a certain measure of confidence.

**Sampling Adequacy of This Study**

The small sample size of this study was not ideal because it can impact error, reliability (Cohen et al., 2011; Field, 2013; Osborne et al., 2008; Whitley, 2002). As a
result, stricter analysis protocols were used to create conditions under which a small sample would be adequate (Guadagnoli & Velicer, 1988). Still, the generalizability of the results was severely limited. However, this survey was adapted from existing survey instruments, which meant that the results could be compared to existing data on the subject. The first four research questions used similar forms of analysis and reporting to those previously used by Huss and Eastep (2016) and Frey and King (Frey & King, 2011).

For the fifth research question, the Kaiser-Meyer-Olkin (KMO) procedure was used to measure adequacy of the sample (Cohen et al., 2011). To ensure accuracy, variables were removed from the analysis per established practices (Kaiser, 1974; Laerd Statistics, 2015). The resulting KMO statistic was considered adequate with caution in interpretation of the results (Glen, 2016; Kaiser, 1974). For KMO statistics between 0.5 and 0.6, the researcher can determine whether the sampling adequacy is appropriate with caution (Glen, 2016).

Because the findings of this study are consistent with those reported in the literature (Frey & King, 2011; Huss & Eastep, 2016; Mancilla & Frey, 2020, 2021a, 2021b), the sampling size of this study was likely adequate. Consequently, there is a greater likelihood that the exploratory factor analysis results are trustworthy.

**Contributions and Connection to the Literature**

There have been many studies that have reported on the frequency of institutional and course designer practices regarding accessibility. The findings of this study support the research (Frey & King, 2011; Huss & Eastep, 2016; Mancilla & Frey, 2020) and collectively show a positive trend in awareness about accessibility and the increased use
of accessible design in online courses. This study also corroborates previous research by Mancilla and Frey (2020) showing that institutions are implementing more policies, support, and resources toward accessibility.

Accessibility policies have previously signaled an increase of some accessible practices (Thompson et al., 2013). However, no known studies have explored how a variety of institutional and designer practices may be associated to impact the accessibility of online courses. This analysis indicated that institutional practices may have a major role in accessible course design. While previous studies have suggested potential links (Frey & King, 2011; Huss & Eastep, 2016; Mancilla & Frey, 2020, 2021b), this study specifically identified four areas of further exploration.

Current research indicates that institutions with accessibility policies that clearly outline practices, procedures, roles, and responsibilities are taking a critical first step in developing an organizational commitment to accessible design (Mancilla & Frey, 2020). However, creating an institutional culture committed to accessibility is predicated on strong leadership, cross-departmental collaboration, and resource prioritization (Mancilla & Frey, 2020). The results of this study suggest that there may be a link between institutions that offer training, support, and resources and designers who are developing more accessible online courses. Combined with previous findings, the results of this study offer specific areas in which institutions should consider increasing leadership, collaboration, and resources.

**Implications and Recommendations for Practice**

Next, implications and recommendations for future research are considered. The findings of this study indicate that progress is being made in accessible design of online
courses. This is the first known study that has attempted to determine whether any variables measuring accessibility practices are statistically associated in some way.

Although the sampling size used for this study limits the generalizability of results, the consistency of the descriptive analysis with previous research on this topic is encouraging. Therefore, the findings from the exploratory factor analysis are worthy of further analysis in future studies. This study found two factors that impact accessible online course practices: institutional accessibility support and accessibility compliance support. Institutional practices contributed heavily to these factor structures, which implies that improved accessibility practices at the institutional level could lead to more accessible online courses.

This analysis identified four specific areas on which institutions could focus their efforts. The first area addresses how the institution handles reviewing online courses for accessibility compliance. The second area concerns institutional responsibility for who is responsible for the development of online course materials. The third area is related to the accessibility training and support provided, and the fourth area concerns the resources that support accessible design.

In addition, the analysis identified two types of designer practices that were also associated with accessible design of online courses. These areas included specific accessible practices for online content and course compliance. Based on the demographics and experience levels of the sample comprising this study, it is possible that the designers participating in this study were able to benefit from and apply accessibility practices from previous training.
While individual designer practices are important, they are a function of institutional practices. Consistent with the theoretical framework used in this study, the findings indicate that institutional practices contribute more to accessibility than those of individual designers. From a systems perspective, the institutional culture translates into changes within systems, experiences, processes and artifacts (Hemphill et al., 2019; Moore & Kearsley, 2012; Tamim, 2020; Warr et al., 2020). In this case, the institution’s culture regarding accessibility would impact the accessible design of online courses through practices at every level. As a result, it is unsurprising changes to institutional practices are suggested in recent research. As such, Mancilla and Frey (2020) recommended that institutions should clearly outline practices, procedures, roles, and responsibilities. They also suggested that accessibility is predicated on strong leadership, cross-departmental collaboration, and resource prioritization (Mancilla & Frey, 2020). In a related study, they also found that course developers were most likely to implement accessibility practices that required a medium to low effort (Mancilla & Frey, 2021a).

Considered collectively with recent research in this area, five recommendations at the institutional level are provided. First, institutions should have staff dedicated to reviewing online courses for accessibility to ensure compliance and consistency. Second, institutions should allocate staff to support the development of accessible online course content, especially for accessibility practices that require a higher level of effort such as captioning or creating transcripts. Third, institutions should require the completion of accessibility training to create and deliver online courses. Fourth, institutions should allocate specific budgetary resources for tools and software needed by course designers to support accessibility practices. Lastly, institutions should provide online course designers
with clear guidelines that include how to find support for creating accessible content. For example, guidance could specify that all videos used in an online course should contain captions and transcripts. In addition, this guidance could include how to access institutional support to effectively implement this practice.

**Limitations**

Finally, limitations of the findings are presented. This descriptive quantitative survey study aimed to explore the characteristics of institutions and individuals responsible for implementing accessibility within online higher education courses. While the results of this study clarified potential associations amongst surveyed constructs, these results only provide an estimate of a pattern of associations that cannot be generalized into models or inferences about those relationships (Costello & Osborne, 2005; Hoyle & Duvall, 2011; Tinsley & Tinsley, 1987). A confirmatory analysis is the next step in establishing generalizability (Costello & Osborne, 2005).

Based on the small sample size of this study, the results of this study are not generalizable to the larger population. Participants were recruited from an instructional designer professional organization and through social media using hashtags targeting instructional designers and accessibility. Accordingly, survey respondents likely had some familiarity and interest in the topic of accessibility within online education. The demographics of the respondents also indicated that this analysis might have been limited to course designers with more than 5 years of online course experience. Further, participation was limited to qualifying U.S. respondents. Therefore, this sample cannot be considered a representative sample.
Reliability and validity limitations associated with self-administered, web-based surveys were addressed through the research design. This study provided evidence to support the reliability and validity of the adapted survey instrument used, which included results consistent with related research. However, the small sample size may have affected these results.

**Recommendations for Future Research**

Due to the exploratory nature of this study, a follow-up confirmatory analysis study with a large sample size is recommended. With additional data and a larger sample size, additional analyses are also recommended. Specifically, future research should consider the relationship between the experience level of course designers and their accessibility practices. In addition, the relationship between institutional characteristics and course designer practices should also be considered. The impact of accessibility tools should also be considered, as these are a fairly new resource for institutions and designers. Future studies could also consider exploring the factors that contribute to some course designers experiencing more barriers to implementing accessible design compared to others.

**Summary**

Chapter Five included key findings from the analysis for each research question. Overall, the descriptive findings indicate growth in the implementation of accessible course design practices. While there are still barriers to accessibility, many are reporting fewer limitations and more resources. Faculty and instructional designers are still largely responsible for accessibility practices, and the results indicate a growing role of institutions through policy, training, and support.
The results from this exploratory factor analysis revealed the presence of two factor structures. Factor 1 focused on institutional accessibility support, and Factor 2 centered on accessibility compliance support. Although no models or inferences can be made from these associations, they do suggest that institutional accessibility practices may be related to accessible course design.

Key findings were followed by a discussion of the contributions of this research and its relationship between the findings and the literature. In general, the results of this study were consistent with current research on accessibility practices within higher education. These results suggest that the adapted survey instrument used in this study is reliable and valid and can be used in future studies. Most significantly, however, are the contributions of this study to accessibility research. While many studies have provided descriptive analysis on the topic, no known studies have explored the associations between institutional and designer accessibility practices. As a result, this study has provided research-based areas of focus for practical application and future research.

Next, implications and recommendations for future research were considered. Although the sampling size used for this study limits the generalizability of results, the findings from the exploratory factor analysis found two factors that impact accessible online course practices: institutional accessibility support and accessibility compliance support. Institutional practices contributed heavily to these factor structures, which implies that improved accessibility practices at the institutional level could lead to more accessible online courses. Therefore, the findings from the exploratory factor analysis are worthy of further analysis in future studies.
Finally, limitations between implication for practice and recommendations for future research were presented. The primary limitations of this study were the small sample size and exploratory design. The results of this study clarified potential associations amongst surveyed constructs; however, these results only provide an estimate of a pattern of associations that cannot be generalized into models or inferences about those relationships (Costello & Osborne, 2005; Hoyle & Duvall, 2011; Tinsley & Tinsley, 1987). A confirmatory analysis is the next step in establishing generalizability (Costello & Osborne, 2005).
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### APPENDIX A

**Survey Protocol Matrix for Initial Draft Instrument**

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<th>Research Question 2</th>
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<td>Q14</td>
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<td>Q15</td>
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<td>Q19</td>
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<td>Q20</td>
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<td>Q24</td>
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<td>Q25</td>
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<td>Q26</td>
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<td>Q27</td>
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<td>Q28</td>
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<td>Q29</td>
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<td>Q30</td>
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<td>X</td>
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<tr>
<td>Q31</td>
<td></td>
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<td>X</td>
</tr>
</tbody>
</table>
APPENDIX B

Initial Draft Survey Instrument

Survey on Accessibility Knowledge, Practices, and Support in U.S. Online Higher Distance Education

Informed Consent

The purpose of this survey is to explore the characteristics of institutions and designers delivering online higher education courses and programs and their accessibility practices. This research is not expected to pose any risk to any of the volunteer participants. Any data obtained from you will only be used for study purposes, and under no circumstances will you or any other respondents who participated in this research be identified.

Your survey responses will be kept confidential to the extent of the technology being used. Qualtrics collects IP addresses for respondents to surveys they host; however, the ability to connect your survey responses to your IP address has been disabled for this survey. I will not be able to identify your responses; however, answers to specific questions may make you more easily identifiable. The security and privacy policy for Qualtrics can be viewed at https://www.qualtrics.com/security-statement.

This survey will require about 10 minutes of your time. Participants will not be paid or otherwise compensated for their participation in this project. Your participation in this research is voluntary. Your decision whether or not to participate will involve no penalty or loss of benefits to which the subject is otherwise entitled, and the subject may discontinue participation at any time.

To participate in this survey, you must:

• work for a higher education institution in the United States, and
• have a job role in which you are responsible for using, creating, reviewing, or enforcing the use of accessible content in online courses.

Do you consent to participate in this study?

  o Yes (1)
  o No (2)
Background Information
The following questions will collect background information about you and your role.

Q1 What is your gender?
   ○ Female (1)
   ○ Male (2)
   ○ Other (3)
   ○ Prefer not to answer (4)

Q2 Please enter your age.

Q3 What is your role at your institution?
   ○ Faculty (1)
   ○ Instructional technologist/designer (2)
   ○ Administrator (3)
   ○ Disability service staff (4)
   ○ Other (5)

Q4 Please enter your years and months of experience teaching in a higher education setting.
   Years (1)  
   Months (2) 

Q5 Please enter your years and months of experience teaching online or working with an online program.
   Years (1)  
   Months (2) 

Q6 Within the context of your current job duties, are you responsible for using, creating, reviewing, or enforcing the use of accessible content in online courses?
   Note: Accessible content refers to multimedia (documents, video, images, and audio) that are usable by people without encountering barriers or issues such as inability to understand content due to lack of captions or transcripts.
   ○ Yes (1)
   ○ No (2)

Skip To: End of Survey If Q= No

Q7 Do you work for a higher education institution in the United States?
   ○ Yes (1)
   ○ No (2)

Skip To: End of Survey If Q= No
Information about the Institution
The following section will collect background information about your institution and its accessibility practices.

Q8 Which of the following describes your institution?
Select all that apply.
- Two-year (1)
- Four-year (2)
- Technical or trade school (3)
- Public (4)
- Private non-profit (5)
- Private for-profit (6)

Q9 Please enter the number of online courses offered by your institution for the current semester.
Number of online courses offered this semester (1) ________________
- Don't know (2)

Q10 What is your student enrollment for the current academic year?
- Less than 999 (1)
- 1,000 - 2,999 (2)
- 3,000 - 9,999 (3)
- More than 10,000 (4)
- Don't know (5)

Q11 Does your institution have systems or policies to ensure online content/courses are accessible?
*Note: Accessible content refers to multimedia (documents, video, images, and audio) that are usable by people without encountering barriers or issues such as inability to understand content due to lack of captions or transcripts.*
- Yes (1)
- No (2)
- Don't know (3)

Q12 Does your institution have a disability statement or policy?
- Yes (1)
- No (2)
- Don't know (3)
Q13 Does your institution require that disability statements or policies be included in course syllabi or other course materials?
   ○ Yes (1)
   ○ No (2)
   ○ Don't know (3)

Q14 Who is responsible for creating, building, or selecting content for online courses?
Select all that apply.
   Faculty/Instructor (1)
   Instructional technologist/designer (2)
   Administrator (3)
   Production staff (4)
   Online course builder (5)
   Other (6)

Q15 Does your institution review courses for accessibility?
Note: Accessibility refers to content that is usable by people without encountering barriers or issues such as inability to understand content due to lack of captions or transcripts.
   ○ Always (1)
   ○ Sometimes (2)
   ○ Never (3)
   ○ Don't Know (4)

Q16 Who is responsible for reviewing online courses for accessibility compliance?
   ○ An institutional office or department (e.g., departments for disability, teaching and learning, or distance education) (1)
   ○ Individual academic departments, schools, or colleges (2)
   ○ Individuals (e.g., faculty, instructional designers, supervisors, etc.) (3)
   ○ Varies throughout institution (4)
   ○ Online courses are not reviewed for accessibility (5)
   ○ Don't know (6)
Information about Training and Support Offered by the Institution
The following section will collect information about how your institution supports accessibility practices through training and support.

Q17 Does your institution offer training on how to develop accessible online courses or content?
   - Yes (1)
   - No (2)
   - Don't know (3)

Q18 If training is offered, what types of accessibility training are available?
   Select all that apply.
   - Mentoring program (1)
   - Internal course or workshop (2)
   - External course or workshop (3)
   - Online resources (4)
   - Webinars (5)
   - Other (6)
   - Institution does not offer training (7)
   - Don't know (8)

Q19 Is accessibility training required to develop an online course?
   - Yes (1)
   - No (2)
   - Don't know (3)

Q20 Does your institution offer any type of support to assist you in creating accessible online content or courses?
   - Yes (1)
   - No (2)
   - Don't know (3)
Information about Individual Practices

The following section will collect information about your accessibility practices and limitation experienced within your role.

Your online course refers to any course that you are responsible for supporting in any way within the context of your role.

Individual Practices

Think about the online course(s) or content you created in the previous semester.

<table>
<thead>
<tr>
<th>Questions</th>
<th>5 (Almost Always (More than 90% of the time))</th>
<th>4 (Often (About 75% of the time))</th>
<th>3 (Half the Time (About 50% of the time))</th>
<th>2 (Occasionally (About 25% of the time))</th>
<th>1 (Almost Never (Less than 10% of the time))</th>
<th>Not Applicable (6)</th>
<th>Don't Know (7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q21 How often do you use multimedia (e.g., document files, videos, audio, images) in your online courses or other online resources?</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Q22 Are the documents formatted with proper text formatting styles (i.e., titles, headings, etc.)?</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Q23 Do these images include appropriate alternative text?</td>
<td>○</td>
<td>○</td>
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<td>○</td>
<td>○</td>
<td>○</td>
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<tr>
<td>Q24 Do these tables contain an identified header row or column?</td>
<td>○</td>
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<td>○</td>
<td>○</td>
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<tr>
<td>Q25 Do these videos contain closed captions?</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Q26 Do these videos include transcripts?</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
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<tr>
<td>Q27 How often do you think these courses were compliant with accessibility guidelines (i.e., WCAG, UDL, etc.)?</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
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</tr>
</tbody>
</table>
Limitations

Think about the online course(s) or content you created in the previous semester.

<table>
<thead>
<tr>
<th>Question</th>
<th>5 Always Almost Always (More than 90% of the time) (1)</th>
<th>4 Often (About 75% of the time) (2)</th>
<th>3 Half the Time (About 50% of the time) (3)</th>
<th>2 Occasionally (About 25% of the time) (4)</th>
<th>1 Almost Never (Less than 10% of the time) (5)</th>
<th>Not Applicable (6)</th>
<th>Don't Know (7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q28 How often was TIME a limitation in making your online course(s) or content accessible?</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
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<td>○</td>
</tr>
<tr>
<td>Q29 How often was KNOWLEDGE ABOUT ACCESSIBILITY a limitation in making your online course(s) or content accessible?</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Q30 How often was ACCESS TO TOOLS OR SOFTWARE a limitation in making your online course(s) or content accessible?</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Q31 How often were BUDGETARY RESOURCES a limitation in making your online course(s) or content accessible?</td>
<td>○</td>
<td>○</td>
<td>○</td>
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</tbody>
</table>

End of Survey Message

Thank you for participating in this study!

If you have any questions, please feel free to ask me using the contact information below. If you are interested, the results of this study will be available at the conclusion of the project. If you have any questions about this research, please feel free to contact me, Rita Fennelly Atkinson, or Dr. Kimberly LaPrairie. If you have questions or concerns about your rights as research participants, please contact Sharla Miles, Office of Research and Sponsored Programs, using her contact information below.
APPENDIX C

IRB-2020-355 Approval

Date: Jan 15, 2021 8:14:49 AM CST
TO: Rita Fennelly-Akinson Kimberly LaPrairie
FROM: SHSU IRB
PROJECT TITLE: Associations Between Accessibility Knowledge, Practices, and Support in Online Higher Education: An Exploratory Factor Analysis
PROTOCOL #: IRB-2020-355
SUBMISSION TYPE: Initial
ACTION: No Human Subjects Research
DECISION DATE: January 15, 2021

NOTE TO PI: Reason for review determination: This application was only supposed to request approval for validating your study instrument. Thus, this project does not meet the federal regulatory definition of human subjects research. Please incorporate this determination letter into any thesis/dissertation packets that you are required to prepare for your degree.

This letter is provided in response to your IRB request regarding human subjects involvement in your proposed research titled, “Associations Between Accessibility Knowledge, Practices, and Support in Online Higher Education: An Exploratory Factor Analysis (IRB #IRB-2020-355).”

This study does not appear to fit the regulatory definition of human subjects research. The Department of Health and Human Services (DHHS) regulations 45 CFR 46.102(D), defines research as “a systematic investigation, including research development, testing and evaluation, designed to develop or contribute to generalizable knowledge.” Thus, this study does not require IRB oversight as specified in DHHS regulations 45 CFR 46, subpart A.

This determination means that there are no restrictions on your research, and you may proceed with your study without IRB oversight. If I need to provide further information, please let me know.

Sincerely,

Chase Young, Ph.D.
Chair, IRB
Hannah R. Gerber, Ph.D.
Co-Chair, IRB
APPENDIX D

Expert Reviewer Recruitment

https://sites.google.com/view/accessibilitystudy/expert-review-solicitation

Social Media Posting

Looking for 2 expert reviewers for a doctoral research survey on #accessibility for online #HigherEd. Must be based in the U.S. & well-versed w/ accessibility practices within higher ed. https://sites.google.com/view/accessibilitystudy/home #A11y #AccessU Please DM me if interested.

(Posts deleted after expert reviewers were identified on March 4, 2021.)

Public Recruitment Information on Website

My name is Rita Fennelly-Atkinson, and I am a doctoral student in the Instructional Systems Design and Technology program within the Department of Library Science and Technology at Sam Houston State University in Huntsville, TX.

The purpose of this proposed doctoral study is to explore the characteristics of institutions and individuals who are responsible for implementing accessibility within online higher education courses. My hope is that this research will build a foundation for a future line of research oriented towards finding solutions for common accessibility implementation issues within the sphere of U.S. higher education and beyond.

Thank you for your consideration to be an expert reviewer for this proposed study. It is estimated that your feedback would require approximately 30 minutes of your time, but it could take longer.

Your expertise will help to establish the validity and reliability of a modified survey instrument that will be used for this study. I am specifically looking for feedback on whether higher education professionals designing online courses will be able to understand the questions and terms used throughout the survey. While it is likely that survey respondents will be familiar with accessibility, I am considering that some people may be engaging in accessible practices without being specifically aware of specific accessibility guidelines or terminology.

Your identity will remain confidential. Only aggregated feedback will be reported in the final research study without any identifying information. Your participation is voluntary and there is no compensation provided.

If you are interested in supporting this research, please contact Rita Fennelly-Atkinson at rxf036@shsu.edu.

Please use the subject line: Accessibility Survey Expert Reviewer. Please feel free to include any questions you have about the study.

Your eligibility as an expert reviewer was based on the following:

- Interest in being an expert reviewer,
- Professional expertise in accessibility practices within higher education,
- Experience and knowledge of U.S. accessibility laws and guidelines.
Follow-Up Email Invitation to Participate/Introduction

Dear [Expert Reviewer]:

I am inviting you to be an expert reviewer of the survey instrument that will be used for an online study that is designed to explore associations between accessibility knowledge, practices, and support in online higher distance education. This survey has been modified from two existing surveys and your review will ensure reliability and validity for the study.

I am specifically looking for feedback on whether higher education professional designing online courses will be able to understand the questions and terms used throughout the survey.

The review process should take about 30 minutes to complete. Once you have completed the survey, you will receive an end-of-survey thank you message.

To fill it out, visit: [INDIVIDUALIZED SURVEY LINK]

Please complete the survey by March 15, 2021.

Thank you for your participation. Please email rxf036@shsu.edu if you have any issues accessing the survey.

Follow this link to the Survey: [INDIVIDUALIZED SURVEY LINK]
Or copy and paste the URL below into your internet browser: [INDIVIDUALIZED SURVEY LINK]

Thank you,
Rita Fennelly-Atkinson
Doctoral Candidate
Instructional Systems Design and Technology
Department of Library Science and Technology
College of Education
Sam Houston State University
Follow the link to opt out of future emails: [OPT OUT LINK]
APPENDIX E

Expert Reviewer Instrument

Expert Review:
Accessibility Knowledge, Practices, and Support in U.S.
Online Higher Distance Education

Participation Request
You have been invited to be an expert reviewer of the survey instrument that will be used for an online survey that is designed to explore associations between accessibility knowledge, practices, and support in online higher distance education. It is estimated that your feedback would require approximately 30 minutes of your time, but it could take longer.

Your expertise will help to establish the validity and reliability of a modified survey instrument that will be used for this study.

I am specifically looking for feedback on whether higher education professionals designing online courses will be able to understand the questions and terms used throughout the survey. While it is likely that survey respondents will be familiar with accessibility, I am considering that some people may be engaging in accessible practices without being specifically aware of specific accessibility guidelines or terminology.

Your identity will remain confidential. Only aggregated feedback will be reported in the final research study without any identifying information. Your participation is voluntary and there is no compensation provided.

Do you consent to be an expert reviewer for this study?
  o Yes
  o No

Reviewing the section information:

Background Information

The following questions will collect background information about you and your role.

Please select the choice or enter the response that best describes you.

The information and directions for this section should be:
  o Kept as is
  o Modified based on the following comments:
Reviewing the question and answer choices
1. What is your gender?
   a. Female
   b. Male
   c. Other
   d. Prefer not to answer

This question and its answer choices should be:
   o Kept as is
   o Modified based on the following comments:

Reviewing the question and answer choices
2. Please enter your age.

This question and its answer choices should be:
   o Kept as is
   o Modified based on the following comments:

Reviewing the question and answer choices
3. What is your role at your institution?
   a. Faculty
   b. Instructional technologist/designer
   c. Administrator
   d. Disability service staff
   e. Other (write-in option)

This question, and its answer choices should be:
   o Kept as is
   o Modified based on the following comments:

Reviewing the question and answer choices
4. Please enter your years and months of experience teaching in a higher education setting.
   Years: ________
   Months: ________

This question and its answer choices should be:
   o Kept as is
   o Modified based on the following comments:

Reviewing the question and answer choices
5. Please enter your years and months of experience teaching online or working with an online program.
   Years: ________
   Months: ________

This question and its answer choices should be:
   o Kept as is
   o Modified based on the following comments:
Reviewing the question and answer choices

6. Within the context of your current job duties, are you responsible for using, creating, reviewing, or enforcing the use of accessible content in online courses? *Note: Accessible content refers to multimedia (documents, video, images, and audio) that are usable by people without encountering barriers or issues such as inability to understand content due to lack of captions or transcripts.*

   a. Yes
   b. No

**This question and its answer choices should be:**
   - Kept as is
   - Modified based on the following comments:

Reviewing the question and answer choices

7. Do you work for a higher education institution in the United States?
   a. Yes
   b. No

**This question and its answer choices should be:**
   - Kept as is
   - Modified based on the following comments:

Reviewing the section information:

Information about the Institution
The following section will collect background information about your institution and its accessibility practices.

*Please select the choice or enter the response that best describes the institution to the best of your knowledge.*

**The information and directions for this section should be:**
   - Kept as is
   - Modified based on the following comments:

Reviewing the question and answer choices

8. Which of the following describes your institution? Select all that apply.
   a. Two-year
   b. Four-year
   c. Technical or trade school
   d. Public
   e. Private non-profit
   f. Private for-profit

**This question and its answer choices should be:**
   - Kept as is
   - Modified based on the following comments:
9. Please enter the number of online courses offered by your institution for the current semester.
   - Number of online courses offered this semester: ________
   - Don't know

This question and its answer choices should be:
   - Kept as is
   - Modified based on the following comments:

10. What is the student enrollment for the current academic year?
   a. Less than 999
   b. 1,000 - 2,999
   c. 3,000 - 9,999
   d. More than 10,000
   e. Don't know

This question and its answer choices should be:
   - Kept as is
   - Modified based on the following comments:

11. Does your institution have systems or policies to ensure online content/courses are accessible?

   Note: Accessible content refers to multimedia (documents, video, images, and audio) that are usable by people without encountering barriers or issues such as inability to understand content due to lack of captions or transcripts.

   a. Yes
   b. No
   c. Don't know

This question and its answer choices should be:
   - Kept as is
   - Modified based on the following comments:
Reviewing the question and answer choices

12. Does your institution have a disability statement or policy?

   a. Yes
   b. No
   c. Don't know

   **This question and its answer choices should be:**
   o Kept as is
   o Modified based on the following comments:

Reviewing the question and answer choices

13. Does your institution require that disability statements or policies be included in course syllabi or other course materials?

   a. Yes
   b. No
   c. Don't know

   **This question and its answer choices should be:**
   o Kept as is
   o Modified based on the following comments:

Reviewing the question and answer choices

14. Who is responsible for creating, building, or selecting content for online courses? Select all that apply.

   a. Faculty/Instructor
   b. Instructional technologist/designer
   c. Administrator
   d. Production staff
   e. Course builder
   f. Other (__________)

   **This question and its answer choices should be:**
   o Kept as is
   o Modified based on the following comments:
Reviewing the question and answer choices

15. Does your institution review courses for accessibility?

Note: Accessibility refers to content that is usable by people without encountering barriers or issues such as inability to understand content due to lack of captions or transcripts.

   a. Always
   b. Sometimes
   c. Never
   d. Don't know

This question and its answer choices should be:
   1. Kept as is
   2. Modified based on the following comments:

Reviewing the question and answer choices

16. Who is responsible for reviewing online courses for accessibility compliance?

   a. An institutional office or department (e.g. departments for disability, teaching and learning, or distance education)
   b. Individual academic departments, schools, or colleges
   c. Individuals (e.g. faculty, instructional designers, supervisors, etc.)
   d. Varies throughout the institution
   e. Online courses are not reviewed for accessibility
   f. Don’t know

This question and its answer choices should be:
   1. Kept as is
   2. Modified based on the following comments:

Reviewing the section information:

Information about Training and Support Offered by the Institution

The following section will collect information about how your institution supports accessibility practices through training and support.

Please select the choice or enter the response that best describes the institutional practices to the best of your knowledge.

The information and directions for this section should be:
   1. Kept as is
   2. Modified based on the following comments:
Reviewing the question and answer choices

17. Does your institution offer training on how to develop accessible online courses or content?

   a. Yes
   b. No
   c. Don't know

This question and its answer choices should be:
   o Kept as is
   o Modified based on the following comments:

Reviewing the question and answer choices

18. If training is offered, what types of accessibility training are available? Select all that apply.

   a. Mentoring program
   b. Internal course or workshop
   c. External course or workshop
   d. Online resources
   e. Webinars
   f. Other (__________)
   g. Institution does not offer training
   h. Don't know

This question and its answer choices should be:
   o Kept as is
   o Modified based on the following comments:

Reviewing the question and answer choices

19. Is accessibility training required to develop an online course?

   a. Yes
   b. No
   c. Don't know

This question and its answer choices should be:
   o Kept as is
   o Modified based on the following comments:
Reviewing the question and answer choices

20. Does your institution offer any type of support to assist you in creating accessible online content or courses?

- a. Yes
- b. No
- c. Don’t know

This question and its answer choices should be:
- o Kept as is
- o Modified based on the following comments:

Reviewing the section information:
Information about Individual Practices

The following section will collect information about your accessibility practices and limitation experienced within your role. Note: Your online course refers to any course that you are responsible for supporting in any way within the context of your role.

Please select the choice or enter the response that best describes your practices.

The information and directions for this section should be:
- o Kept as is
- o Modified based on the following comments:

The remainder of the survey will use a frequency Likert scale to measure respondent practices. Research participants will be provided with a question about how often they engage in an accessibility practice or how often they are limited by a specific factor.

Based on this context, please review the following scale:

<p>| | | | | | | |</p>
<table>
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<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Almost Always (More than 90% of the time)</td>
<td>Often (About 75% of the time)</td>
<td>Half the Time (About 50% of the time)</td>
<td>Occasionally (About 25% of the time)</td>
<td>Almost Never (Less than 10% of the time)</td>
<td>Not Applicable</td>
<td>Don’t Know</td>
</tr>
</tbody>
</table>

This frequency Likert scale should be:
- o Kept as is
- o Modified based on the following comments:
Research participants will be provided with the following questions and will respond using the Likert scale you previously reviewed.

Based on this context, please review the following question:

Think about the online course(s) or content you created in the previous semester.

21. How often do you use multimedia (e.g., document files, videos, audio, images) in your online courses or other online resources?
This question should be:
  o Kept as is
  o Modified based on the following comments:

Research participants will be provided with the following questions and will respond using the Likert scale you previously reviewed.

Based on this context, please review the following question:

Think about the online course(s) or content you created in the previous semester.

22. Are these documents formatted with proper text formatting styles (i.e., titles, headings, etc.)?
This question should be:
  o Kept as is
  o Modified based on the following comments:

Research participants will be provided with the following questions and will respond using the Likert scale you previously reviewed.

Based on this context, please review the following question:

Think about the online course(s) or content you created in the previous semester.

23. Do these images include appropriate alternative text?
This question should be:
  o Kept as is
  o Modified based on the following comments:

Research participants will be provided with the following questions and will respond using the Likert scale you previously reviewed.

Based on this context, please review the following question:

Think about the online course(s) or content you created in the previous semester.

24. Do these tables contain an identified header row or column?
This question should be:
  o Kept as is
  o Modified based on the following comments:
Research participants will be provided with the following questions and will respond using the Likert scale you previously reviewed.

**Based on this context, please review the following question:**

*Think about the online course(s) or content you created in the previous semester.*

25. Do these videos contain closed captions?

**This question should be:**

- Kept as is
- Modified based on the following comments:

Research participants will be provided with the following questions and will respond using the Likert scale you previously reviewed.

**Based on this context, please review the following question:**

*Think about the online course(s) or content you created in the previous semester.*

26. Do these videos include transcripts?

**This question should be:**

- Kept as is
- Modified based on the following comments:

Research participants will be provided with the following questions and will respond using the Likert scale you previously reviewed.

**Based on this context, please review the following question:**

*Think about the online course(s) or content you created in the previous semester.*

27. How often do you think these courses were compliant with accessibility guidelines (i.e., WCAG, UDL, etc.)?

**This question should be:**

- Kept as is
- Modified based on the following comments:

Research participants will be provided with the following questions and will respond using the Likert scale you previously reviewed.

**Based on this context, please review the following question:**

*Think about the online course(s) or content you created in the previous semester.*

28. How often was TIME a limitation in making your online course(s) or content accessible?

**This question should be:**

- Kept as is
- Modified based on the following comments:
Research participants will be provided with the following questions and will respond using the Likert scale you previously reviewed.

Based on this context, please review the following question:

*Think about the online course(s) or content you created in the previous semester.*

29. How often was KNOWLEDGE ABOUT ACCESSIBILITY a limitation in making your online course(s) or content accessible?

This question should be:
   - Kept as is
   - Modified based on the following comments:

Research participants will be provided with the following questions and will respond using the Likert scale you previously reviewed.

Based on this context, please review the following question:

*Think about the online course(s) or content you created in the previous semester.*

30. How often was ACCESS TO TOOLS OR SOFTWARE a limitation in making your online course(s) or content accessible?

This question should be:
   - Kept as is
   - Modified based on the following comments:

Research participants will be provided with the following questions and will respond using the Likert scale you previously reviewed.

Based on this context, please review the following question:

*Think about the online course(s) or content you created in the previous semester.*

31. How often were BUDGETARY RESOURCES a limitation in making your online course(s) or content accessible?

This question should be:
   - Kept as is
   - Modified based on the following comments:
Research participants will be provided with the previous questions and Likert scale response format using the depicted layout.

**Image description:** Likert scale response questions will be presented in a table format with the instruction for respondents to think about their courses for the current semester. Likert scale response choices will be presented in the header row. Questions will be presented in the header column.

*Think about the online course(s) or content you created in the previous semester.*

<table>
<thead>
<tr>
<th>How often do you use multimedia (e.g. document files, videos, audio, images) in your online courses or other online resources?</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
<th>Not</th>
<th>Applicable</th>
<th>Don't Know</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Almost Always (More than 90% of the time)</td>
<td>Often (About 75%)</td>
<td>Half the Time (About 50%)</td>
<td>Occasionally (About 25%)</td>
<td>Almost Never (Less than 10% of the time)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are these documents formatted with proper text formatting styles (i.e., titles, headings, etc.)?</td>
<td>☐</td>
<td>☐</td>
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<td></td>
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</tr>
<tr>
<td>Do these images include appropriate alternative text?</td>
<td>☐</td>
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<td>☐</td>
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<td>☐</td>
<td>☐</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do these tables contain an identified header row or column?</td>
<td>☐</td>
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</tr>
</tbody>
</table>

**This question should be:**

- Kept as is
- Modified based on the following comments:

**End of Survey Message**

Thank you for being an expert reviewer for this study! Your feedback is invaluable, and much appreciated.

If you have any questions, please feel free to ask me using the contact information below. If you are interested, the results of this study will be available at the conclusion of the project. If you have any questions about this research, please feel free to contact me, Rita Fennelly-Atkinson, or Dr. Kimberly LaPrairie. If you have questions or concerns about your rights as research participants, please contact Sharla Miles, Office of Research and Sponsored Programs, using her contact information below.

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**Dr. Kimberly LaPrairie**  
Research Advisor &  
Dissertation Chair  
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Phone: (936) 294-2324  
E-mail: Dr.L@shsu.edu

**Sharla Miles**  
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Huntsville, TX 77341  
Phone: (936) 294-4875  
Email: info@shsu.edu
APPENDIX F

Field Tester Recruitment

https://sites.google.com/view/accessibilitystudy/survey-pre-testing

Social Media Posting

Looking for 8 field testers for a doctoral research survey on #accessibility for online #InstructionalDesign. Must be based in US & design online courses for professional learning outside of higher education. More info online at http://sites.google.com/view/accessibilitystudy
#A11y DM me if interested
(Post deleted when field testers were identified on March 23, 2021.)

Public Recruitment Information on Website

My name is Rita Fennelly-Atkinson, and I am a doctoral student in the Instructional Systems Design and Technology program within the Department of Library Science and Technology at Sam Houston State University in Huntsville, TX.

The purpose of this proposed doctoral study is to explore the characteristics of institutions and individuals who are responsible for implementing accessibility within online higher education courses. My hope is that this research will build a foundation for a future line of research oriented towards finding solutions for common accessibility implementation issues within the sphere of U.S. higher education and beyond.

Thank you for your consideration to be a field tester for this proposed study.

As a field tester, you will support establishing the validity and reliability of a modified survey instrument that will be used for this study. It is estimated that your participation would require approximately 45 minutes total of your time. Part of this time would be spent testing the online survey (about 10 minutes), and part of the time would be spent in a focus group debrief via Zoom (about 30 minutes). Your survey data and feedback on the experience will be used to adjust the survey before research data is collected.

Your identity will remain confidential. Only aggregated feedback will be reported in the final research study without any identifying information. Your participation is voluntary and there is no compensation provided.

If you are interested in supporting this research, please contact Rita Fennelly-Atkinson at rxf036@shsu.edu.

Please use the subject line: Accessibility Survey Field Tester. Please feel free to include any questions you have about the study.

Your eligibility as a field tester will be based on the following:

- Interest in being a field tester,
- Professional experience designing online courses for professional development, and
- Working for a U.S. organization that is NOT classified as higher education.
Email Invitation to Participate/Introduction

Dear [Field Tester]:

I am inviting you to be a pilot tester of the survey instrument that will be used for an online study that is designed to explore associations between accessibility knowledge, practices, and support in online distance education. This survey has been modified from two existing surveys and your review will ensure reliability and validity for the study.

Completing the survey is expected to take about 10 minutes. After at least 8 pilot testers complete the survey, you will be contacted to participate in a group debrief via Zoom that will take about 30 minutes.

Please complete the survey by Friday, March 26, 2021.

Thank you for your participation. Please email rxf036@shsu.edu if you have any issues accessing the survey.

Follow this link to the Survey: [INDIVIDUALIZED SURVEY LINK]

Or copy and paste the URL below into your internet browser: [INDIVIDUALIZED SURVEY LINK]

Follow the link to opt out of future emails: [OPT OUT LINK]

Email Reminder for Participation

Dear [Field Tester],

Thank you so much for volunteering to support this research as a field tester. This is a reminder to complete the survey by Friday, March 26, 2021.

Follow this link to the Survey: [INDIVIDUALIZED SURVEY LINK]

Or copy and paste the URL below into your internet browser: [INDIVIDUALIZED SURVEY LINK]

Follow the link to opt out of future emails: [OPT OUT LINK]
Email Regarding Debrief Participation

Dear [Field Tester],

Thank you for completing the field test of the accessibility of the survey.

The next part of this field test is a focus group debrief via Zoom (about 30 minutes). The debrief will focus on questions regarding the ease of use and clarity of the survey. This debrief will take no more than 30 minutes of your time.

If you are unable to attend this debrief, please contact Rita Fennelly-Atkinson at rxf036@shsu.edu to schedule an individual debrief at your convenience.

Thank you for your time.

Rita Fennelly-Atkinson
Doctoral Candidate
Instructional Systems Design and Technology
Department of Library Science and Technology
College of Education

Time: Apr 6, 2021 05:30 PM Central Time (US and Canada)
Join Zoom Meeting [ZOOM LINK]
APPENDIX G

Revised Survey Instrument Based on Expert Review

Field-Test Survey:
Accessibility Knowledge, Practices, and Support in U.S. Online Higher Distance Education

Participation Request
You have been invited to be a field tester of the survey instrument that will be used for an online survey that is designed to explore associations between accessibility knowledge, practices, and support in online higher distance education. It is estimated that this survey will take approximately 10 minutes of your time. You are also being asked to participate in a later virtual group debrief that will take approximately 30 minutes.

Your expertise will help to establish the validity and reliability of a modified survey instrument that will be used for this study.

As you take the survey, please make note of any part of the survey experience that you liked or that could be improved.

Your identity will remain confidential. Only aggregated feedback will be reported in the final research study without any identifying information. Your participation is voluntary and there is no compensation provided.

Do you consent to be a field tester for this study?
- Yes
- No

Skip To: End of Survey If Question = No

Background Information

The following questions will collect background information about you and your role.

Q1 What is your gender?
- Female
- Male
- Other
- Prefer not to answer

Q2 Please enter your age. ____________________

Q3 What is your primary role at your institution?
- Faculty/Instructor
- Instructional technologist/designer
- Administrator/Leadership
- Disability service staff
- Other
Q4 Please enter your years and months of experience teaching in an adult learning setting. 
*May include professional learning and coaching experience.*

Years

Months

Q5 Please enter your years and months of experience teaching online (in whole or part) in an adult learning setting.

Years

Months

Q6 Please enter your years and months of experience supporting an online education program in a non-instructional capacity.
*Programs may include blended, hybrid, and partially online programs.*

Years

Months

Q7 Within the context of your current job duties, are you responsible for any of the following:
- [ ] using accessible content for online instruction,
- [ ] creating accessible content,
- [ ] reviewing or selecting accessible content, or
- [ ] enforcing the use of accessible content in online courses?

*Note: Accessible content refers to multimedia (documents, video, images, and audio) that are usable by people without encountering barriers or issues due to a disability.

- [ ] Yes
- [ ] No

Skip To: End of Survey if Question = No

Q8 Are you employed by an institution that delivers online professional learning in the United States?
- [ ] Yes
- [ ] No

Skip To: End of Survey if Question = No

Information about the Institution

The following section will collect background information about your institution where you are employed.

Q9 Which of the following describes your institution?

*Select all that apply.*

- [ ] Two-year
- [ ] Four-year
- [ ] Technical or trade school
- [ ] Public
- [ ] Private non-profit
- [ ] Private for-profit
Q10 What is the TOTAL student enrollment at your institution for the previous term?
- Less than 999
- 1,000 - 2,999
- 3,000 - 9,999
- More than 10,000
- Don't know

Institutional Practices

Think about the institutional practices you have observed in the previous term. Courses refers to those offered in the context of adult professional learning.

Note: Accessible content and accessibility refer to content and practices that make instruction usable by people without encountering barriers or issues due to a disability.

<table>
<thead>
<tr>
<th>Q11 How often does the institution offer ONLINE courses?</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
<th>Not Applicable</th>
<th>Don’t Know</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOTE: Online courses refers to courses specifically designed to be delivered online (in whole or part) and not as an emergency response to the COVID-19 pandemic.</td>
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<table>
<thead>
<tr>
<th>Q12 How often does your institution use systems or policies to ensure ONLINE content/courses are accessible?</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
<th>Not Applicable</th>
<th>Don’t Know</th>
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<table>
<thead>
<tr>
<th>Q13 How often does your institution require that a disability statement or policy be included in ALL course syllabi or other course materials?</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
<th>Not Applicable</th>
<th>Don’t Know</th>
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<tr>
<th>Q14 How often does your institution review ONLINE courses for accessibility?</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
<th>Not Applicable</th>
<th>Don’t Know</th>
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</table>
Institutional Responsibility For Online Instructional Content

Think about the institutional practices you have observed in the previous term. Courses refers to those offered in the context of adult professional learning.

*Note: Accessible content and accessibility refer to content and practices that make instruction usable by people without encountering barriers or issues due to a disability.*

<table>
<thead>
<tr>
<th>Q15 How often is the FACULTY/INSTRUCTOR responsible for creating, building, or selecting content for online courses?</th>
<th>5: Almost Always (More than 90% of the time)</th>
<th>4: Always (About 75% of the time)</th>
<th>3: Half the Time (About 50% of the time)</th>
<th>2: Occasionally (About 25% of the time)</th>
<th>1: Almost Never (Less than 10% of the time)</th>
<th>Not Applicable</th>
<th>Don't Know</th>
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<table>
<thead>
<tr>
<th>Q16 How often is the INSTRUCTIONAL/TECHNOLOGIST/EDESIGNER responsible for creating, building, or selecting content for online courses?</th>
<th>5: Almost Always (More than 90% of the time)</th>
<th>4: Always (About 75% of the time)</th>
<th>3: Half the Time (About 50% of the time)</th>
<th>2: Occasionally (About 25% of the time)</th>
<th>1: Almost Never (Less than 10% of the time)</th>
<th>Not Applicable</th>
<th>Don't Know</th>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Q17 How often is the ADMINISTRATOR/LEADER responsible for creating, building, or selecting content for online courses?</th>
<th>5: Almost Always (More than 90% of the time)</th>
<th>4: Always (About 75% of the time)</th>
<th>3: Half the Time (About 50% of the time)</th>
<th>2: Occasionally (About 25% of the time)</th>
<th>1: Almost Never (Less than 10% of the time)</th>
<th>Not Applicable</th>
<th>Don't Know</th>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Q18 How often is the PRODUCTION STAFF responsible for creating, building, or selecting content for online courses?</th>
<th>5: Almost Always (More than 90% of the time)</th>
<th>4: Always (About 75% of the time)</th>
<th>3: Half the Time (About 50% of the time)</th>
<th>2: Occasionally (About 25% of the time)</th>
<th>1: Almost Never (Less than 10% of the time)</th>
<th>Not Applicable</th>
<th>Don't Know</th>
</tr>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Q19 How often is the DESIGNATED ONLINE COURSE BUILDERS responsible for creating, building, or selecting content for online courses?</th>
<th>5: Almost Always (More than 90% of the time)</th>
<th>4: Always (About 75% of the time)</th>
<th>3: Half the Time (About 50% of the time)</th>
<th>2: Occasionally (About 25% of the time)</th>
<th>1: Almost Never (Less than 10% of the time)</th>
<th>Not Applicable</th>
<th>Don't Know</th>
</tr>
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</tbody>
</table>
Institutional Responsibility For Accessibility Review

Think about the institutional practices you have observed in the previous term. Courses refers to those offered in the context of adult professional learning.

*Note: Accessible content and accessibility refer to content and practices that make instruction usable by people without encountering barriers or issues due to a disability.*

| Q20 How often is an INSTITUTIONAL OFFICE OR DEPARTMENT responsible for reviewing online courses for accessibility compliance? Examples include departments for disability, teaching and learning, or distance education. |
|---|---|---|---|---|---|---|---|
| 5 Almost Always (More than 90% of the time) | 4 Often (About 75% of the time) | 3 Half the Time (About 50% of the time) | 2 Occasionally (About 25% of the time) | 1 Almost Never (Less than 10% of the time) | Not Applicable | Don't Know |
| ○ | ○ | ○ | ○ | ○ | ○ | ○ |

| Q21 How often are INDIVIDUAL ACADEMIC DEPARTMENTS, SCHOOLS, OR COLLEGES responsible for reviewing online courses for accessibility compliance? |
|---|---|---|---|---|---|---|---|
| 5 Almost Always (More than 90% of the time) | 4 Often (About 75% of the time) | 3 Half the Time (About 50% of the time) | 2 Occasionally (About 25% of the time) | 1 Almost Never (Less than 10% of the time) | Not Applicable | Don't Know |
| ○ | ○ | ○ | ○ | ○ | ○ | ○ |

| Q22 How often are INDIVIDUALS responsible for reviewing online courses for accessibility compliance? Examples include faculty, instructional designers, compliance officer, or supervisors. |
|---|---|---|---|---|---|---|---|
| 5 Almost Always (More than 90% of the time) | 4 Often (About 75% of the time) | 3 Half the Time (About 50% of the time) | 2 Occasionally (About 25% of the time) | 1 Almost Never (Less than 10% of the time) | Not Applicable | Don't Know |
| ○ | ○ | ○ | ○ | ○ | ○ | ○ |

Information about Training and Support Offered by the Institution

The following section will collect information about how the institution at which you are employed supports accessibility practices through training and support.

Q23 If accessibility training or support are offered, is completion a requirement to developing or delivering an online course?

- ○ Yes
- ○ No
- ○ Don't know
Institutional Training and Support

Think about the institutional practices you have observed in the previous term. Courses refers to those offered in the context of adult professional learning.

Note: Accessible content and accessibility refer to content and practices that make instruction usable by people without encountering barriers or issues due to a disability.

<table>
<thead>
<tr>
<th>Question</th>
<th>Rating Options</th>
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</thead>
<tbody>
<tr>
<td>Q24 How often does your institution offer a PROGRAM to support the</td>
<td>5 Almost Always (More than 90% of the time)</td>
</tr>
<tr>
<td>development of accessible online courses or content?</td>
<td>4 Often (About 75% of the time)</td>
</tr>
<tr>
<td></td>
<td>3 Half the Time (About 50% of the time)</td>
</tr>
<tr>
<td></td>
<td>2 Occasionally (About 25% of the time)</td>
</tr>
<tr>
<td></td>
<td>1 Almost Never (Less than 10% of the time)</td>
</tr>
<tr>
<td></td>
<td>Not Applicable</td>
</tr>
<tr>
<td></td>
<td>Don’t Know</td>
</tr>
<tr>
<td>Q25 How often does your institution offer an INTERNAL COURSE or WORKSHOP</td>
<td>○</td>
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<tr>
<td>to support the development of accessible online courses or content?</td>
<td>○</td>
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<td></td>
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<tr>
<td>Q26 How often does your institution offer an EXTERNAL COURSE or WORKSHOP</td>
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<td>to support the development of accessible online courses or content?</td>
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<tr>
<td>Q27 How often does your institution offer ONLINE RESOURCES to support</td>
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<td>the development of accessible online courses or content?</td>
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<tr>
<td>Q28 How often does your institution offer WEBINARS to support the</td>
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<td>development of accessible online courses or content?</td>
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<tr>
<td>Q29 How often does your institution offer SUPPORT OR ASSISTANCE FOR the</td>
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<td>development of accessible online courses or content?</td>
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</table>
Information about Individual Practices

The following section will collect information about your accessibility practices and limitations experienced within your role at the institution at which you are employed.

Your online course refers to any professional learning course that you are responsible for supporting in any way within the context of your role.

Individual Practices

Think about the online course(s) or content you created in the previous term. Courses refers to those offered in the context of adult professional learning.

<table>
<thead>
<tr>
<th>Q30 How often do you use multimedia (e.g., document files, videos, audio, images)?</th>
<th>5 Almost Always (More than 50% of the time)</th>
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<td>Q31 How often are documents formatted with proper text formatting styles (i.e., titles, headings, etc.)?</td>
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<td>Q32 How often do images include appropriate alternative text?</td>
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<td>Q33 How often do tables contain an identified header row or column?</td>
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<td>Q34 How often do videos contain closed captions?</td>
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</table>

*Based on dissertation committee feedback this question was suggested for inclusion in the survey during the field test debrief.*
Limitations

Think about the online course(s) or content you created in the previous term. Courses refers to those offered in the context of adult professional learning.

| Q37 How often was TIME: a limitation in making your online course(s) or content accessible? | 5 Almost Always (More than 90% of the time) | 4 Often (About 75% of the time) | 3 Half the Time (About 50% of the time) | 2 Occasionally (About 25% of the time) | 1 Almost Never (Less than 10% of the time) | Not Applicable | Don't Know |
| Q38 How often was KNOWLEDGE ABOUT ACCESSIBILITY a limitation in making your online course(s) or content accessible? | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Q39 How often was ACCESS TO TOOLS OR SOFTWARE a limitation in making your online course(s) or content accessible? | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Q40 How often were BUDGETARY RESOURCES a limitation in making your online course(s) or content accessible? | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

End of Survey Message

Thank you for participating in this study!

If you have any questions, please feel free to ask me using the contact information below. If you are interested, the results of this study will be available at the conclusion of the project. If you have any questions about this research, please feel free to contact me, Rita Fennelly Atkinson, or Dr. Kimberly LaPrairie. If you have questions or concerns about your rights as research participants, please contact Sharla Miles, Office of Research and Sponsored Programs, using her contact information below.

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Disertation Chair & Associate Professor  
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Programs  
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APPENDIX H

Field Test Debrief Guide

Outline

- Welcome
  - Hi, my name is Rita Fennelly-Atkinson, a doctoral candidate at Sam Houston State University, and I am conducting a field test of an online survey that will be used in a research study.

- Topic, Eligibility, Consent
  - You have been invited to participate in this focus group debrief because you previously agreed to field-test the survey instrument and participate in this interview. While I and the other focus group participants will know of your participation in this study, no identifying information will be reported in this study and identifying information will be stored separately from your comments. This debrief will be recorded and a written transcript without identifying information will be used to improve the survey instrument. This interview should take approximately 20 minutes. Is there anyone who has any questions or would like to withdraw their consent to participate? [Address questions]

- Guided Focus Debrief Questions
  - I am placing a copy of the survey in the chat so that you can refer to it during the debrief.
  - In section 1, regarding the background information:
    - Were there any part of the directions that seemed confusing or that you didn’t understand?
    - Was there any wording or terms that seemed confusing or that you didn’t understand?
    - Does anyone have any additional comments about the content or format that could improve this survey for participants?
  - In section 2, regarding the information about the institution:
    - Were there any part of the directions that seemed confusing or that you didn’t understand?
    - Was there any wording or terms that seemed confusing or that you didn’t understand?
• Does anyone have any additional comments about the content or format that could improve this survey for participants?

• In section 3, regarding the information about training:
  • Were there any part of the directions that seemed confusing or that you didn’t understand?
  • Was there any wording or terms that seemed confusing or that you didn’t understand?
  • Does anyone have any additional comments about the content or format that could improve this survey for participants?

• In section 2, regarding the information about your practices:
  • Were there any part of the directions that seemed confusing or that you didn’t understand?
  • Was there any wording or terms that seemed confusing or that you didn’t understand?
  • Does anyone have any additional comments about the content or format that could improve this survey for participants?

• Regarding the overall survey experience:
  • Did the general flow of the survey seem intuitive?
  • Did you feel that you were able to answer the questions to the best of your ability?
  • Does anyone have any additional comments about the content or format that could improve this survey for participants?

• Conclusion
  • Thank you all for your participation in this debrief. This information will be helpful in improving the final survey that will be sent to research participants.
APPENDIX I

Final Survey Instrument Based on Pretesting Feedback

Final Instrument:
Survey on Accessibility Knowledge, Practices, and Support in
U.S. Online Higher Distance Education

Informed Consent

The purpose of this survey is to explore the characteristics of institutions and designers
delivering online higher education courses and programs and their accessibility practices. This
research is not expected to pose any risk to any of the volunteer participants. Any data obtained
from you will only be used for study purposes, and under no circumstances will you or any other
respondents who participated in this research be identified.

Your survey responses will be kept confidential to the extent of the technology being used.
Qualtrics collects IP addresses for respondents to surveys they host; however, the ability to
connect your survey responses to your IP address has been disabled for this survey. I will not be
able to identify your responses; however, answers to specific questions may make you more
easily identifiable. The security and privacy policy for Qualtrics can be viewed at

This survey will require about 10 minutes of your time. Participants will not be paid or otherwise
compensated for their participation in this project. Your participation in this research is
voluntary. Your decision whether or not to participate will involve no penalty or loss of benefits
to which the subject is otherwise entitled, and the subject may discontinue participation at any
time.

To participate in this survey, you must:
- work for a higher education institution in the United States, and
- have a job role in which you are responsible for using, creating, reviewing, or enforcing the
  use of accessible content in online courses.

What are my rights as a research subject?
If you feel you have not been treated according to the descriptions in this form, or you have any
questions about your rights as a research participant, you may call the Office of Research and
Sponsored Programs – Sharla Miles at 936-294-4875 or e-mail ORSP at sharla_miles@shsu.edu

This study was approved by Sam Houston State University's Institutional Review Board on May

Do you consent to participate in this study?
  - I agree
  - I disagree

Skip To: End of Survey If Question = I disagree
Background Information
The following questions will collect background information about you and your role.

Q1 What is your gender?
   o Female
   o Male
   o Other
   o Prefer not to answer

Q2 Please enter your age. ____________________________

Q3 What is your primary role within higher education at your institution?
   o Faculty/Instructor
   o Instructional technologist/designer
   o Administrator/Leadership
   o Disability service staff
   o Other ____________________________

Q4 Please enter your years and months of experience teaching in a higher education setting.
   May include graduate, adjunct, lecturer, and related higher education teaching experience.
   Years ___________________________________
   Months ___________________________________

Q5 Please enter your years and months of experience teaching online (in whole or part) in a higher education setting.
   Years ___________________________________
   Months ___________________________________

Q6 Please enter your years and months of experience supporting an online higher education program in a non-instructional capacity.
   Programs may include blended, hybrid, and partially online programs.
   Years ___________________________________
   Months ___________________________________

Q7 Within the context of your current job duties, are you responsible for any of the following:
   ▪ using accessible content for online instruction,
   ▪ creating accessible content,
   ▪ reviewing or selecting accessible content, or
   ▪ enforcing the use of accessible content in online courses?
   Note: Accessible content and accessibility refer to content and practices that make instruction usable by people without encountering barriers or issues due to a disability.
   o Yes
   o No

Skip To: End of Survey If Question = No
Q8 Are you employed by a higher education institution in the United States?
   ○ Yes
   ○ No

Information about the Institution
The following section will collect background information about your higher education institution where you are employed.

Q9 Which of the following best describes your institution?
   ○ Two-year
   ○ Four-year
   ○ Technical or trade school
   ○ Does not apply

Q10 Which of the following best describes your institution?
   ○ Public
   ○ Private non-profit
   ○ Private for-profit
   ○ Does not apply

Q11 What is the TOTAL student enrollment at your institution for the previous term?
   ○ Less than 999
   ○ 1,000 - 2,999
   ○ 3,000 - 9,999
   ○ More than 10,000
   ○ Don't know
Institutional Practices

Think about the institutional practices you have observed in the previous term. Courses and content refers to offerings in the context of student-facing online courses offered at your institution.

*Note: Accessible content and accessibility refer to content and practices that make instruction usable by people without encountering barriers or issues due to a disability.*

| Q12 How often does the institution offer ONLINE courses? NOTE: Online courses refers to courses specifically designed to be delivered online (in whole or part) and not as an emergency response to the COVID-19 pandemic. |
|---|---|---|---|---|---|---|---|
| 5 Almost Always (More than 90% of the time) | 4 Often (About 75% of the time) | 3 Half the Time (About 50% of the time) | 2 Occasionally (About 25% of the time) | 1 Almost Never (Less than 10% of the time) | Not Applicable | Don't Know |
| O | O | O | O | O | O | O |

| Q13 How often does your institution use systems or policies to ensure ONLINE content/ courses are accessible? |
|---|---|---|---|---|---|---|
| O | O | O | O | O | O | O |

| Q14 How often does your institution require that a disability statement or policy be included in ALL course syllabi or other course materials? |
|---|---|---|---|---|---|---|
| O | O | O | O | O | O | O |

| Q15 How often does your institution review ONLINE courses for accessibility? |
|---|---|---|---|---|---|---|
| O | O | O | O | O | O | O |
Institutional Responsibility For Online Instructional Content

Think about the institutional practices you have observed in the previous term. Courses and content refers to offerings in the context of student-facing online courses offered at your institution.

*Note: Accessible content and accessibility refer to content and practices that make instruction usable by people without encountering barriers or issues due to a disability.*

| Q16 How often is the FACILITY/INSTRUCTOR responsible for creating, building, or selecting content for online courses? |
|---|---|---|---|---|---|---|---|---|
| 5 | 4 | 3 | 2 | 1 | Not | Don't |
| Almost Always (More than 90% of the time) | | | | | Applicable | Know |

| Q17 How often is the INSTRUCTIONAL TECHNOLOGIST/DESIGNER responsible for creating, building, or selecting content for online courses? |
|---|---|---|---|---|---|---|---|---|
| 5 | 4 | 3 | 2 | 1 | Not | Don't |
| Almost Always (More than 90% of the time) | | | | | Applicable | Know |

| Q18 How often is the ADMINISTRATOR/LEADER responsible for creating, building, or selecting content for online courses? |
|---|---|---|---|---|---|---|---|---|
| 5 | 4 | 3 | 2 | 1 | Not | Don't |
| Almost Always (More than 90% of the time) | | | | | Applicable | Know |

| Q19 How often is the PRODUCTION STAFF responsible for creating, building, or selecting content for online courses? |
|---|---|---|---|---|---|---|---|---|
| 5 | 4 | 3 | 2 | 1 | Not | Don't |
| Almost Always (More than 90% of the time) | | | | | Applicable | Know |

| Q20 How often are the DESIGNATED ONLINE COURSE BUILDERS responsible for creating, building, or selecting content for online courses? |
|---|---|---|---|---|---|---|---|---|
| 5 | 4 | 3 | 2 | 1 | Not | Don't |
| Almost Always (More than 90% of the time) | | | | | Applicable | Know |
Institutional Responsibility For Accessibility Review

Think about the institutional practices you have observed in the previous term. Courses and content refers to offerings in the context of student-facing online courses offered at your institution.

Note: Accessible content and accessibility refer to content and practices that make instruction usable by people without encountering barriers or issues due to a disability.

<table>
<thead>
<tr>
<th>Q21 How often is an institutional office or department responsible for reviewing online courses for accessibility compliance? Examples include departments for disability, teaching and learning, or distance education.</th>
<th>5 Always (More than 90% of the time)</th>
<th>4 Often (About 75% of the time)</th>
<th>3 Half the Time (About 50% of the time)</th>
<th>2 Occasionally (About 25% of the time)</th>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Q22 How often are individual academic departments, schools, or colleges responsible for reviewing online courses for accessibility compliance?</th>
<th>5 Always (More than 90% of the time)</th>
<th>4 Often (About 75% of the time)</th>
<th>3 Half the Time (About 50% of the time)</th>
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<thead>
<tr>
<th>Q23 How often are individuals responsible for reviewing online courses for accessibility compliance? Examples include faculty, instructional designers, compliance officers, or supervisors.</th>
<th>5 Always (More than 90% of the time)</th>
<th>4 Often (About 75% of the time)</th>
<th>3 Half the Time (About 50% of the time)</th>
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</table>

Information about Training and Support Offered by the Institution

The following section will collect information about how the institution at which you are employed supports accessibility practices through training and support.

Q24 If accessibility training or support are offered, is completion a requirement to developing or delivering an online course?

- ☐ Yes
- ☐ No
- ☐ Don't know
Institutional Training and Support

Think about the institutional practices you have observed in the previous term. Courses and content refers to offerings in the context of student-facing online courses offered at your institution.

*Note: Accessible content and accessibility refer to content and practices that make instruction usable by people without encountering barriers or issues due to a disability.*

<table>
<thead>
<tr>
<th>Q25 How often does your institution offer a MENTORING PROGRAM to support the development of accessible online courses or content?</th>
<th>5 Almost Always (More than 90% of the time)</th>
<th>4 Often (About 75% of the time)</th>
<th>3 Half the Time (About 50% of the time)</th>
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| Q26 How often does your institution offer an INTERNAL COURSE OR WORKSHOP to support the development of accessible online courses or content? | | | | | | | |
| | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

| Q27 How often does your institution offer an EXTERNAL COURSE OR WORKSHOP to support the development of accessible online courses or content? | | | | | | | |
| | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

| Q28 How often does your institution offer ONLINE RESOURCES to support the development of accessible online courses or content? | | | | | | | |
| | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

| Q29 How often does your institution offer SUPPORT OR ASSISTANCE FOR the development of accessible online courses or content? | | | | | | | |
| | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
Information about Individual Practices

The following section will collect information about your accessibility practices and limitations experienced within your role at the institution at which you are employed.

*Your online course refers to any student-facing course that you are responsible for supporting in any way within the context of your role.*

**Individual Practices**

Think about the online course(s) or content you created in the previous term. Courses refers student-facing online courses offered at your institution.

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Limitations

Think about the online course(s) or content you created in the previous term. Courses refers student-facing online courses offered at your institution.

| Q38 How often was TIME a limitation in making your online course(s) or content accessible? | 1 Almost Never (Less than 10% of the time) | 2 Occasionally (About 25% of the time) | 3 Half the Time (About 50% of the time) | 4 Often (About 75% of the time) | 5 Almost Always (More than 90% of the time) |
| Q39 How often was KNOWLEDGE ABOUT ACCESSIBILITY a limitation in making your online course(s) or content accessible? | | | | | |
| Q40 How often was ACCESS TO TOOLS OR SOFTWARE a limitation in making your online course(s) or content accessible? | | | | | |
| Q41 How often were BUDGETARY RESOURCES a limitation in making your online course(s) or content accessible? | | | | | |

End of Survey Message

Thank you for participating in this study!

If you have any questions, please feel free to ask me using the contact information below. If you are interested, the results of this study will be available at the conclusion of the project. If you have any questions about this research, please feel free to contact me, Rita Fennelly-Atkinson, or Dr. Kimberly LaPrairie. If you have questions or concerns about your rights as research participants, please contact Sharla Miles, Office of Research and Sponsored Programs, using her contact information below.
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<th>Research Question 3</th>
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APPENDIX K

IRB-2021-110 Conditional Approval

TO: Rita Fennelly-Atkinson Kimberly LaPrairie
FROM: SHSU IRB
DATE: May 7, 2021 3:16:10 PM CDT
RE: Notice of Receipt of Initial Submission on May 7, 2021 3:16:10 PM CDT
STUDY #: IRB-2021-110
STUDY TITLE: Associations Between Accessibility Knowledge, Practices, and Support in Online Higher Education: An Exploratory Factor Analysis

Greetings,

Federal Regulations (45 CFR 46.124) allow for an IRB to give an approval with conditions determination. This means that the IRB can place conditions at the time a project is approved when the additional conditions are necessary for the protection of human subjects. The SHSU Committee for the Protection of Human Subjects (IRB) gives conditional approval based on the following conditions being met. Once the PI has addressed these conditions, the IRB will review the application again. Provided that the committee determines that the conditions have been fulfilled, the conditional approval status will be changed to Exempt approval. The Sam Houston State University Committee for the Protection of Human Subjects (IRB) gives approval with conditions based on the following conditions being met (Note: no data may be collected until the conditions stated have been met and the PI receives the official notification of Exempt approval):

Findings: This submission is conditionally approved exempt based on the condition that the PI obtains a formal permission letter or memo from AECT to conduct this research. The permission must be attached to the application and re-submitted for final approval.

Notes to researchers: What does a conditional approval in the Cayuse IRB world mean for researchers? The submission is reopened so the requested documentation can be attached.

If you have any questions, please contact Sharla Miles at 936-294-4875 or irb@shsu.edu. Please include your protocol number in all correspondence with this committee.

Sincerely,

Chase Young, Ph.D.
Chair, IRB
Hannah R. Gerber, Ph.D.
Co-Chair, IRB
APPENDIX L

AECT Research Request Process

(https://members.aect.org/publications/studies)

To make formal requests for the purpose of soliciting AECT members to participate in surveys and other studies, please follow the steps listed below.

- *Review the Research Policy.
- *Prepare a document outlining the study and questions.
- *Include your Name, and Email as the contact person
- *Include the start and ending date of the study.
- Include the link to the questionnaire if you already have it prepared. (Note: AECT will not create the questionnaire for you)
- Include a paragraph of instructions or guidelines you would like to be displayed after a member consents to participate.
- *A copy of approval by appropriate certifying committees (such as Human Subjects Review or Institutional Review Boards), when such committees have authority over the research.
- Forward this information to Phillip Harris at pharris@aect.org

* Items needed for approval. The other information can come after approval is received.

AECT Research Policy

Policy on Requesting AECT Member Participation in Research Studies From time to time, AECT receives formal requests for email or mailing lists for the purpose of soliciting AECT members to participate in surveys and other studies. In some cases, these requests ask AECT Headquarters to help draw random or purposeful samples. Additionally, the requested sample sometimes seems best derived from the total membership, and other times might best be drawn from a division or cluster of divisions.

As an international organization, AECT is an active supporter of research and wishes to facilitate research studies and sharing of results that may benefit the field. At the same time, AECT is responsible for assuring that its members receive no more requests for participation than are reasonable and that such participation requests are appropriate. AECT also has the responsibility of assuring its membership rolls are properly protected.

In order to help identify whether a request for a sample is appropriate for member participation and to facilitate deriving the proper sample, those requesting samples should provide the following information as part of their requests:

a. The title of the study for which a sample is requested.
b. The name, affiliation, title, and contact information of the requesting person or organization.
c. Whether the requester is a member of AECT, and if so, any divisions with which affiliated.
d. The size and nature of the requested sample.

e. Why AECT member participation is appropriate.

f. Specifics on those for whom participation might be most appropriate (for instance, age, gender, race, rank, experience, content area, type of employment, etc.)

g. Why the study is important to the field and why its results would be of interest/benefit to AECT members.

h. A description of how the results are to be used.

i. The name, affiliation, title, and contact information for advisors, chairs, or other supervisors involved.

j. An assurance statement that confirms the researcher(s) involved will not share participant data or participant addresses or emails, that contact information for participants will be retained under lock and key, and that such contact information will be destroyed upon completion of the research.

Upon receipt of such a request, the Executive Committee of the AECT Board will discuss the merits of the research and decide whether AECT should facilitate member participation in the proposed research. If participation does not seem appropriate, the Executive Committee – in consultation with the division officers and headquarters staff – will decide whether sampling is most reasonable at the organizational level of research and decide whether AECT should facilitate member participation in the proposed research. If participation does seem appropriate, the Executive Committee – in consultation with division officers and headquarters staff – will decide whether sampling is most reasonable at the organizational level or the divisional level, or some other level (for example, Special Interest Forum, Task Force, or Work Group). If the Exec feels that the request needs modification before AECT can facilitate participation or if AECT needs further information (such as confirmation by the requester’s affiliated organization), the requester may be asked to make such modifications or supply such additional information prior to approval.

Once AECT agrees to disseminate the survey, the researcher needs to file the following materials with AECT Headquarters prior to release of the member sampling list to the researcher:

k. A copy of approval by appropriate certifying panels or committees (such as Human Subjects Review or Institutional Research Boards), when such panels or committees have authority over the research.

l. Copies of all instruments to be used with AECT member
Hi Larry,

I received the full IRB approval today, which I have attached for your reference. Thank you so much for your patience. I have included all the requested information below. Thank you so much for everything that you do. I am so grateful to AECT for their support of my doctoral study.

**Start Date:** June 3, 2021  
**End Date:** July 2, 2021  
**Title of Study:** Associations Between Accessibility Knowledge, Practices, and Support in Online Higher Education: An Exploratory Factor Analysis  
**Description:**
The purpose of this study is to explore the associations amongst the characteristics of institutions and individuals who are responsible for implementing accessibility within online higher education courses.

Criteria for this study are:
- A person with a job role in which they are responsible for using, creating, reviewing, or enforcing the use of accessible content in online courses.
- A person who works for a higher education institution in the United States.
- Agree to participate in an online survey which should take about 10 minutes to complete.

Participants are asked to take an anonymous online survey. You can withdraw from the survey at any time by closing out/exiting the page, or you can contact Rita Fennelly-Atkinson at rxf036@shsu.edu. This study was approved by Sam Houston State University's Institutional Review Board on May 28, 2021, under IRB-2021-110.

If you meet the study criteria, please grant your member consent below.

**Study URL:** https://shsu.co1.qualtrics.com/jfe/form/SV_8wD7KZKuvjuLqR0  
**Contact Name:** Rita Fennelly-Atkinson  
**Contact Email:** rxf036@shsu.edu  
**Contact Response:** If left blank, the web page will deliver a generic 'Thank you for participating' response.
Rita Fennelly-Atkinson  
Doctoral Candidate  
Instructional Systems Design and Technology  
Department of Library Science and Technology  
College of Education  

From: Ivernon  
Sent: Friday, May 14, 2021 7:32 PM  
To: Fennelly-Atkinson, Rita  
Subject: Fwd: FW: Research Request  

Dear Rita Fennelly-Atkinson, 
This is what I need to post your study.  

Start Date:  
End Date:  
Title of Study:  
Description:  
Study URL:  
Contact Name:  
Contact Email:  
Contact Response: If left blank, the web page will deliver a generic 'Thank you for participating' response.  

FURTHER DETAIL  
Start Date: This is the date that the study becomes public on http://www.aect.org/publications/studies/  
End Date: This date terminates new participants.  
Title of Study:  
Description: This is the front page describing the survey. The AECT member consent form or link is automatically displayed at the bottom of the page.  

Study URL: Once an AECT member grants their consent the link to your study titled, 'Proceed to Study' is displayed and a generic thank you for participating. If you wish to have something more than the generic thank you for participating like more specific directions you may enter you own statement in the Contact Response.  

ContactResponse: If left blank, the web page will deliver a generic 'Thank you for participating' response. If you want more detail (directions, next steps,..ie) then add an additional message.  

Contact Name: Person doing the study (Your Name).  
Contact Email: (After every member consent an email is sent to this address announcing the AECT member's participation. Included in each participant confirmation message is a  


link displaying all participants. This is meant to be information only and requires no action on your part. If you do not want this information, then just set the email to webmaster@aect.org.

Once the study is set up the contact person (researcher/you) will receive an email from me giving the opportunity to review the post before a public announcement is sent.

Larry Vernon

-------- Original Message --------
Subject: FW: Research Request
Date: 2021-05-10 20:56
From: Phillip Harris
To: Iverson

Larry see if this is ready for distribution maybe next week. It is approved

Phillip Harris, Ed.D.
AECT Executive Director

From: "Fennelly-Atkinson, Rita"
Date: Monday, May 10, 2021 at 7:56 PM
To: Phillip Harris
Cc: LaPrairie, Kimberly
Subject: Research Request

Dr. Harris,

I would like to formally request approval for an AECT research participation request for a survey study I am conducting as part of my doctoral studies. I have attached the requested information to facilitate your decision. I will note that the IRB committee has provided conditional approval for the study, pending a memo of approval from AECT for this request. Upon that approval, the memo will be attached to the IRB application for final approval.

I greatly appreciate your time. I have cc'ed my doctoral advisor in case there are any questions we may be able to address. Thank you so much for your consideration.

Rita Fennelly-Atkinson
Doctoral Candidate
Instructional Systems Design and Technology
Department of Library Science and Technology
College of Education
Sam Houston State University
APPENDIX N

IRB-2021-100 Final Approval

Date: May 28, 2021 10:00:33 AM CDT
TO: Rita Fennelly-Atkinson Kimberly LaPrairie
FROM: SHSU IRB
PROJECT TITLE: Associations Between Accessibility Knowledge, Practices, and Support in Online Higher Education: An Exploratory Factor Analysis
PROTOCOL #: IRB-2021-110
SUBMISSION TYPE: Initial
ACTION: Exempt
DECISION DATE: May 28, 2021

EXEMPT REVIEW CATEGORY: Category 2.(i). Research that only includes interactions involving educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior (including visual or auditory recording). The information obtained is recorded by the investigator in such a manner that the identity of the human subjects cannot readily be ascertained, directly or through identifiers linked to the subjects.

OPPORTUNITY TO PROVIDE FEEDBACK: To access the survey, click here. It only takes 10 minutes of your time and is voluntary. The results will be used internally to make improvements to the IRB application and/or process. Thank you for your time.

Greetings,

Thank you for your submission of Initial Review materials for this project. The Sam Houston State University (SHSU) IRB has determined this project is EXEMPT FROM IRB REVIEW according to federal regulations.

Since Cayuse IRB does not currently possess the ability to provide a "stamp of approval" on any recruitment or consent documentation, it is the strong recommendation of this office to please include the following approval language in the footer of those recruitment and consent documents: IRB-2021-110/May 28, 2021.

We will retain a copy of this correspondence within our records.

* What should investigators do when considering changes to an exempt study that could make it nonexempt?

It is the PI’s responsibility to consult with the IRB whenever questions arise about whether planned changes to an exempt study might make that study nonexempt human subjects research.

In this case, please make available sufficient information to the IRB so it can make a correct determination.

If you have any questions, please contact the IRB Office at 936-294-4875 or irb@shsu.edu. Please include your project title and protocol number in all correspondence with this committee.

Sincerely,

Chase Young, Ph.D.
Chair, IRB
Hannah R. Gerber, Ph.D.
Co-Chair, IRB
APPENDIX O

AECT Member Research Participation Request

Request was live from June 3 – July 2, 2021. It was accompanied by an email and posting on the AECT member website.

Approved Research Participation Request

From time to time, AECT receives formal requests for the purpose of soliciting AECT members to participate in surveys and other studies. The section below displays the recent research initiatives approved by the Executive Committee.

Please take a moment to review the participation request(s) listed below.

**Participation Request 1:** Associations Between Accessibility Knowledge, Practices, and Support in Online Higher Education: An Exploratory Factor Analysis

**Participation Request 2:** Examining Doctoral Candidates’ Use of Media and Sense of Connectedness

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**How to Make Research Request**

AECT members can make a formal request for the purpose of soliciting our members to participate in surveys and other studies by follow the steps listed below.

- Review the Research Policy.
- Prepare a document outlining the study and questions.
- Include your name, and Email as the contact person.
- Include the start and ending date of the study.
- Include the link to the questionnaire if you already have it prepared. (Note: AECT will not create the questionnaire for you)
- Include a paragraph of instructions or guidelines you would like to be displayed after a member consents to participate.
- A copy of approval by appropriate certifying committees (such as Human Subjects Review or Institutional Review Boards), when such committees have authority over the research.
- Forward this information to the Philip Harris at pharris@aect.org

* Items needed for approval. The other information can come after approval is received.

---

**Research Participation Request**

*(Your member number is at the bottom of this page.)*

*Return to top*

**Study Title:** Associations Between Accessibility Knowledge, Practices, and Support in Online Higher Education: An Exploratory Factor Analysis

The purpose of this study is to explore the associations amongst the characteristics of institutions and individuals who are responsible for implementing accessibility within online higher education courses.

Criteria for this study are:

- A person with a job role in which they are responsible for using, creating, reviewing, or enforcing the use of accessible content in online courses.
- A person who works for a higher education institution in the United States.
- Agree to participate in an online survey which should take about 10 minutes to complete.

Participants are asked to take an anonymous online survey. You can withdraw from the survey at any time by closing out/exiting the page, or you can contact Rita Farmer-Alonzo at nfr36@shsu.edu. This study was approved by Sam Houston State University’s Institutional Review Board on May 28, 2011, under IRB-2021-116.

If you meet the study criteria, please grant your member consent below.

**Member Consent**

Dear AECT Member,

Thank you for your participation consideration on this potentially beneficial study. Please login to participate in this study upon which an email will be sent to Rita Farmer-Alonzo at nfr36@shsu.edu confirming your participation.

*Login to Participate*

Member No.: [ ]

Last Name: [ ]

Member Login: [ ]
Dear Rita Fennelly-Atkinson,

A New Research Participation Request titled, 'Associations Between Accessibility Knowledge, Practices, and Support in Online Higher Education: An Exploratory Factor Analysis' has been submitted by AECT member, Rita Fennelly-Atkinson, Sam Houston State University.

Please take a moment to review this study and give consideration to your participation.

* [CLICK HERE](#) to View Study
* This link is personally formatted for you. Do not forward this message.

Thank you for your support,

AECT Membership Services
APPENDIX P

Participant Social Media Recruitment

Social Media Posting
Want to participant in a doctoral research survey on #accessibility for online #InstructionalDesign? Must be based in the U.S. & design online courses for in #HigherEducation. Learn more and participate in the study https://sites.google.com/view/accessibilitystudy/home
#A11y

*Post will be deleted when a sufficient sample size (323) or 30 day from original posting.*

Public Recruitment Information in Website
https://sites.google.com/view/accessibilitystudy/home

Study Title
*Associations Between Accessibility Knowledge, Practices, and Support in U.S. Online Higher Education: An Exploratory Factor Analysis*

Purpose of the Study
The purpose of this study is to explore the associations amongst the characteristics of institutions and individuals who are responsible for implementing accessibility within online higher education courses.

Participants are asked to take an anonymous online survey. You can withdraw from the survey at any time by closing out/exiting the page, or you can contact Rita Fennelly-Atkinson at rxf036@shsu.edu. This study was approved by Sam Houston State University's Institutional Review Board on May 28, 2021, under IRB-2021-110.

Participation Criteria
Criteria for participation in this study are:
- A person with a job role in which they are responsible for using, creating, reviewing, or enforcing the use of accessible content in online courses.
- A person who works for a higher education institution in the United States.
- Agree to participate in an online survey which should take about 10 minutes to complete.

How to Participate in this Research Survey
By clicking the study link, you agree to participate in this anonymous online survey. Once you have completed the survey, click the “Submit” button on the “Thank you” page to exit the survey.
To participate in this survey, visit https://shsu.qualtrics.com/jfe/form/SV_EwDjKZKvujLqR0
This survey will be closed when the sample size is met or no later than 30 days from social media posting.

Thank you for your participation.

What are my rights as a research subject?
If you feel you have not been treated according to the descriptions in this form, or you have any questions about your rights as a research participant, you may call the Office of Research and Sponsored Programs – Sharla Miles at 936-294-4875 or e-mail ORSP at sharla_miles@shsu.edu
APPENDIX Q

IRB-2021-100 Modification

Date: Jun 29, 2021 10:37:38 AM CDT

TO: Rita Fennelly-Atkinson Kimberly LaPrairie  
FROM: SHSU IRB  
PROJECT TITLE: Associations Between Accessibility Knowledge, Practices, and Support in Online Higher Education: An Exploratory Factor Analysis  
PROTOCOL #: IRB-2021-110  
SUBMISSION TYPE: Modification  
ACTION: Exempt  
DECISION DATE: June 29, 2021  
EXEMPT REVIEW CATEGORY: Category 2.(i). Research that only includes interactions involving educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior (including visual or auditory recording). The information obtained is recorded by the investigator in such a manner that the identity of the human subjects cannot readily be ascertained, directly or through identifiers linked to the subjects.  

OPPORTUNITY TO PROVIDE FEEDBACK: To access the survey, click here. It only takes 10 minutes of your time and is voluntary. The results will be used internally to make improvements to the IRB application and/or process. Thank you for your time.

Greetings,

Thank you for your submission of Modification materials for this project. The Sam Houston State University (SHSU) IRB has determined this project is EXEMPT FROM IRB REVIEW according to federal regulations.

The following is a reminder of the changes that the IRB has approved with this Modification:

Due to low participation numbers inadequate to meet the needed sample size for analysis, this modification is requesting to expand the sample recruitment. Currently, participants are being recruited through a professional organization. This recruitment process will be maintained as is, and this modification will add recruitment of participants through social media and who do not belong to the professional organization listed.

Requested ADDITIONS/MODIFICATIONS (changes in bold):

Section 10.A Modification:

1. DELETION OF "who are members of the Association for Educational Communications and Technology (AECT), a professional organization."
Section 10.B.1 Modification:

- DELETION OF Must be a member of the Association for Educational Communications and Technology (AECT), a professional organization

Section 10.C.1 Addendum to existing participant involvement:

- Request for participation in the study will be posted on various public social media channels.
- The posting will include a brief description of the study with a link to a website with the purpose of the study, informed consent information, and practices to ensure anonymity.
- The website will direct interested participants to the study link.
- Once participants enter the study, they will agree to the informed consent before proceeding to the survey.
- The survey includes two filter questions that will end the survey if participants do not meet the study criteria (amended to remove membership in AECT).
- Those who meet the survey criteria will complete the survey that is expected to take approximately 13 minutes.
- Once the survey is completed, participants will be thanked for their participation. Respondents may receive periodic reminder emails if they have started but not completed the survey.

Section 10.C.2 Addendum to existing requirement:

- Participants will be asked to participate in a survey on social media ~ 2 minutes
- Participants will be able to read about study details ~ 5 minutes
- Participants will be asked to complete an online survey with an estimated completion time of 13 minutes. In total, participants are expected to spend less than 20 minutes on this survey.

Section 10.D.1.A Addendum:

- ADD I will post a link to my survey online using Twitter, Facebook, LinkedIn, Public Facebook Groups

Section 10.E. Addendum:

- ADD ATTACHMENT Social media recruitment messages: https://myshsu-my.sharepoint.com/:w:/g/personal/rxf036_shsu_edu/EXTfAg27n3ZlIH4s43E5Du0B0edb1ZBDWbW35PA31gwphg?e=gmfn4F
Section 10.F:

☐ ADD ATTACHMENT OF UNMODIFIED Consent documentation in the existing survey:  https://myshsu-my.sharepoint.com/:w:g/personal/rxf036_shsu_edu/ETSpOdjnsRGj5q_uF2fX0BS0jpHMyreWbwD6ppcp51wQ?e=fgCHF5

We will retain a copy of this correspondence within our records.

* What should investigators do when considering changes to an exempt study that could make it nonexempt?

It is the PI’s responsibility to consult with the IRB whenever questions arise about whether planned changes to an exempt study might make that study nonexempt human subjects research.

In this case, please make available sufficient information to the IRB so it can make a correct determination.

If you have any questions, please contact the IRB Office at 936-294-4875 or irb@shsu.edu. Please include your project title and protocol number in all correspondence with this committee.

Sincerely,

Chase Young, Ph.D.
Chair, IRB
Hannah R. Gerber, Ph.D.
Co-Chair, IRB
## APPENDIX R

### Variable Coding

<table>
<thead>
<tr>
<th>Question</th>
<th>Description</th>
<th>Coding Used for Variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1</td>
<td>Gender</td>
<td>0 = Other&lt;br&gt;1 = Female&lt;br&gt;2 = Male&lt;br&gt;3 = Prefer not to answer</td>
</tr>
<tr>
<td>Q2</td>
<td>Age (Years)</td>
<td>Continuous, not applicable</td>
</tr>
<tr>
<td>Q3</td>
<td>Primary Role Served</td>
<td>0 = Other&lt;br&gt;1 = Faculty/Instructor&lt;br&gt;2 = Instructional Technologist/Designer&lt;br&gt;3 = Administration/Leadership&lt;br&gt;4 = Disability service staff</td>
</tr>
<tr>
<td>Q4</td>
<td>Teaching Experience (Years)</td>
<td>Continuous, not applicable</td>
</tr>
<tr>
<td>Q5</td>
<td>Online Teaching Experience (Years)</td>
<td>Continuous, not applicable</td>
</tr>
<tr>
<td>Q6</td>
<td>Non-Instructional Online Support (Years)</td>
<td>Continuous, not applicable</td>
</tr>
<tr>
<td>Q7</td>
<td>Institution Type</td>
<td>0 = Does not apply&lt;br&gt;1 = Two-year&lt;br&gt;2 = Four-year&lt;br&gt;3 = Technical or trade school</td>
</tr>
<tr>
<td>Q8</td>
<td>Institution Type (Public/Private)</td>
<td>0 = Does not apply&lt;br&gt;1 = Public&lt;br&gt;2 = Private no-profit&lt;br&gt;3 = Private for-profit</td>
</tr>
<tr>
<td>Q9</td>
<td>Total Student Enrollment</td>
<td>0 = Don’t know&lt;br&gt;1 = Less than 999&lt;br&gt;2 = 1,000 – 2,999&lt;br&gt;3 = 3,000 – 9,999&lt;br&gt;4 = More than 10,000</td>
</tr>
<tr>
<td>Q10</td>
<td>Institution Offers Online Courses</td>
<td>1 = Almost never&lt;br&gt;2 = Occasionally&lt;br&gt;3 = Half the time&lt;br&gt;4 = Often&lt;br&gt;5 = Almost always&lt;br&gt;6 = Not applicable&lt;br&gt;7 = Don’t know</td>
</tr>
<tr>
<td>Q11</td>
<td>Institution Uses Systems and Policies</td>
<td></td>
</tr>
<tr>
<td>Q12</td>
<td>Institution Requires Disability Statement or Policy</td>
<td></td>
</tr>
<tr>
<td>Q13</td>
<td>Institutions Reviews Online Courses for Accessibility</td>
<td></td>
</tr>
<tr>
<td>Q14</td>
<td>Faculty or Instructor Responsible for Online Courses</td>
<td></td>
</tr>
<tr>
<td>Q15</td>
<td>Instructional Technologies or Designer Responsible for Online Courses</td>
<td></td>
</tr>
<tr>
<td>Q16</td>
<td>Administrator or Leader Responsible for Online Courses</td>
<td></td>
</tr>
<tr>
<td>Q17</td>
<td>Production Staff Responsible for Online Courses</td>
<td></td>
</tr>
<tr>
<td>Q18</td>
<td>Online Course Builders Responsible for Online Courses</td>
<td></td>
</tr>
<tr>
<td>Q19</td>
<td>Institutional Office or Department: Accessibility Review</td>
<td></td>
</tr>
<tr>
<td>Q20</td>
<td>Individual Academic Department, Schools, or College: Accessibility Review</td>
<td></td>
</tr>
<tr>
<td>Q21</td>
<td>Individuals: Accessibility Review</td>
<td></td>
</tr>
</tbody>
</table>
| Q24 | Completion of Institutional Training Required | 0 = Don’t know  
1 = Yes  
2 = No |
| Q25 | Training Support: Mentoring Program |
| Q26 | Training Support: Internal Course or Workshop |
| Q27 | Training Support: External Course or Workshop |
| Q28 | Training Support: Online Resources |
| Q29 | Training Support: Assistance |
| Q30 | Multimedia Use |
| Q31 | Documents with Text Formatting Styles |
| Q32 | Images with Alt Text |
| Q33 | Tables Contain Headers |
| Q34 | Videos Include Captions |
| Q35 | Videos Include Transcript |
| Q36 | Compliance with Accessibility Guidelines |
| Q37 | Use of Software Tool to Evaluate Accessibility |
| Q38 | Limitation: Time |
| Q39 | Limitation: Accessibility Knowledge |
| Q40 | Limitation: Access to Tools or Software |
| Q41 | Limitation: Budget |

1 = Almost never  
2 = Occasionally  
3 = Half the time  
4 = Often  
5 = Almost always  
6 = Not applicable  
7 = Don’t know
APPENDIX S

All Unrotated and Rotated Factor Loadings and Communalities

Unrotated Factor Matrix for EFA with Principal Axis Factoring

<table>
<thead>
<tr>
<th>Variable</th>
<th>Factor 1</th>
<th>Factor 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Training Support: Internal Course or Workshop</td>
<td>0.702</td>
<td>0.125</td>
</tr>
<tr>
<td>Training Support: Online Resources</td>
<td>0.620</td>
<td>0.117</td>
</tr>
<tr>
<td>Training Support: Assistance</td>
<td>0.573</td>
<td>0.057</td>
</tr>
<tr>
<td>Training Support: Mentoring Program</td>
<td>0.563</td>
<td>0.169</td>
</tr>
<tr>
<td>Compliance with Accessibility Guidelines</td>
<td>0.562</td>
<td>-0.252</td>
</tr>
<tr>
<td>Limitation: Access to Tools or Software</td>
<td>-0.528</td>
<td>0.309</td>
</tr>
<tr>
<td>Institutions Reviews Online Courses for Accessibility</td>
<td>0.522</td>
<td>0.338</td>
</tr>
<tr>
<td>Images with Alt Text</td>
<td>0.514</td>
<td>-0.161</td>
</tr>
<tr>
<td>Documents with Text Formatting Styles</td>
<td>0.483</td>
<td>-0.456</td>
</tr>
<tr>
<td>Institution Uses Systems and Policies</td>
<td>0.470</td>
<td>0.150</td>
</tr>
<tr>
<td>Use of Software Tool to Evaluate Accessibility</td>
<td>0.467</td>
<td>-0.039</td>
</tr>
<tr>
<td>Limitation: Budget</td>
<td>-0.458</td>
<td>0.285</td>
</tr>
<tr>
<td>Videos Include Transcript</td>
<td>0.408</td>
<td>0.020</td>
</tr>
<tr>
<td>Limitation: Accessibility Knowledge</td>
<td>-0.375</td>
<td>0.314</td>
</tr>
<tr>
<td>Individual Academic Department, Schools, or College: Accessibility Review</td>
<td>0.367</td>
<td>0.344</td>
</tr>
<tr>
<td>Limitation: Time</td>
<td>-0.341</td>
<td>0.285</td>
</tr>
<tr>
<td>Institution Offers Online Courses</td>
<td>0.226</td>
<td>0.109</td>
</tr>
<tr>
<td>Online Course Builders Responsible for Online Courses</td>
<td>0.215</td>
<td>0.654</td>
</tr>
<tr>
<td>Instructional Technologies or Designer Responsible for Online Courses</td>
<td>0.097</td>
<td>0.642</td>
</tr>
<tr>
<td>Production Staff Responsible for Online Courses</td>
<td>0.031</td>
<td>0.633</td>
</tr>
<tr>
<td>Administrator or Leader Responsible for Online Courses</td>
<td>0.135</td>
<td>0.580</td>
</tr>
<tr>
<td>Tables Contain Headers</td>
<td>0.410</td>
<td>-0.530</td>
</tr>
<tr>
<td>Institutional Office or Department: Accessibility Review</td>
<td>0.498</td>
<td>0.502</td>
</tr>
<tr>
<td>Faculty or Instructor Responsible for Online Courses</td>
<td>0.163</td>
<td>-0.348</td>
</tr>
</tbody>
</table>

*Note.* No rotation applied. Factors converged in 5 iterations.
<table>
<thead>
<tr>
<th>Variable</th>
<th>Factor 1</th>
<th>Factor 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Institutional Office or Department: Accessibility Review</td>
<td>.711</td>
<td>-.058</td>
</tr>
<tr>
<td>Online Course Builders Responsible for Online Courses</td>
<td>.626</td>
<td>-.359</td>
</tr>
<tr>
<td>Institutions Reviews Online Courses for Accessibility</td>
<td>.608</td>
<td>.083</td>
</tr>
<tr>
<td>Training Support: Internal Course or Workshop</td>
<td>.577</td>
<td>.364</td>
</tr>
<tr>
<td>Instructional Technologies or Designer Responsible for Online Courses</td>
<td>.536</td>
<td>-.427</td>
</tr>
<tr>
<td>Administrator or Leader Responsible for Online Courses</td>
<td>.517</td>
<td>-.355</td>
</tr>
<tr>
<td>Training Support: Online Resources</td>
<td>.514</td>
<td>.316</td>
</tr>
<tr>
<td>Training Support: Mentoring Program</td>
<td>.513</td>
<td>.239</td>
</tr>
<tr>
<td>Individual Academic Department, Schools, or College:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accessibility Review</td>
<td>.505</td>
<td>-.023</td>
</tr>
<tr>
<td>Production Staff Responsible for Online Courses</td>
<td>.484</td>
<td>-.463</td>
</tr>
<tr>
<td>Training Support: Assistance</td>
<td>.438</td>
<td>.331</td>
</tr>
<tr>
<td>Institution Uses Systems and Policies</td>
<td>.434</td>
<td>.192</td>
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<td>Videos Include Transcript</td>
<td>.297</td>
<td>.251</td>
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<tr>
<td>Institution Offers Online Courses</td>
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<td>.065</td>
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<td>Tables Contain Headers</td>
<td>-.104</td>
<td>.673</td>
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<td>Documents with Text Formatting Styles</td>
<td>.000</td>
<td>.664</td>
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<td>Limitation: Access to Tools or Software</td>
<td>-.139</td>
<td>-.581</td>
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<tr>
<td>Compliance with Accessibility Guidelines</td>
<td>.204</td>
<td>.560</td>
</tr>
<tr>
<td>Limitation: Budget</td>
<td>-.108</td>
<td>-.517</td>
</tr>
<tr>
<td>Limitation: Accessibility Knowledge</td>
<td>-.030</td>
<td>-.485</td>
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<tr>
<td>Images with Alt Text</td>
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<td>.459</td>
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<tr>
<td>Limitation: Time</td>
<td>-.028</td>
<td>-.440</td>
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<tr>
<td>Faculty or Instructor Responsible for Online Courses</td>
<td>-.142</td>
<td>.373</td>
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<td>Use of Software Tool to Evaluate Accessibility</td>
<td>.294</td>
<td>.335</td>
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</table>

*Note.* Rotation with Kaiser normalization. Rotation converged after 3 iterations.
### Variable Communalities for Factor Analysis

<table>
<thead>
<tr>
<th>Variable</th>
<th>Initial</th>
<th>Extraction</th>
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<tbody>
<tr>
<td>Institution Offers Online Courses</td>
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<td>.063</td>
</tr>
<tr>
<td>Institution Uses Systems and Policies</td>
<td>.659</td>
<td>.243</td>
</tr>
<tr>
<td>Institutions Reviews Online Courses for Accessibility</td>
<td>.632</td>
<td>.387</td>
</tr>
<tr>
<td>Faculty or Instructor Responsible for Online Courses</td>
<td>.392</td>
<td>.148</td>
</tr>
<tr>
<td>Instructional Technologies or Designer Responsible for Online Courses</td>
<td>.617</td>
<td>.421</td>
</tr>
<tr>
<td>Administrator or Leader Responsible for Online Courses</td>
<td>.486</td>
<td>.355</td>
</tr>
<tr>
<td>Production Staff Responsible for Online Courses</td>
<td>.639</td>
<td>.401</td>
</tr>
<tr>
<td>Online Course Builders Responsible for Online Courses</td>
<td>.638</td>
<td>.474</td>
</tr>
<tr>
<td>Institutional Office or Department: Accessibility Review</td>
<td>.648</td>
<td>.500</td>
</tr>
<tr>
<td>Individual Academic Department, Schools, or College:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accessibility Review</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Training Support: Mentoring Program</td>
<td>.507</td>
<td>.345</td>
</tr>
<tr>
<td>Training Support: Internal Course or Workshop</td>
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<td>.509</td>
</tr>
<tr>
<td>Training Support: Online Resources</td>
<td>.744</td>
<td>.398</td>
</tr>
<tr>
<td>Training Support: Assistance</td>
<td>.681</td>
<td>.332</td>
</tr>
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<td>Documents with Text Formatting Styles</td>
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<tr>
<td>Images with Alt Text</td>
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<td>Tables Contain Headers</td>
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</tr>
<tr>
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<td>.525</td>
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<tr>
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<td>.197</td>
</tr>
<tr>
<td>Limitation: Accessibility Knowledge</td>
<td>.559</td>
<td>.239</td>
</tr>
<tr>
<td>Limitation: Access to Tools or Software</td>
<td>.818</td>
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</tr>
<tr>
<td>Limitation: Budget</td>
<td>.792</td>
<td>.291</td>
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*Note.* Initial uses EFA with principal axis factoring. Extraction uses EFA with principal axis factoring and Promax rotation.
### VITA

#### EDUCATION

<table>
<thead>
<tr>
<th>Year</th>
<th>Degree</th>
<th>Institution</th>
</tr>
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<tbody>
<tr>
<td>In Progress</td>
<td>Ed.D. Instructional Systems Design and Technology</td>
<td>Sam Houston State University</td>
</tr>
<tr>
<td>2004</td>
<td>M.Ed. Secondary Education</td>
<td>Concordia University, Irvine</td>
</tr>
<tr>
<td>2002</td>
<td>B.A. Biology</td>
<td>Concordia University, Irvine</td>
</tr>
<tr>
<td>1999</td>
<td>A.A. General Studies</td>
<td>Palomar College, San Marcos</td>
</tr>
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</table>

#### EMPLOYMENT

<table>
<thead>
<tr>
<th>Year</th>
<th>Position</th>
<th>Organization</th>
</tr>
</thead>
<tbody>
<tr>
<td>2021-Present</td>
<td>Associate Director of Professional Learning Content</td>
<td>Digital Promise</td>
</tr>
<tr>
<td>2020-2021</td>
<td>Instructional Designer</td>
<td>Education Service Center Region 13</td>
</tr>
<tr>
<td>2019-2020</td>
<td>Instructional Designer</td>
<td>Instructure</td>
</tr>
<tr>
<td>2017-2020</td>
<td>Technology Design Coach &amp; Verizon Innovative Learning Schools Coach</td>
<td>Austin ISD</td>
</tr>
<tr>
<td>2016-2017</td>
<td>Special Education Curriculum Specialist</td>
<td>Austin ISD</td>
</tr>
<tr>
<td>2014-2016</td>
<td>Special Education Secondary Science Teacher</td>
<td>Austin ISD</td>
</tr>
<tr>
<td>2009-2013</td>
<td>Special Education Case Manager</td>
<td>Responsive Education Solutions</td>
</tr>
<tr>
<td>2003-2008</td>
<td>Secondary Science Teacher</td>
<td>Saddleback Valley ISD</td>
</tr>
<tr>
<td>1999-2000</td>
<td>Staff Writer and Researcher</td>
<td>San Diego Business Journal</td>
</tr>
</tbody>
</table>
UNIVERSITY AND PROFESSIONAL SERVICE

2021-Present  Graduate Student Representative
Accessibility Committee
Association for Educational Communications and Technology (AECT)

2020-Present  Appointed Student Representative
Learning Technology Advisory Committee
Texas Higher Education Coordinating Board

2020-Present  Committee Member
Diversity, Equity, and Inclusion Committee
Consortium for School Networking (CoSN)

2020-Present  President
LatinX Graduate Student Organization
Sam Houston State University

2020  Mentor Coach
Verizon Innovative Learning Schools
Digital Promise

2019-2020  Advisory Council
Verizon Innovative Learning Schools
Digital Promise

2019-2020  Online Communications Manager
LatinX Graduate Student Organization
Sam Houston State University

GRANTS AND FELLOWSHIPS

2015-2016  Learning Innovation Through Technology
Innovation Grants Pilot
Austin Education Fund

AWARDS AND HONOURS

2021  Quantitative Methodologies and Educational Measurement Finalist
In-Progress Research Gala, Division-D, AERA

2020  Finalist, 3 Minute Thesis Competition, SHSU

2019  ISDT Doctoral Scholarship, SHSU

2018  Academic Affairs Scholars, SHSU
PUBLICATIONS


CONFERENCES


Fennelly-Atkinson, R., Hanabury, T., & Martinez, M. (2018, November 30). Designing support for non-mainstream and Spanish-speaking Canvas users [Conference session]. CanvasCon Texas, Austin, TX, United States. https://events.bizzabo.com/CanvasConTexas/agenda/session/35945


PROFESSIONAL MEMBERSHIPS

AECT Association for Educational Communications and Technology
AERA American Educational Research Association
TAA Textbook & Academic Authors Association
TCEA Texas Computer Educator Association
TxDLA Texas Distance Learning Association