FACULTY PERCEPTION OF KNOWLEDGE AND PRACTICE IN DESIGNING AND IMPLEMENTING ACCESSIBLE ONLINE COURSES

by

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ABSTRACT

THELMA CHRISTA GUILBAUD. Faculty perceptions of knowledge and practice in designing and implementing accessible online courses. (Under the direction of DR. FLORENCE MARTIN)

This study examined the perceptions of university faculty on their knowledge and accessibility practices in designing and delivering online courses for students with disabilities. An online survey developed by the researcher was utilized to collect data on perceptions of awareness of disability laws, quality standards, utilization of tools and professional development support. Results from the study indicate that professional development training in online learning had a very significant influence on accessibility knowledge and practice. In addition, high perceptions of knowledge for institutional policy and terminology and low perception for accessibility laws and standards were found. Given the results of the survey, this research study has implications for the type of training and professional development support faculty who teach online need to receive. It is also found that higher education institutions need to take a proactive stance regarding strengthening faculty knowledge and awareness of disability-related laws and regulations. This is to ensure that courses are developed and implemented to allow all students, including students with disabilities, to fully participate and engage online.

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DEDICATION

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LIST OF ABBREVIATIONS

ACL	Administration for Community Living
ADA	Americans with Disabilities Act
CEI	Center for Educational Innovation
CTL	Center for Teaching and Learning
CSS	Cascading Style Sheets
CVAA	Twenty-First Century Communications and Video Accessibility Act of 2010
DOE	United States Department of Education
DOJ	United States Department of Justice
DOL	U.S. Department of Labor
EEOC	Equal Employment Opportunity Commission
FCC	Federal Communications Commission
GSA	U.S. General Services Administration
HEA	Higher Education Act 1965
HEI	Higher Education Institutions
HTML	Hypertext Markup Language
LMS	Learning Management System
NCDAE	National Center on Disability and Access to Education
NCES	National Center for Education Statistics
OCR	Office of Civil Rights
OSC	Online Schools Center
PDF	Portable Document Format

QA	Quality Assurance
QM	Quality Matters
Section 504	Section 504 of the Rehabilitation Act of 1973
Section 508	Section 508 of the Rehabilitation Act
UDL	Universal Design for Learning
W3C	World Wide Web Consortium
WAI	Web Accessibility Initiative
WCAG	Web Content Accessibility Guidelines
WHO	World Health Organization

CHAPTER 1: INTRODUCTION

In a climate of tightening budgets, declining traditional student enrollment, increasing competition for students, and urgent calls to provide greater student access, universities and colleges are under strong pressure to increase their online presence (Allen & Seaman, 2014; Anderson & Dron, 2010; Barr & McClellan, 2018; Saba, 2011). While overall college enrollment is declining, students are taking online courses at an accelerated rate (Lederman, 2018). Such a shift is not too surprising because online learning offers students the ability to take courses at any time and any place (Ko & Rossen, 2017). In addition, students today are demanding flexibility in options as they navigate school work while balancing other off campus interests, work, family, and or other obligations (White, 2015).

According to Seaman, Allen, & Seaman (2018), more than 6.3 million U.S. undergraduate students from over 4,700 colleges and universities surveyed, took at least one online course in the fall of 2016. This constitutes an increase of over five percent from the 2015 figures. As a result, higher education institutions have responded to the increased demand by offering more online courses and programs. This has led to a greater consideration to strengthen faculty competence and capacity so they can teach online courses effectively and efficiently (Hinson & LaPrairie, 2005; Martin, Budhrani, Kumar & Ritzhaupt, 2019; Wynants & Dennis, 2017). Moreover, with the increased online presence, many traditional public higher education institutions have extended access to diverse student populations and groups such as adult learners, working professionals, and students with disabilities, which previously were not a prime focus for them (Allen & Seaman, 2014; Betts, Cohen, & Broadus, 2013; Hadley & Archer, 2017).

Unsurprisingly, higher education institutions have been steadily expanding their online courses and programs to meet the needs of learners who want flexible, convenient, and comprehensive access to postsecondary education and training. At present, approximately 67.8% of four-year colleges and universities, both public and private, offer online classes (Allen and Seaman, 2017; Parker, Lenhart & Moore, 2014; Richardson, Besser, Koehler, Lim & Strait, 2016). Yet, many college presidents predict that online learning will continue to have a substantive focus at their institutions, and that most of their students will increasingly take online classes within 10 years (Akanegbu & Google, 2012; Parker et al., 2014).

Statement of the Problem

The number of students with disabilities pursuing post-secondary education and training has been steadily rising in the past few years (Simoncelli & Hinson, 2008). According to the most available data from the National Center for Education Statistics (2019), 19% of undergraduate students in 2015–16 academic year reported having a disability. These students have visual, aural, kinesthetic, or psychological impairments. Students with disabilities also have lower course completion rates compared to their non-disabled peers (Gladhart, 2010). While many steps have been taken to address the needs of students with disability who take courses on the traditional campus, fewer steps have been taken for online courses and program offerings to meet the needs of all students.

As a result, United States higher education institutions face significant challenges in regard to adequately serving students with disabilities who take online learning courses and programs. These are:

1. Effectively supporting the learning needs of all students, including those with a disability;
2. Supporting faculty to develop online courses that meet the needs of students according to their specific disability needs; and
3. Ensuring that online program and course offerings are compliant to federal and state laws and most specifically, with the Americans with Disabilities Act of 1990 amended 2008, and Section 504 of the Rehabilitation Act of 1973.

Students with Disabilities in Online Learning

Online learning is a flexible and relatively affordable alternative to taking courses on a traditional campus for abled as well as disabled students enrolled in postsecondary institutions (Online Schools Center, 2019). Long perceived as an equalizing medium, online learning was reported to be the means by which students with disabilities can have their impairments made invisible and where they can be related to on the meritoriousness of their work (Bowker & Tuffin, 2002; Kanevsky, 2012; World Health Organization, 2011). Thus, online learning offered by higher education institutions presents many opportunities for them to broaden their outreach to serve students with disabilities.

In responding to student demand, colleges and universities are offering many of their required courses, certificates, and degree programs solely online. As a result, students with disabilities often find they must take online courses in order to progress in their program. Given that students with disabilities are a diverse population (some students are hearing impaired, others are visually impaired, and some have physical or mental challenges), they are challenged in many ways in trying to navigate online courses that do not take accessibility into consideration (Burgstahler, 2015; Gladhart, 2010;

World Health Organization, 2011). In addition to the diversity of disability, these students also have demographic characteristics with differences in gender, age, socioeconomic status, sexuality, ethnicity, and cultures. Therefore, supporting the student needs to focus not only on the disability but the whole person.

Increasing access to higher education for students with disabilities does not automatically translate to equality in use of course content in the online learning environment. Hence, the lack of attention being paid to fully addressing the online needs of students with disabilities has the unintended consequence of marginalizing these students (Leake & Stodden, 2014). Moreover, faculty who teach and design the online courses are key to providing accessible learning environments that are inclusive of all learners (Betts, Cohen, Veit, Alphin & Broadus, 2013; Burgstahler, 2003; Marchetti, 2011). Further, research shows that the student-instructor interaction in addition to course organization and design are all important factors in facilitating enhanced learning experiences in both online and traditional face-to face courses (Kumar & Skrocki, 2017; Rand Education and Labor, 2012; Reupert, Maybery, Patrick, & Chittleborough, 2009; Schaffhauser, 2017). Yet, many of the faculty development and student support units and departments at higher education institutions wrestle with finding ways to meet the academic needs of postsecondary students with disabilities in the online environment.

Research shows that when students with disabilities try to explain their need for accommodations they find few faculty who are familiar with the difficult academic-related issues that they face, and fewer still who have the knowledge and skills to prepare online content that appropriately meets their needs (Betts et al., 2013; Getzel & Thoma, 2008; Terras, Leggio & Phillips, 2015). As a result, there is an urgent need to provide

faculty with training and professional development that will enable them to serve students with disabilities who take online courses in a new way. Transformative learning, as advanced by Mezirow (1991), is a theory that is oriented towards helping adult learners become more critically reflective so that they can achieve "integrated and discriminating meaning perspectives" (p. 225). A key advantage of transformative learning is the clear focus on placing subjects such as adult learners *in situ* to help provoke reflection on beliefs and practices.

For my study, I use transformative learning, as the framework as it provides a lens for examining, delineating, and re-orienting faculty perceptions with regards to learners with disability. I also argue that transformative learning can be used as the proverbial Archimedes lever to help faculty better integrate accessibility concepts in the design, implementation, and roll-out of online courses so they can meet the needs and requirements of learners with disabilities who enroll in those courses.

Legal Requirements Pertaining to Accessibility in Online Learning

Online courses that lack accessibility through course design place higher education institutions at legal risk. This is because the law requires all public and private postsecondary institutions to provide equal access to all students. State and federal laws, such as the Americans with Disabilities Act (ADA) of 1990, amended 2008 and (Section 504) of the Rehabilitation Act of 1973, apply to all organizations and entities that receive public funding. For example, the Rehabilitation Act passed in 1973 made it unlawful to discriminate against persons with disabilities in all federally assisted programs, services, and employment. Section 504 stipulates that, "no qualified individual with a disability in the United States shall be excluded from, denied the benefits of, or be subjected to

discrimination under any program or activity that receives federal financial assistance" (United States Department of Education, 2018).

Section 508 is a 1998 amendment to the Rehabilitation Act that requires electronic and information technology developed, procured, maintained, or used by federal agencies to be accessible by people with disabilities (Office of Information and Regulatory Affairs; 2012). The Americans with Disabilities Act (ADA) is civil rights legislation signed in 1990 to prohibit discrimination based on a student's disability. Public higher education institutions are required to comply with the ADA and Section 504 laws if they receive any type of federal funding.

Although it is a legal imperative that higher education institutions comply with the aforementioned laws, Betts et al. (2013) state that "accessibility is the right thing to do and training should be focused on students, their engagement online, and program completion," and therefore, go beyond the need to comply with laws. In fact, the laws alone do not provide sufficient guidance to ensure compliance. This is because they do not explicitly specify online courses in higher education. The lack of specific mention of online education in these laws has presented some challenges for those involved in delivering content to students with disabilities because there are not clear guidelines or standards on exactly how compliance is to be accomplished.

Currently, individual institutions must determine ways to ensure compliance based on their understanding of the laws and by relying on the Office of Accessibility to ensure student needs are being addressed. While there have been several high-profile disability court cases, (Helland, 2017; Loftus, 2019; U.S. Dept. of Education, Office of Civil Rights, 2014), few provide the precedent to assist higher education institutions on

how to meet the legal requirements for online courses (Helland, 2017; Loftus, 2019; Rothstein, 2010). However, there is enough information for higher education institutions to take proactive measures in the design and delivery of their online courses (Perez & Ali, 2010; U.S. Department of Education (DOE), 2010; U.S. DOE, Office of Civil Rights (OCR), 2014). For, with recent court decisions, as well as state laws and policies mandating accessibility for items such as websites, technologies, and documents for federal and state governments and public entities, more people are now aware of laws prohibiting discrimination and requiring accommodations (Federal Communications Commission (FCC), 2017; United States Department of Justice (DOJ), 2015 U.S. DOJ, OCR, n.d U.S. General Services Administration (GSA), n.d.).

Purpose of the Study

The research study examines higher education faculty including tenured/non tenured, full-time, part-time, adjunct, clinical instructors who teach undergraduate, graduate, degree and certificate programs in various disciplines, teaching in online or hybrid formats on their perceptions of the knowledge and practices on designing and implementing accessible online courses. Further, the study places focus on assessing the relevant training and professional development approaches to help faculty gain the competency required to effectively support students with disabilities who take online courses. Ultimately, the goal of the study is to expand upon the existing research to better inform practice on the need to develop, design, and implement online courses that are accessible to students with disabilities. Through the collection of data, the study will help raise faculty awareness and present opportunities for rethinking approaches to make online learning not only accessible but also engaging for all students.

Research Questions

The research questions addressed by the study are:

1. What are faculty perceptions of their knowledge in terms of creating accessible online courses for students with disabilities?
2. What are faculty perceptions regarding practices to create accessible online courses for students with disabilities?
3. How important do faculty think professional development supports are to help them incorporate accessibility considerations in their online courses?
4. Do faculty perceptions vary by key background factors for their capacity to design and implement accessible online tools for students with disabilities?

Survey Instrument

The study uses a researcher developed questionnaire with basic demographic, Likert-scale, and open-ended questions. The Likert scale measure faculty awareness and perception of their knowledge and practices in their online courses. The survey also ascertains information on the number of annual training for online teaching faculty receive and the professional development training they find beneficial. The open-ended questions provide a prompt to allow faculty to share their experience and understanding about ADA compliance in online courses and the types of training they expect to receive to strengthen their capacity to serve students with disabilities who take online courses.

Methodology

The study is primarily quantitative survey-based research, employing a convenience sample from the population of faculty members from three public higher education institutions in the Southeastern region of the United States. The survey

includes two qualitative survey open-ended questions to gain additional input on faculty perspectives. The research interest is to explore faculty perceptions of knowledge and practice in designing and implementing online courses for all students in order to gain insight on professional development and to ultimately develop ideas for best practices and future research.

Significance of the Study

It is clear, faculty play a crucial role in the academic achievement of students with disabilities in higher education. However, professional development and training has been limited in preparing faculty in understanding the various challenges of students with disabilities and fostering inclusive instructional practices into the design of the learning experiences (Betts et al., 2013; Wynants & Dennis, 2017).

The significance of the study is meant to provide insight on the support to be provided to faculty members, as adult learners with specific interests, characteristics, and world-views so that they are able to design online learning contents that meet the needs of all students, and most specifically those with disabilities. Faculty members may also receive greater professional development support that places more focus on universal learning or inclusive approaches from their higher education institutions. In this case, the beginnings of an established set of best practices in faculty development could enhance the knowledge gained from this study. Furthermore, the study explores the relationship between the knowledge of accessibility standards and proactive practices that employ design principles that are more student-centered and inclusive of all learners (deMaine, 2017).

Definitions

Several key terms are regularly referred to in this study and are central to this research. Operational definitions are as follows:

Accessible: means that individuals with disabilities are able to independently acquire the same information, engage in the same interactions, and enjoy the same services within the same timeframe as individuals without disabilities, with substantially equivalent ease of use. (University of Montana, Dept of Education, 2014).

Accessible online learning: The transaction of teaching and learning online where technology and web content, course materials and course design, are equally accessible and usable by students with and without disability (Burgstahler, 2004).

Accessible information technology: Technology that can be used by people with a wide range of abilities and disabilities. It incorporates the principles of universal design, whereby each user is able to interact with the technology in ways that work best for him or her (ADA National Network, 2019).

Assistive Technology: Assistive Technology Act of 2004, which defined an assistive technology device as "any item, piece of equipment, or product system, whether acquired commercially off the shelf, modified, or customized, that is used to increase, maintain, or improve functional capabilities of individuals with disabilities" (Administration for Community Living (ACL), n.d.).

Disability: A physical or mental impairment that substantially limits one or more major life activities, a record of such an impairment, or being regarded as having such an impairment (ADA National Network, 2019).

Equal Opportunity: An opportunity for people with disabilities to participate and benefit from programs and services that is equal to and as effective as the opportunity provided to others (ADA National Network, 2019).

Impairment: A physical impairment is a physiological disorder or condition, cosmetic disfigurement or anatomical loss affecting one or more of the body systems; a mental impairment is any mental or psychological disorder (ADA National Network, 2019).

Qualified individual with a disability: A person with a disability who satisfies the requisite skill, experience, education and other job-related requirements of the employment position such individual holds or desires, and who, with or without reasonable accommodation, can perform the essential functions of such position (ADA National Network, 2019).

Reasonable accommodation: Are "adjustments to the tasks, environment or to the way things are usually done that enable individuals with disabilities to have an equal opportunity to participate in an academic program or a job" (U.S. Department of Education, 2007).

Reasonable modification: "A public entity must modify its policies, practice, or procedures to avoid discrimination unless the modification would fundamentally alter the nature of its service, program, or activity" (U.S. Department of Education, 2007).

Transformative Learning: "the transformation of the learners' meaning perspectives, frames of reference, and habits of mind. It occurs when individuals change their frames of reference by critically reflecting on their assumptions and beliefs and

consciously making and implementing plans that bring about new ways of defining their worlds" (Mezirow, 1997).

Universal Design for Learning (UDL): A proactive learning model which allows accessibility features from the beginning of the development process of coursework without adaptation, allowing for a variety of formats to make learning accessible to everyone (Rose & Meyer, 2008).

Usability: Refers to the iterative testing and feedback process wherein users are observed as they interact with the product features (Quality Matters (QM), 2018).

Conclusion

Due to strong demand, higher education institutions are now offering more online courses (Allen & Seaman, 2017; Lederman, 2018). A key appeal to online learning is that it accommodates the busy schedules of students who cannot come to campus (Ko & Rossen, 2017). At the same time, the number of students with disabilities pursuing post-secondary education and training is also on the increase (NCES, 2019). Higher education institutions and faculty are thus striving to offer a teaching and learning experience to online students that is comparable to what is provided to traditional college attendees (Kolowich, 2012).

While many steps have been taken to support faculty in creating and teaching online courses that benefit student learners, students with disabilities are often overlooked (Online Universities, 2016; Phillips, Terras, Swinney & Schneweis, 2012). In the second chapter of this document, I present a perspective on the current knowledge related to issues that faculty face in regard to creating their online courses for students with disabilities. I also examine supporting literature on challenges students with disabilities

taking online courses in public higher education, and the legal implications for online learning. I also highlight in that chapter the issues and examples of interventions pertaining to design considerations and faculty development related to accessibility in online learning. I conclude chapter two of the document by offering a summary of knowledge including any gaps identified through the review of the current literature on the topic of accessibility in online learning.

The third chapter includes the methodology employed to assess faculty knowledge, practices and support in designing online courses that are accessible to students with disabilities. Details of the specific higher education institutions chosen is described, as well as the survey protocol relating to faculty knowledge, practices and professional development at the various institutions. Lastly, the procedure for analysis is described, including the method used for quantitatively analyzing the survey data.

CHAPTER 2: LITERATURE REVIEW

This literature review offers the context and state of online delivery and learning in the United States, with a special focus on faculty knowledge, practices, and training support to meet the needs of learners with disabilities. To achieve this aim, the literature looks at three scholarship domains, designated as *Macro*, *Meso*, and *Micro*. As illustrated in Figure 1 below, the *Macro* domain focuses on the online learning landscape. Next, the *Meso* or middle layer of the review explores the law and institutional readiness pertaining to accessibility in online learning. *Micro*, the final domain of the review examines the issues, approaches, and strategies that are directly connected to supporting online learners with disabilities.

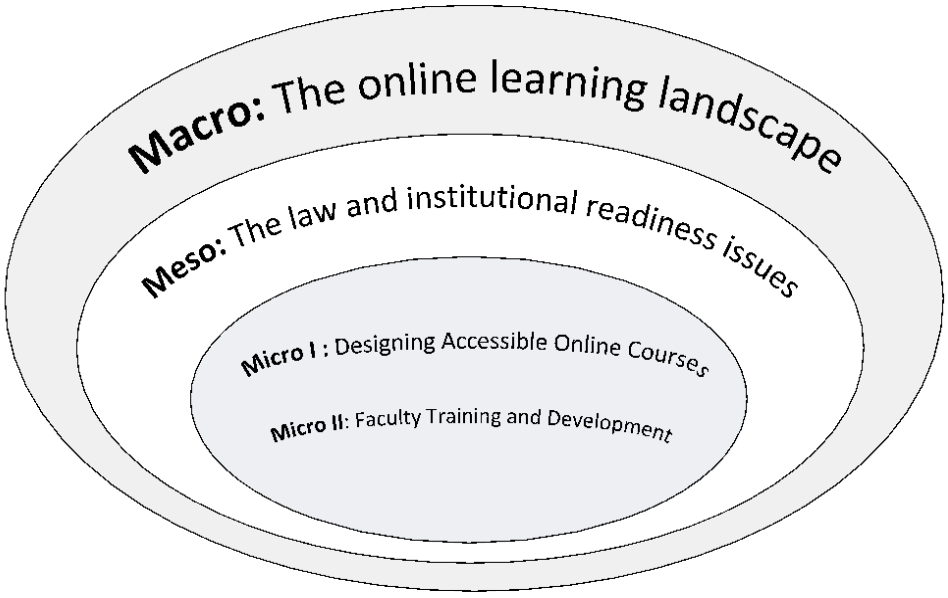


Figure 1. Structure of Literature Review

Theoretical Framework

As part of the *Macro* domain, the literature review explores current issues related to the rise of online learning in higher education. For example, while the Internet has

been widely used since the early 1980's, higher education institutions have only begun to use it as a learning platform in the past 20 years (Saba, 2011). Consequently, the *Macro* domain takes a close look at some of the factors driving increased online presence by the vast majority of colleges and universities in the U.S. (Allen & Seaman, 2014; Allen & Seaman, 2018, Gladhart, 2010; Lederman, 2018).

The *Meso* domain of the literature review looks specifically at some of the key reasons higher education institutions have been dedicating resources and personnel to support learners with disabilities who take online courses (Center for Educational Innovation, n.d.; Loftus, 2019; Rothstein, 2010; Perez& Ali, 2010). Laws and regulations related to campus accessibility, in general, and accessible online education, in particular, are examined (deMaine, 2017; Federal Communications Commission, 2017; Helland, 2017; Huss & Eastep, 2016; U.S. General Services Administration, n.d.). Key activities and endeavors undertaken by higher education institutions in response to accessibility-related laws and regulations are appraised and discussed (Seale, 2014; Yuknis & Bernstein, 2017). The *Meso* domain of the literature review also examines the organizational structure of higher education institutions to gauge its impact on responses and reactions by those institutions to accessibility-related laws and regulations (Cohen & Kisker, 2010; deMaine, 2014; Higher Education Compliance Alliance, n.d; Manning, 2013).

The *Micro* and final domain of the literature review focuses on designing accessible online courses and faculty training and development related to supporting learners with disabilities who take online courses (Barber & King, 2016; Baumgartner, 2001; Holmes & Kozlowski, 2015; Mezirow, 2000; Simoncelli & Hinson, 2008). The

Micro domain also examines current best practices to create, implement, and support effective and efficient accessible online learning courses. Further, the *Micro* domain assesses and determines the ways in which higher education institutions can take proactive steps and interventionary measures to ensure equitable access and support are afforded to learners with disabilities who take online courses (Basham, Stahl, Ortiz, Rice & Smith, 2015; Gappa & Austin, 2007; Rose, Meyer & Hitchcock, 2011).

The intent of the literature review is to look at themes, issues, practices, and outcomes that together offer a comprehensive view on how faculty can best be trained, supported, and assisted in creating and implementing accessible online courses and programs (Roehrs, Wang & Kendrick, 2013; Schaffhauser, 2017). Table 1 below lists the three domains, their sub-domains, and the key authors and publications that are pertinent to the literature review.

Table 1

Literature map

Domain	Sub-Domain Area	Key Authors / Publications
Macro - The Online Learning Landscape	● Structure and Governance of Higher Education	Bolman & Deal, 2017; Hrebiniak, 1978; Lunenburg, 2012; Manning, 2013; Cohen & Kisker, 2010; Renn, Reason, 2013; Birnbaum, 1988
	● Growth in Online Learning	Ko & Rossen, 2010; Allen &Seaman, 2013, 2017; Zumeta et al., 2012
	● Pedagogical Impact of Online Learning	Lombardi & Adam, 2017; Meyer, 2014; Linder et al., 2015; CEI, n.d.; Hadley & Archer, 2017
	● Learners with Disabilities in Higher Education	NCES, 2019; Seale, 2014; Terras et al., 2015
	● Challenges faced by online learners with Disabilities	

Domain	Sub-Domain Area	Key Authors / Publications
		Burgstahler, 2015; Seale, 2014; Terras et al., 2015
Meso – The Law and Institutional Readiness Issues	● Section 504 of the Rehabilitation Act, 1973	deMaine, 2017; FCC, 2017; Perez, Ali & U.S. DOE, 2010; Rothstein, 2010
	● Americans with Disabilities Act of 1990 amended 2008, title II and title III	Madaus, Kowitt & Lalor, 2012; ACL, 2019; Alnahdi, 2014; U.S. DOJ, 2009, 2015
	● Assistive Technology Act, 1998, amended in 2004 ● Section 508 of the Rehabilitation Act ● The Twenty-first Century Communications and Video Accessibility Act of 2010 (CVAA)	Brain Injury Association of America, 2019; CTD, n.d.; Chingos & Baum, 2017; Dill, 2015; Helland, 2017 Loftus, 2019; U.S. DOE, 2007, 2018; EEOC, 2008; GSA, n.d.
	● Higher Education Institution as a Public Good ● Institutional Readiness	East, Stokes & Walker, 2014; Wattenberg, 2004; Linder et al., 2015; Lombardi & Adam, 2017
Micro – 1) Designing accessible online courses; 2) Faculty Development	<u>Design</u> ● Online Learning Accessibility at the Onset	Burgstahler, 2003; 2015; Coombs, 2010; QM, 2018
	● Proactive Accessible Course Design Techniques and Approaches ● Universal Design for Learning	Izzo, Murray & Novak, 2008; Rodesiler &McGuire, 2015; Rose, Meyer & Hitchcock, 2011; Roehrs & Kendricks, 2013; CAST, 2019; Oswal &
	● Web Content Accessibility Guidelines	Meloncon, 2014; Web3c WAI, n.d.
	● Quality Assurance in Online Education ● Quality Matters	Betts et al., 2013; Cohn et al., 2016; Coy et al., 2014; deMaine, 2017; Diefenderfer, 2019; Herman, 2012
	<u>Faculty Development</u> ● Transformative Learning ● Training and Pedagogy ● Issues and Challenges ● Time commitment ● Workload balance ● Incentives	Baumgartner, 2001; Cranton, 1996; Kegan, 2000; Mezirow, 1991, 2000; Huss & Eastep, 2016; Keengwe & Kidd, 2010; Brooks, 2010; Kuhlenschmidt, 2010; Austin & Sorcinelli, 2013; Austin, 1990; Gappa & Austin, 2007; Gillespie, Robertson, & Associates, 2010

The Online Learning Landscape

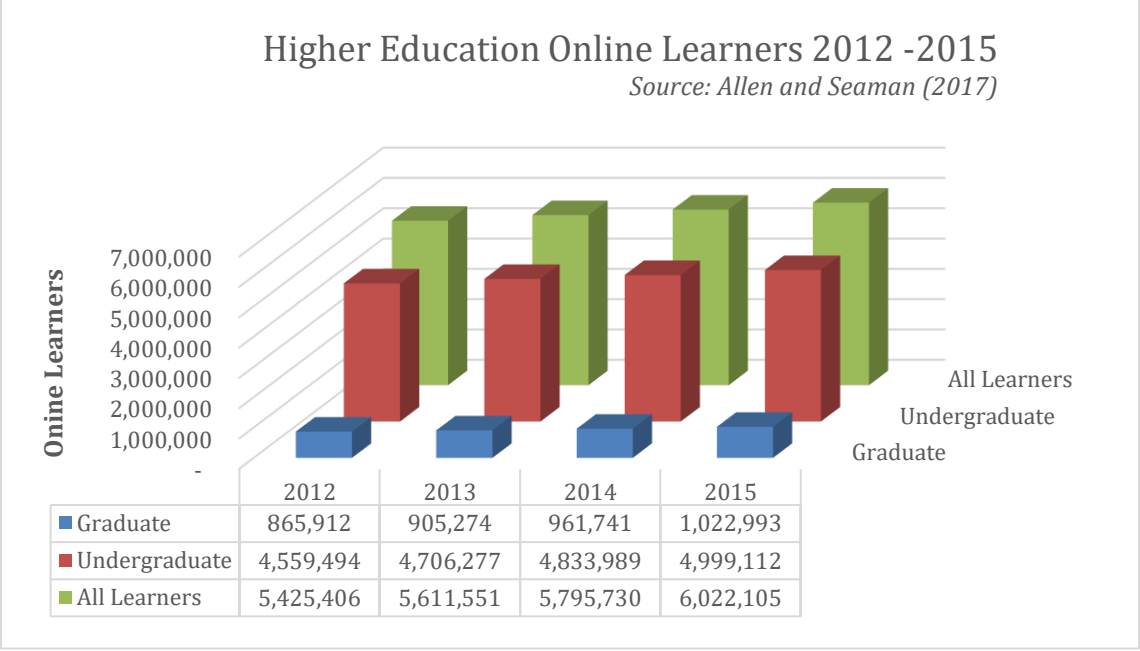
Online learning, often interchangeably referred to as eLearning, online education, or virtual learning, can be defined as any education or training that occurs through the Internet. Keengwe and Kidd (2010) add that online learning can be called "web-based training, distributed learning, cyberlearning, virtual learning, or net-based learning" (p. 533). According to Ko and Rossen (2010), online learning uses the Internet as the primary mode of communication and delivery of content for a course. "Teaching online can be conducted either partially or entirely through the internet…" (Ko & Rossen, p. 3). In fact, according to Allen and Seaman (2013), online courses have at least 80 percent of the content delivered via the internet, whereas in blended or hybrid instruction, 30 to 80 percent of the content is delivered online and online instruction is combined with traditional face-to-face settings. Both methods utilize various media and technologies to varying degrees for the delivery of the learning content.

Another important feature of online learning is the fact that neither the instructor nor the learner is bound by a fixed time and place (Ko & Rossen, 2017). Thus, students taking online courses never have to step foot on a college campus or see their instructor in person. Online learning offers freedom, flexibility, and convenience for both student and instructor. With online learning, instruction can be delivered either synchronously (in real-time with a designated meeting time) or asynchronously (instructor and students do not have to be online at the same time) and this constitutes a major appeal for those learners juggling multiple roles and navigating competing responsibilities, such as work and family (Peer Review, 2015; Terras, Leggio & Phillips, 2015). Students enrolled in online learning may be physically located anywhere in the world. Instructors also have

similar benefits in flexibility with time and location to deliver the online course when it works best for them.

Growth in Online Learning

In the past few years, there has been tremendous growth in online learning in the U.S. and globally (Gladhart, 2010). According to Allen and Seaman (2017), in fall 2015, the number of students taking at least one online course comprised 29.7% of all students enrolled in higher education institutions. Further, 25.9% of students in higher education institutions had taken distance education courses in 2012; that number reached 28.3% in 2014 (Allen & Seaman, 2017). Data from the National Center for Education Statistics (2019) reports that, in fall 2015, nearly 6 million students enrolled in a distance course, an increase by 3.9% over the previous year's statistics.



	2012	2013	2014	2015
Graduate	865,912	905,274	961,741	1,022,993
Undergraduate	4,559,494	4,706,277	4,833,989	4,999,112
All Learners	5,425,406	5,611,551	5,795,730	6,022,105

Figure 2. Distance Education Student Enrollment

Pedagogical Impact

Higher education institutions are now placing a greater focus on student-centered instruction (Wright, 2011). There is also a strong shift to move the responsibility of learning from the instructor to the student (Weimer, 2002). A unique feature of online learning is that it combines instruction and technology to engage learners. Thus, online learning, as an instructional delivery method, supports the move towards student-centered instruction and allocating greater responsibility for learning to the student. Consequently, online learning allows the repositioning of the instructor away from conveyer of knowledge or "sage on the stage" to facilitator or "guide on the side" (Baran & Correia, 2009; Barber & King, 2016; Portugal, 2015; Richardson, Besser, Koehler, Lim & Strait, 2016).

Further, the use of modern and advanced technology systems in conjunction with an institution's Learning Management System (LMS) makes it possible for the instructor or course designer to create educational experiences and interactions in online learning that are similar to what can be done in face-to-face courses (Barber & King, 2016). However, the pedagogical approach for online learning can leave faculty who are new to that delivery model feeling frustrated as they wrestle with issues such as "teaching presence" and "learners' cognitive engagement" (Barber & King, 2016; Stavredes & Herder, 2014).

In the case of the face-to-face course, "teaching presence" is relatively easy to distinguish because the students can see the instructor. In the online learning environment, "teaching presence" takes a different perspective, as the instructor needs to be a facilitator of learning. Likewise, to achieve learners' cognitive engagement, courses

need to be designed in a manner that allows students to fully participate in the learning experience even without the watchful eye of an instructor. Thus, for educators, online learning provides opportunities to experiment with new pedagogies, use different teaching approaches, and more closely adapt instructional activities to the needs of learners. Further, given the new delivery platforms, there is a strong impetus to help faculty gain the pedagogical and instructional skills needed to teach online (Barber & King, 2016; Marchetti, 2011; Wickersham & McElhany, 2010).

Learners with Disabilities in Higher Education

Recent reports and studies reveal that at least one in ten students in college reported having some forms of disability (Huss & Eastep, 2016; NCES, 2016; Patton, Renn, Guido-DiBrito & Quaye, 2016; Seale, Georgeson, Mamas, & Swain, 2015). Hadley and Archer (2017) report that students with learning disabilities make up the largest segment of students with disabilities enrolled at higher education institutions. However, Horn and Neville (2006) found that 11.3% of undergraduate students in higher education reported their disabilities as follows: ‘‘3.8% visual, 5.0% hearing, 0.4% speech, 25.4% orthopedic, 7.5% specific learning disability, 11% attention deficit disorder, 21.9% mental illness/depression, 17.3% health impairments/problems, and 7.8% other’’ (p. 134). The difference in the two reports may be due to how the disability is either reported by the students or categorized by the researcher. In fact, the numbers of students with a disability may be much higher as many students fail to disclose their disability either because they do not know how or out of fear of being stigmatized (Patton et al., 2016; Terras et al., 2015; Yuknis & Bernstein, 2017).

According to the Americans with Disabilities Act of 1990, the term “disability” refers to an individual: (a) with a physical or mental impairment that substantially limits one or more major life activities of the individual; (b) who has a record of the impairment; or (c) as regarded as having such an impairment” (U.S. Department of Justice, 2009). Major life activities involve limitations in caring for oneself, performing physical activities, seeing, hearing, speaking, learning, reading, and concentrating (National Center for Education Statistics, 2019).

The disabilities as stated above are very important to consider regarding accessibility in the online learning context. Students with disabilities taking online courses can have one or more impairments that affect their ability to be successful.

The National Center for Education Statistics (2019), reports that psychological impairments such as: depression, anxiety, post-traumatic stress can additionally pose significant barriers to learning for the student. Despite the many challenges, the enrollment numbers for students with disabilities at post-secondary institutions continue to rise (Patton et al., 2016). Online learning presents increased opportunities for students with disabilities to complete their post-secondary education, especially for students who are less inclined to navigate the on-campus landscape (Basham, Stahl, Ortiz, Rice & Smith, 2015; Case & Davidson, 2011). Unfortunately, students with disabilities have a lower degree completion rate than their abled peers (Izzo, Murray & Novak, 2008; Katsiyannis, Zhang, Landmar, & Reber, 2008).

Challenges faced by online learners with Disabilities

While online learning offers many opportunities for access to higher learning, when courses do not take into consideration students with disabilities, this can create

many challenges, concerns, and some uncertainties for the academy. For example, deMaine (2014) relates a story about a graduate of Harvard Law School who is deaf describing her challenging online learning experience. The student states that "What I want to stress to universities is that …when they build online learning tools, think about accessibility because there are small changes [they] can make that would make it easily accessible to hundreds and hundreds of students" (p. 532).

Further, according to Vasek (2005), faculty members at most institutions are not always prepared to provide the necessary accommodations to assist students with disabilities who take online courses. For example, Seale (2014) argues that some faculty members believe that student support services such as disability offices are the sole entities that are responsible for making sure the student receives the appropriate accommodations.

Moreover, research shows that many faculty members in higher education have limited knowledge on the challenges and the legal obligation that higher education institutions have to adequately serve students with disabilities (Burgstahler, 2003; Katsiyannis et al., 2008; Lombardi & Adam, 2017). As a result, the typical response offered at many institutions is to point students needing help to the Office of Accessibility. Yet, many online courses are not designed to be adjusted in a post-hoc fashion to facilitate the complete integration of learners with disabilities. Thus, despite the reactive approach to accommodate the needs of students with disabilities, faculty and staff are challenged when trying to retrofit the learning contents and assessments used in those courses to make them more accessible (Case & Davidson, 2011). Faculty may require an approach to designing online instruction that challenges them to think in a dramatically different way from their current perspective. A shift in thinking about the

ways in which the learner experiences the online environment. This research argues that in order for this to happen, for change to really occur, faculty need to undergo a challenge to their established perceptions or a transformative experience to better understand how students with disabilities engage and interact in online learning.

Summary of the Online Learning Landscape

Many studies show that the challenges and perspectives of students with disabilities are not often considered in the design and roll-out of online courses (Burgstahler, Corrigan & Mccarter, 2004; Madaus, Kowitt & Lalor, 2012). Further, technology support staff, student support services, and even administrators are often ill-prepared to provide the support required to allow students with disabilities to fully participate and engage in their online courses. Therefore, a comprehensive approach and strategy must be developed and implemented by institutions seeking to ensure all learners, including students with disabilities, have the opportunity not only to take online courses but also the chance to engage in enriching learning experiences in those courses like all of their peers (Fisseler & Schaten, 2010; Katsiyannis et al., 2008). A sustainable practice would involve a combination of course design, learner support, and faculty training to achieve the goal of making online learning more inclusive for all students. Moreover, by moving away from a hodge-podge type of an approach to serving students with disabilities, agile institutions can place themselves in position to meet relevant academic, legal, and ethical needs and requirements to serve learners with disabilities on an ongoing basis (Lombardi & Adam, 2017).

The Law and Institutional Readiness

Table 2

Assistive-Related Law Pertaining to Higher Education

Law	Year	Focus	Agency	Target	Impact
ADA	1990, amended 2008	Anti-discrimination statute designed to ensure equal access	DOJ, DOL, EEOC	HEIs-public/private Gov't, Private	Direct
Sec 504	1973	Protects the rights of individuals with disabilities from discrimination solely on the basis of the disability	DOJ, DOL, EEOC	HEIs-public / private Gov't, Private	Direct
Sec 508	1998, 2000, currently in revision	promotes equality for people with disabilities is responsible for developing Information and Communication Technology (ICT) standards and guidelines	DOL, EEOC	Federal agencies	Indirect
HEA	1965, amended 2008	Broaden access and improve outcomes for students with disabilities	DOJ, DOL, EEOC	HEIs-public/private	Direct
TRAID Act	1988, amended 1994	Access and Funding for Assistive Technology	DOL, EEOC	HEIs-public / private Gov't	Direct
CVAA	2010	accessibility compliance for the web and other technologies	DOL, EEOC	Federal/state agencies, Private	Indirect
Assistive Tech Act	1998, amended 2004	financing state activities and programs for device reutilization, device demonstration and device loans	DOL, EEOC, DOH	HEIs-public/private Gov't, Private	Direct

There are several federal laws and numerous state laws in place regarding individuals with disabilities. These require equity in accommodation and offer protection against discrimination to those individuals. The most influential laws and enforceable by the Office of Civil Rights are: Section 504 of the Rehabilitation Act of 1973 and Title II and Title III of the Americans with Disabilities Act of 1990 amended in 2008, and

Section 508 of the Rehabilitation Act. The Higher Education Act (HEA) 1965, is the law that governs college and other post-secondary programs. Updated in 2008, HEA 1965 focused on broadening access and improving outcomes for students with disabilities pursuing higher education.

The Technology-Related Assistance for Individuals with Disabilities Act (TRAID) of 1988 (reauthorized in 1994) was passed by Congress to increase access to, availability of, and funding for Assistive Technology through state efforts and national initiatives (Congress.gov, 2004). It forms the basis for the Assistive Technology Act, signed into law in 1998 (amended 2004). Other laws, such as the Twenty-First Century Communications and Video Accessibility Act of 2010 (CVAA), provide some guidance on accessibility compliance for the web and other technologies, but they specifically apply to government and or private organizations and not to higher education institutions. Additionally, there are state and federal laws requiring public higher education institutions to assure their online material is accessible to current and prospective students and employees. However, higher education institutions are specifically obligated to comply with Section 504 and the ADA as these laws provide protections and equal access and use of all products, services, and facilities for individuals with disabilities.

Section 504 of the Rehabilitation Act, 1973

Section 504 of the Rehabilitation Act or simply Section 504, is a federal law that protects the rights of individuals with disabilities from discrimination solely on the basis of the disability in programs and activities that receive federal financial assistance. Section 504 states that: “No otherwise qualified individual with a disability in the United States . . . shall, solely by reason of her or his disability, be excluded from the

participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance" (U.S. Department of Education, 2018, p. 1). Section 504 also requires that any organization or program receiving federal assistance is required to adhere to this law. Although the law was enacted in 1973, well before the existence of any online programs, it would apply to higher education institutions since they receive federal funds in the form of grants and student financial aid. This means that it is a requirement that all programs and activities adhere to the law and not exclude individuals with disabilities from participation in online courses.

Americans with Disabilities Act of 1990 amended 2008, title II and title III

The Americans with Disabilities Act (ADA) of 1990, amended in 2008, is an anti-discrimination statute designed to ensure equal access to opportunities, programs, and benefits for qualified individuals with disabilities in education, employment, and other areas. It is enforced by several federal agencies, including the Department of Justice, Department of Labor, and the Equal Employment Opportunity Commission (Higher Education Compliance Alliance, n.d.). The amended 2008 version of the ADA added to the meaning of disability so that the definition would be broadly construed and applied (EEOC, 2008). Title II regulations, under the ADA, apply to state and local government entities which require that students with disabilities enjoy an equal opportunity to participate in all school activities and public schools. This can be done through the provision of auxiliary aids and services allowing for effective communications to students with or without disabilities, regardless of whether or not the entities receive federal funding (U.S. Department of Justice, Civil Rights Division, n.d.). Title III applies

to programs and services provided by private entities. Title II of the ADA, states that “no qualified individual with a disability shall, by reason of such disability, be excluded from participation in or be denied the benefits of the services, programs, or activities of a public entity, or be subjected to discrimination by any such entity” (U.S Department of Labor, n.d).

Section 504 of the Rehabilitation Act of 1973 and Title II and III of the Americans with Disabilities Act of 1990, were enacted many years before the proliferation of technologies we have today. Yet, they provide sufficient protections against discrimination of individuals with disabilities. These laws also ensure equal access, and benefits regarding accessibility requirements with regard to technologies that were unimaginable in 1990 and most certainly in 1973. And to further emphasize the point, in 2010 the Department of Justice (DOJ) and the Department of Education jointly voiced their concerns and issued standards guiding the accessibility of educational technology to students with disabilities, in this particular case, those with visual impairments, further enforcing Section 504 and the ADA, Title II and Title III (Perez & Ali, 2010).

The general provisions of the laws require that higher education institutions provide equal access to programs and services offered. Therefore, online courses need to be accessible to students with disabilities and reasonable accommodations provided to ensure they receive equal opportunity to participate. Reasonable accommodations include the use of assistive devices. Accessibility of online courses is also addressed in the Higher Education Opportunity Act (2008) through an advisory committee regarding

accessible instructional materials and funding for professional development and technical support on accessibility (Madaus, Kowitt & Lalor, 2012).

The ADA Amendments of 2008 and the Rehabilitation Act together made provisions for auxiliary aids and services which include: special services and resources for the hearing and visually impaired - interpreters, taped texts, modifications to equipment and devices (National Association of the Deaf, 2002). So far, it is mainly through Section 504 and the ADA that legal cases with complaints against higher education institutions have been successfully leveraged.

Assistive Technology Act, 1998, amended in 2004

The Assistive Technology Act defines an assistive technology device as "any item, piece of equipment, or product system, whether acquired commercially off the shelf, modified, or customized, that is used to increase, maintain, or improve functional capabilities of individuals with disabilities," (Brain Injury Association of America, 2019, p. 1; National Federation of the Blind, 2017). Assistive technology can be either high-tech or low-tech. Rather, low-tech assistive technology includes items such as: eyeglasses, highlighters and organizers for the cognitively impaired to pencil grips for individuals with writing impairments. With the advancements in technology, there are a great deal more high-tech devices available, such as voice recognition programs or screen readers and text to-speech readers for individuals with visual disabilities, and electronic sign-language dictionaries for individuals with hearing impairments (Center on Technology and Disability (CTD), n.d.).

The Assistive Technology Act of 2004 reauthorized the assistive technology programs in all states and territories and set forth a core set of program services to

increase program consistency across the country in support of activities related to: financing state activities and programs for device reutilization, device demonstration, and device loans (Administration for Community Living (ACL), U.S. Department of Health and Human Services, n.d.).

Section 508 of the Rehabilitation Act

Section 508 of the Rehabilitation Act is an amendment to the 1973 act which impacts federal agencies and departments to ensure that their websites, databases, electronic documents, and all other electronic information are as equally accessible to the disabled as to the nondisabled employees and members of the public (GSA, n.d.). Although Section 508 does not directly impact higher education institutions, it provides guidance on how compliance with Title II and Section 504 are assessed by the Office of Civil Rights. The U.S. Access Board, a federal agency that promotes equality for people with disabilities and is responsible for developing Information and Communication Technology (ICT) standards and guidelines for governing federal procurement practices, updated and revised Section 508 and Section 255 of the Rehabilitation act. The revisions were in response to future trends and innovations in technology for the U.S. and abroad (U.S. GSA, n.d.). The standards are in sync with the standards issued by the European Commission and with the World Wide Web Consortium (W3C) Web Content Accessibility Guidelines (WCAG 2.0), a globally recognized standard for web content and ICT.

The Twenty-first Century Communications and Video Accessibility Act of 2010 (CVAA)

The CVAA was enacted to target accessibility of digital content to the disabled. The act provides guidance for captioning video content. Although Section 508 and the CVAA mainly apply to hardware, software, and video content producers and providers and not to U.S. colleges and universities, they can provide guidance on proactive decision-making for institutions on areas for accessibility to technologies (FCC, 2017).

Institutional Readiness Pertaining to Online Learning Accessibility

U.S. colleges and universities, whether private or public, hold very special positions in the country due to the nature of their mission, activities, community engagement, and impact on society. For example, colleges and universities serve as arbiters of social mobility as they determine who receives a college degree, which is a major requirement for a well-paying job or career advancement opportunities in the United States (Davidson, 2016; Gray, 2017; Hart Research Associates, 2013). Colleges and universities also serve as the official guardians of knowledge (Collins & Skover, 2012; Cunningham, 2007). In that capacity, they are the official public institution that is given the task to teach and train the next generation of leaders of the country.

Thus, in many ways, our colleges and universities can be viewed as a public good for the community, whether local, regional, national, or even global, that they serve (Dill, 2015; East, Stokes & Walker, 2014). Moreover, colleges and universities receive subsidies from the state and federal government in the forms of direct funding, research grants, aid to students, and tax-breaks (Chingos & Baum, 2017; Deming & Walters, 2017; Snyder, 2015). Many laws and regulations govern the activities of those

institutions, including a requirement that they provide equal access to education and academic support to all students, including those with disabilities (Higher Education Compliance Alliance, n.d.; National Association of the Deaf, 2002).

However, higher education organizations are complex entities and are characterized by imperatives that are often competing and contradictory (Manning, 2013). A unique feature of the higher education organization which contributes to its complexity is the coexistence of parallel governing bodies: the professional authority of the faculty and the legal authority of administration. Unlike other types of organizations where decision-making occurs along a vertical line of authority to accomplish a singular goal, higher education organizations are comprised of dual systems of decision-making that are often in conflict (Hrebiniak, 1978).

Despite having to operate under challenging and conflicting imperatives, higher education institutions must be agile, as they need to keep up with both academic needs and requirements of their students. These include the professional development offerings to be provided to faculty such as training on pedagogy, instructional design, and academic support of students who take online courses. Many academic institutions now have a unit called the Center for Teaching and Learning (CTL) or some variations thereof, which has the focus or mission to help faculty with the pedagogical aspect of their courses (Austin & Sorcinelli, 2013). As a result, the CTL offers workshops, seminars, and short courses on learning theories and instructional approaches that facilitate the understanding and comprehension of course materials (Herman, 2012). Given the rise in online learning offerings, most institutions also have an Office of Distance or Online Education (Diefenderfer, 2019; Herman, 2012). That unit often has

the responsibility to help faculty with the design of high-quality online courses. It also typically manages the institution's Learning Management System (LMS), often in partnership with the Information and Computing Technology unit or department (Diefenderfer, 2019). Training activities offered to faculty by the Office of Distance Education tend to be on instruction design, effective use of the university LMS, and external or vendor-specific tools and applications such as Turnitin or YouTube that are used to enhance the learning of course materials by students.

In addition, many academic institutions also have an Office of Accessibility, which serves as a focal point for all issues related to learners' accessibility including compliance with existing laws and regulations on that issue (Linder, Fontaine-Rainen & Behling, 2015; Yuknis & Bernstein, 2017). As a result, the Office of Accessibility is the go-to unit when faculty members become aware that they have students with disabilities in one of their classes (Getzel & Thoma, 2008).

The Office of Accessibility usually offers information, advice or detailed guides and plans pertaining to supporting the learner with disability, whether in face-to-face or online courses (Seale, 2014; Yuknis & Bernstein, 2017). However, as the focus of existing efforts tend to be post-hoc, as a result, students with disabilities do not often have the full range of support and intervention necessary to successfully engage in their online courses and programs (Burgstahler, 2003; Burgstahler, 2015; Linder et al., 2015). Consequently, higher education institutions that seek to serve and support students with disabilities who wish to take online courses will need to explore proactive measures and approaches to achieve that aim.

Summary of the Law and Institutional Readiness

Public higher education institutions are chartered by states according to the U.S. Constitution (Cohen & Kisker, 2010). Governing boards in both public and private higher education institutions, appoint a board of trustees, who in turn, appoint the President or Chancellor to oversee the administrative and financial affairs of the institution (Cohen & Kisker, 2010; Zumeta, Breneman, Callan & Finney, 2012). Another factor facing higher education institutions is the responsibility the administrative authority has to adhere to the legal state and federal laws. Thus, they are very sensitive to mandates from the government.

Moore (2018) states that faculty are often seen as barriers to change by administration in situations where quick adjustment is needed to respond to a legal requirement, from offering courses that are compliant with laws and regulations to providing equitable online learning access to students with disabilities. Yet, as control of curriculum rests on the faculty at higher education institutions, they need to be consulted and grant their approval for all additions, changes, adjustments, and updates to courses and other academic offerings **(**Birnbaum, 1988; Bess & Dee, 2012).

Nonetheless, the ultimate goal of all higher education institutions is educating students. Therefore, the bureaucracy and collegium of faculty must work together to accomplish the institution's goal. As full and adequate support of learners with disabilities is part of the goal of an institution, approaches and plans must be developed to offer viable online courses and programs to those students as part of its long-term strategy (CEI, n.d.; Dirr, 2003; Zumeta et al., 2012).

Designing accessible online courses

The increase in the number of students with disabilities who are taking online courses has created new challenges for higher education institutions (Alamri & Taylor-Wood, 2017; Simoncelli & Hinson, 2008). This is because of the needs and requirements to have learning experiences and assessment approaches that are accessible to all students, as noted previously. Moreover, when online courses are not designed and implemented to accommodate the needs of all students, they effectively become major barriers to learners with disabilities (O'Hanlon, 2005). For example, according to Betts et al. (2013), it is very common for instructors to present their online content with MS Word and PDF documents. However, students with visual impairments who rely on screen readers for assistance may still be unable to read the text that is part of a course requirement if they are not formatted and organized to accommodate assistive devices (Alnaldi, 2014).

Videos are another medium through which faculty present their content since many students like the visual presentation (Duerig, 2016; Roscorla, 2017). And still, students with hearing impairments will not benefit from them if they do not have captions or include transcripts, and those with cognitive impairments will be challenged if the videos have too much information- music, text, media effects (Betts et al, 2013). While there is a greater awareness at the institutional level of the need to provide necessary accommodation to learners with disabilities in campus-based courses, many online courses are very often designed and taught solely for the abled students (Harrison, 2006). At the same time, researchers and practitioners such as Edmonds (2004) and Burgstahler (2015) have noted that in order to have online courses that are inclusive of all

students it is imperative that higher education institutions address the pedagogical and technical issues around accessibility.

Online Learning Accessibility at the Onset

Because of the lack of targeted focus on designing accessible online courses at the onset, current approaches to support learners with disabilities are often made in post-hoc fashion (Oswal & Meloncon, 2014). This leads to online courses that are inconsistent, unevenly designed and not learner inclusive. Furthermore, students with non-traditional learning styles can also encounter barriers to accessibility (Gladhart, 2010). As a result, some researchers advocate for designing online course content and delivery with a focus on accessibility at the onset. Even so, adjustments to the design of the course can significantly improve the learning experiences for all students (Burgstahler, 2015; Burgstahler, Corrigan & Mccarter, 2004).

Three approaches that have been proven to be successful in creating inclusive online learning courses are: 1) Proactive Accessible Course Design Techniques, 2) Use of Universal Design Principles, and 3) Quality Assurance in Online Learning. Each of these three approaches, which are discussed in the next sections of the document, has some strengths and weaknesses. Thus, the context of use might ultimately be the deciding factor concerning which inclusive course or curricular design approach might be better suited for a given institution.

Proactive Accessible Course Design Techniques and Approaches

Numerous studies show that the approach taken by faculty regarding course design serves as an important influence on student engagement in online learning (Martin, Budhrani, Kumar, & Ritzhaupt, 2019; Roehrs, Wang & Kendrick, 2013).

Moreover, online courses are required to be compliant with existing laws and requirements pertaining to learners' accessibility. Thus, faculty need to consider learners' accessibility in the design of online courses to ensure full support of all learners as well as compliance with existing laws. Case et al. (2011) on the other hand offer that compliance with the law should not be the primary motivating factor in the drive to make online courses accessible to students with disabilities; they argue that accessibility is an ethical imperative.

To achieve proactive accessible course design, instructors and staff may need to position themselves in the place of students with disabilities (Hutchings, O'Hora, Peters, Richards, Fryer & Battisti, 2001; Simoncelli & Hinson, 2008). This is because lack of understanding of the challenges faced by students with disabilities taking online courses is often a key reason for the implementation and rollout of inaccessible courses. For instance, some faculty at times use images that are difficult or even impossible for students who have visual impairments to process or understand. Yet, informative or decorative images that convey meaning will be imperceptible to screen readers if they do not include "alternative text" to help visually impaired learners understand what the image is about (deMaine, 2014). Moreover, lessons that include audio clips without transcription are not accessible to students who are deaf or hearing impaired. For students who have hearing impairments or learning disabilities, accessibility becomes a challenge if they do not have captioning. Captions help with comprehension of dialogue, learning terminology, and enhancing concentration (Linder, 2016). Yet a national survey found faculty use of captions on videos varies according to their institution's priority to accessibility (Linder, 2016; Roscorla, 2017).

It is also fairly common for faculty to require students go to third party external internet sites and databases. Yet, documents at the external sites and the content on the websites may not be easily accessible to students with various types of disabilities.

Researchers and practitioners agree, there are many online access strategies that can be implemented to assist individuals with disabilities (Burgstahler, 2015; deMaine, 2014; Huss & Eastep, 2016). The strategies listed below provide a highlight of a few basic tasks that can enable greater accessibility to the content in the online course:

First, Burgstahler (2015) states that it is important to include a statement on the syllabus on how to request disability accommodations and report inaccessible design features in the course. This means making sure content is available in a variety of formats and accessible by many devices e.g., smart phones, tablet PCs, desktop computers, and laptops (Rose et al, 2011). Online instructors should ensure content is presented logically and consistent so that students can focus on content and not on how to sort through a mass of information (Smith & Basham, 2014). Online classes, whether delivered either in hybrid/blended or fully online, are typically hosted by a learning management system (LMS) such as, Blackboard, Canvas or Moodle. Common features used in the LMS are the discussion board, chat, wikis and quizzes. Faculty can eliminate some barriers to usability of their content by checking the accessibility icon feature on their institution's LMS. There are similar accessibility checkers in MS Word and through Adobe Acrobat Pro for Portable Document Format (PDF) files. The accessibility feature identifies violations and provide solutions to remedy (Coombs, 2010).

Other inclusive approaches include the use of descriptive text for links rather than using wording like "click here", as this sort of verbiage can cause frustration,

especially when that is the only information that is provided for multiple links on a page (Burgstahler, 2003; Coombs, 2010). Further, the content on pages for MS Word and PDF documents can be structured using the integrated heading styles features, such as "Heading 1" or "Heading 2". Such an approach provides cues that can be picked up by screen-readers as style headings have embedded code that provide information about the structure and layout of a document. Additionally, such structure provides consistency in organization to assist learners with cognitive impairments. However, when headers are created manually, the embedded code is not available and therefore organizational structure is undetected.

If colors or particular fonts are used as the primary means to convey important information, then students who are colorblind or have learning disabilities may be challenged with accessing the information. It is as equally important to provide alternative means to communicating the information in the online course. Lastly, the use of alternative text is necessary to describe important content presented through images and providing captions or transcripts is essential for videos (Coombs, 2010; Huss & Eastep, 2016). Thus, proactive accessible course design anticipates the various needs of students with disabilities from planning to implementation of the online course, while modifications and accommodations made after the initial online course design in response to a student's need is considered reactive (Perno & Fattor, 2019).

Other Accessibility Related Design Considerations

Universal Design for Learning. Universal Design is based on the idea that environmental spaces-architectural structures such as wheelchair ramp access- can be designed to accommodate everyone at the beginning stage of planning (Leake & Stodden,

2014; National Disability Authority, n.d.). Therefore, universal design anticipates barriers and plans access that is inclusive to all. *In A practical reader in universal design for learning*, Rose and Meyer (2008) introduced Universal Design to the education world. In the guide, they highlight significant aspects of the Universal Design for Learning that would make school curriculum accessible to meet the needs of a wide range of students (Dell et al., 2015).

According to the Higher Education Opportunity Act of 2008, Universal Design for Learning (UDL) is defined as a "scientifically valid framework for guiding educational practice," (CAST, 2019, p.1). Hence, UDL places the responsibility with the higher education institution to design and implement curriculum and information to address how students participate and engage in learning by reducing barriers to instruction (Rose, Meyer & Hitchcock, 2011; UDL in Public Policy, 2019). Further, Burgstahler (2015) states that within the last decade, "Universal design" (UD) and other similar approaches such as "design for all" or "inclusive design" are frameworks in use to describe proactive design and development of instruction.

Frameworks such as the Universal Design for Learning Model provide useful guidelines that make online content accessible to a wider range of students with disabilities (Tobin, 2014). Research and studies on the subject have also found that implementing UDL principles enhance the quality of the learning experiences for all students whether they have a disability or not (Coy, Marino & Serianni, 2014; Dell, Dell, & Blackwell, 2015; Harrison, 2006; Simoncelli & Hinson, 2008).

Web Content Accessibility Guidelines. The accessibility of websites is a major barrier for individuals who have disabilities. Having accessible web content is used as a

first line of communication for all organizations, including higher education institutions. The World Wide Web Consortium (W3C), is an internationally recognized organization established in 1999 that brought together web developers from all over the world. The W3C through the Web Accessibility Initiative (WAI), developed the Web Content Accessibility Guidelines (WCAG) 2.1 to provide information, education, communication to develop a wide range of recommendations and guidelines for making Web content more accessible globally (Web3c WAI., n.d.). The (WAI) is committed to developing and promulgating its web accessibility guidelines on technical specifications such as HTML, and CSS, and educational resources to help make the web accessible to people with disabilities. The goal for the (WCAG) is to make websites useful to all users and provide explanations and recommendations on solving some of the problems faced by users with disabilities. Faculty who refer their students to external websites should be aware of the types of challenges that students with disabilities encounter and ensure there is an accessibility statement on the site to assist students accessing the content.

Through the use or integration of UDL, WCAG 2.0 and similar frameworks in implementing online courses, HEIs have proven and tested approaches to help them in reducing barriers to instruction for students with disabilities (Rose, Meyer & Hitchcock, 2011; CAST, 2019). Consequently, higher education institutions have the means and capacity to meeting the needs of students with disabilities who take online courses. By so doing, they will be able to meet the academic, legal, and ethical imperative to help faculty proactively develop accessible online courses. In addition, they will be able to ensure that all students – irrespective of their disability status – receive the highest quality teaching and learning possible in their pursuit of their desired academic credential.

Quality Assurance in Online Education

There are several quality assurance frameworks and approaches available to guide the planning, designing, and reviewing of online courses that have been adopted by many higher education institutions (Schaffhauser, 2017). In addition to providing a useful and tested approach to designing quality online courses, these frameworks and approaches often place strong focus on accessibility in online learning. A major advantage to using a pre-existing framework when designing an online course is that they follow best practices (Roehrs, Wang & Kendrick, 2013; Schaffhauser, 2017). Further, there is usually a community of practitioners for the existing frameworks, which can be tapped into for suggestions and advice in the design and implementation of quality online courses. The most common online learning quality assurance frameworks and approaches used in the U.S. are Quality Matters (QM), Web Content Accessibility Guidelines (WCAG 2.0), and the Universal Design for Learning (UDL) Framework.

Quality Matters

Quality Matters (QM) is a peer-review national standards system that focuses primarily on course design instead of delivery (Gillespie, Robertson & Associates, 2010). QM is grounded in research on effective and engaged learning and promotes best practices for instructors and instructional designers for online learning (Quality Matters (QM), 2018). The QM rubric is useful for providing a good starting point to assist faculty with Standard 8 for enhancing accessibility and usability. Many instructional designers and online course developers at U.S. higher education institutions follow the QM rubric as a guide. The areas of review involve ensuring the online course is well - organized, easy to navigate, provides information in multiple formats and promotes the

use of technologies that are accessible and provides the learner with information on how to obtain accommodations. Roehrs et al. (2013) report that faculty members tend to follow QM standards before ever having a formal review as many already apply writing measurable learning objectives and linking assignments and assessments to learning outcomes. Roehrs et al. (2013) suggest that familiarity with the QM standards may be sufficient to educate and easily encourage faculty to adopt the standards to improve the quality in their own online courses.

Summary of Designing Accessible Online Courses

The design and implementation of accessibility in online course decisions will require a change in paradigm where emphasis is placed on holistic ---instead of targeted or selective --- faculty support and interventions (Burgstahler, 2015). deMaine (2014) states that it is more efficient and cost-effective in the long run to plan for accessibility at the initial phase of the development of the online course. Moreover, in order to ensure that students of all abilities are able to fully engage in the online course, the instructor needs to be intentional in the steps taken in creating an accessible online course environment (Dell, Dell & Blackwell, 2015).

As presented in this section, it is best for Higher Education Institutions (HEI) to take proactive steps and actions to ensure their online learning offerings are accessible to all students, including those with disabilities. Such a focus and orientation will involve training and supporting faculty in the methods, guidelines, and principles of UDL, WCAG, and other accepted practices, in regard to facilitating inclusion and participation of students with disabilities in online learning courses. Further, the use of a Quality Assurance (QA) model such as Quality Matters helps in informing whether an HEI has

met its goals and objectives related to accessibility in online learning. Finally, the offices of disability or accessibility on campus can help ensure that HEI remains in compliance with existing laws and regulations concerning accessibility while providing support to students with disabilities.

With the anticipated expansion of online education, greater focus will need to be placed on designing, supporting, and verifying accessibility in online learning at HEIs in the United States. Thus, the use of proactive measures (UDL and WCAG) in conjunction with evaluative efforts (QA) allow HEIs to offer efficient and effective support to learners with disabilities who take classes in-seat or online at the institution, while meeting all compliance related measures and ordinances related to accessibility in online learning.

Faculty Development to Support Online Learners with Disabilities

As teaching online requires designing and delivering instruction that is very different from how it is delivered in face-to-face settings, designing instruction that is considerate of the needs of students with disabilities adds complexity to the online environment. Some faculty will need to approach the design of online instruction in a new way. These faculty will need to shift the way they think about the ways in which the learners experience the online environment. Professional Development programs can provide faculty opportunities to reflect on their perceptions of the students and on their online teaching practices. Professional development training can be designed to bring about challenges to faculty assumptions and beliefs about who their students are and how they experience their online environments. As experts in their discipline, faculty are often inclined to teach in the way they were taught and may often be unaware of the students

enrolled in their course who have a disability. Students with disabilities are often an overlooked population when instructors begin their course planning (McQuiggan, 2012; Perno & Fattor, 2019). As mentioned earlier, the approach used for designing and developing instruction for students with disabilities is often reactive (Perno & Fattor, 2019). However, this approach is very problematic as it requires retrofitting course materials that is often a time-consuming process, and which does not accommodate providing a timely an equitable learning experience for the student (Madaus, Kowitt & Lalor, 2012; Oswal & Meloncon, 2014). Burgstahler (2015) and McQuiggan (2012) propose that faculty would need to experience a paradigmatic shift in thinking to understand the online context of learning of their students and their broad range of abilities. Essentially, Burgstahler (2015) and McQuiggan, (2012) describe a transformational learning experience as described by adult learning theoreticians (Baumgartner, 2001; Cranton & Roy, 2003; Mezirow, 2000).

When considering ways to support faculty in teaching online, Farmer (2004) states that it is important that model approaches of faculty development support tap into adult resources of the learners' life experiences and knowledge according to the research theories on adult learning (Knowles, 1980). Subsequently, central to the practitioner's understanding of working with faculty is the role experience plays in that learning. Faculty as adult learners also value learning and sharing with peers with whom they can interact and discuss relevant issues in Communities of Practice (Terosky & Heasley, 2014). These communities are comprised of learners with different levels of knowledge and expertise where novice learners can engage at the periphery and move toward the center as their knowledge matures (Lave & Wenger, 1991). The structure of the

collegium, with its flat non-hierarchical and culture of equality among peers, requires a theoretical framework that is amenable to stakeholder participation, responsibility and encourages ownership.

The theory would embrace the flow of information laterally and assist faculty in achieving their own goals through reflection and dialogue. Transformative learning theory, viewed through various lenses over the decades (Boyd, 1989; Dirkx, 1998; Kegan, 2002; Mezirow, 2000) provides the ideal framework necessary to facilitate the type of paradigmatic shift in thinking that faculty who teach online would need to take firmly established proactive and inclusive learning practices in their courses for all students. The critical elements for transformative learning to occur are the lived experiences faculty bring to the learning context, the need to critically reflect on those experiences and an environment that encourages reflective discourse on knowledge and practice (Mezirow, 2000).

Professional training and development has evolved through various stages over several decades from faculty sabbaticals that supported academic research, to a focus on more student-centered pedagogical practices in response to changing student learning needs (Gillespie, Douglas & Associates, 2010; McCombs, 2015; Sorcinelli, Austin, Eddy & Beach, 2006). At present, most postsecondary institutions in the United States, regardless of size and type, have some form of faculty development to promote growth in education and practice for teaching, research and service (Gillespie et al., 2010; Kidney, 2004; Sorcinelli et al, 2006). Professional development provides significant opportunities for faculty training on accessibility knowledge and skill development in online courses.

Issues and Challenges

There are many offices available at most academic institutions to help faculty improve accessibility in online learning. Nevertheless, the faculty are ultimately responsible for ensuring that their online courses adequately meet the learning needs and requirements of all students. Further, given the rise in online learning, training and professional development of faculty for that medium is becoming more critical. Research and studies on the subject propose that preparing faculty to teach in the various online delivery modes, either fully online, hybrid or web-centric, necessitates the importance for higher education to make training and professional development for faculty a priority (Hinson & LaPrairie, 2005; Holmes & Kozlowski, 2015; Kidney, 2004). Further, as technology and online education continues to be pervasive in higher education settings, faculty members need to readily seek out support from professional developers especially when using instructional technology in teaching and learning in their online courses (Gillespie et al., 2010 in referencing Chickering & Ehrmann, 1996).

According to Kuhlenschmidt (2010), the institution has a responsibility to support faculty by providing education and training on instructional technology that address key ethical and legal issues such as the accessibility for students with disabilities to online courses. However, university instructors may not receive adequate training in effective practices for teaching students with disabilities (Katsiyannis, Zhang, Landmar, & Reber, 2008; Vitelli, 2015). Unless faculty receive the appropriate knowledge and support in designing and implementing teaching strategies that meet the diversity of learning needs, barriers to access will persist for students with disabilities (Alamri & Tyler-Wood, 2017; Izzo, Murray, & Novak, 2008; Lederman, 2017). “People with disabilities who are on the

right side of the first digital divide, too often find themselves on the wrong side of the second digital divide. They have technology but do not have full access to all of the benefits it delivers to others." (Burgstahler, 2005, p. 84).

Key issues that are often presented by faculty as impediments to being properly trained to teach online and to support learners with disabilities are time commitment, lack of an incentive regime, scheduling conflicts, and inappropriateness. While these issues may not be present in all cases, together they form the major barriers to helping faculty be ready to ensure their courses are accessible to all of their students, including those with disabilities.

Time commitment. Lombardi and Adam (2017) state that research supports that faculty who participate in trainings and workshops are more aware of students with disabilities and apt to provide more accommodations. However, even when educational materials or professional development activities are developed to provide support, faculty are not always in a position to take advantage of the offerings. According to the results of a national NCES 2011 survey of 29 public postsecondary institutions, 70% of faculty responded that a major barrier on their part to participating in training opportunities related to accessibility knowledge is lack of time (Lombardi & Adam, 2017; Raue & Lewis, 2011).

Workload balance. Due to the nature of faculty work and the diversity of needs and teaching schedules, faculty have limited time to attend traditional workshops that require they attend at a specific time and location (Gappa, Austin & Trich, 2007; Lombardi & Adam, 2017). Faculty report challenges to negotiating their time with professional and disciplinary criteria of tenure and promotion which rewards scholarly

productivity ahead of teaching and other activities such as student advising and community involvement (Austin, 1990). Also, since there is an increase of full-time and part-time non-tenure track and adjunct faculty among the teaching ranks, they have different career needs. Faculty have demanding teaching loads and are expected to integrate new technologies when designing and developing learning experiences for their students.

Incentives. Faculty also spend a great deal of effort and time developing technology-enabled instruction for student learning. Institutional incentives that value their efforts are not reflected in the tenure and promotion schedule. Faculty at some point in their career will also teach some mode of online learning. Online learning has added a new dimension to the teaching and learning transaction. Thus, compensating faculty for the time and commitment that it takes to develop the skills required to teach online can help with achieving the goal of expanded course and program delivery via the online medium (Gappa, Austin & Trice, 2007).

Transformative Perspective - Faculty as Learners

Faculty are experts in their fields. They have deep knowledge and ability in their academic domain. As noted, faculty must also balance a number of priorities to include teaching, advising, conducting research, and participating in service activities at the department, school or college, and university level. As a result, the professional development and training offerings provided to faculty are often seen through the lens of faculty as scholars. Yet many faculty members are new to the online teaching area. A great number of faculty members often look for fresh opportunities to strengthen their

pedagogical and technical skills so they can achieve the expertise to teach in all types of delivery formats to include face to face, hybrid, and online.

As a result, there is a need to incorporate the perspective of faculty as adult learners in training and development efforts. Such a change in perspective offers a lens to understand that faculty must often negotiate the relevance, practicality, and appropriateness of what they are being asked to learn before they can fully engage in it (Brookfield, 1986; Holford, 2017; Knowles, Holton & Swanson, 2015). Further, a transformative perspective would help to provide a heuristic device that can be used to enhance faculty awareness on their assumptions about their students and the challenges they encounter in online courses.

According to Mezirow (1991), transformative learning theory explains how adult learners negotiate meaning from their personal experiences and the influences of the social environment. Morrell and O'Connor (2002) describe transformative learning as "a shift in consciousness that dramatically and permanently alters our way of being in the world" (p. 49), which Mezirow (1991) says happens when newly encountered knowledge does not fit with our assumptions. In his 10-Step Model, Mezirow (2000) explains the phases learners go through when they are confronted with knowledge that conflicts with their existing paradigmatic worldview.

For some faculty members who teach online, being made aware of students with disabilities taking online courses and the challenges they encounter with accessibility of course content, can lead faculty to experience a "disorienting dilemma." As offered by Merriam & Bierema (2014), a "disorienting dilemma" is a state brought about by a significant personal event or an accumulation of experiences over time that come together

to foster transformation. The “disorienting dilemma,” is the first step that happens in Mezirow’s 10-step transformative learning model.

The subsequent steps in the phases of the model are as follows: Step 2, initial feelings experienced, for example, bewilderment, shame, denial, etc, which leads to Step 3, critically reflecting on personal assumptions, next is step 4, others sharing experiences, then Step 5, exploring avenues to moving forward, and Steps 6 and 7, planning for change; movement toward gaining knowledge and skills, leading to Steps 8 and 9, practicing the new skill; new confidence in the new practice, and finally, as Whitelaw, Sears and Campbell (2004) summarize, that by arriving at Step 10, habits of mind are fully formed by integrating existing with new frames of reference to a transformed perspective that is more global and inclusive. Further elaborating on Mezirow’s perspective, Cranton (1996) and Kegan (2000) state that the actual lynchpins of Transformative Learning are critical reflection and reflective discourse. These, they say are absolutely necessary for personal as well as professional change to actually occur.

Some researchers question whether in fact learners go through all 10 steps of the model or challenge Mezirow’s learning perspective as leaning too heavily toward the cognitive rational and ignores the influences of the sociopolitical, historical, cultural and spiritual in the transformative learning process (Baumgartner, 2001; Collard & Law, 1989, Taylor, 2007). However, many researchers agree that transformative learning theory provides solid basis to explain adult learning that is life-changing (Christie, Carey, Robertson & Grainger, 2015).Transformative learning as a framework in Professional Development offerings can provide opportunities for the paradigmatic shift in thinking that is necessary for faculty to change the way they think about their students in the

online learning environment and initiate revolutionary changes in faculty approaches to course design.

The way forward: Helping faculty improve accessibility in online learning

As discussed in previous sections of this document, many higher education faculty members are not often aware of the need to consider students with disabilities in the design of online learning courses (Burgstahler, 2015). Therefore, given the need, professional development and training should help faculty position themselves in the context of their students with disabilities (National Center on Disability and Access to Education (NCDAE), n.d.). To meet the challenges of time and scheduling conflicts, individualized, flexible, multimodal training should be offered to accommodate different teaching schedules and the ebb and flow in the seasonal cycles of a semester (Herman, 2012). Seale (2014) argues that, faculty prefer training experiences that are less-time intensive and more portable. Because faculty have heavy teaching loads, faculty training should be in the form of just-in-time formats, as such an approach permits a quick refresher or answer to a specific question (NCDAE, n.d.). Support and training activities should be faculty-centered and customized to their specific learning needs and adapted to teaching discipline (Gappa, Austin & Trice, 2007). To accommodate the differences in faculty schedules, online videos should be available to watch at times that are convenient.

According to Lawless and Pellegrino (2007), the use of technology in education has become more widespread. Therefore, when done properly professional development and training of faculty need to place emphasis on the appropriate use of technology and instruction in online learning and presented as an incentive for career development, management and growth.

Summary of Faculty Development to Support Online Learners with Disabilities

It has become increasingly important that postsecondary institutions formulate a strategy to make their online content accessible and usable for all students. A major factor in supporting faculty in designing accessible online content must consider the culture of faculty autonomy and academic freedom. Given the importance and requirements for institutions to equitably serve and support all learners, it is important that they have the skills and capacity to effectively teach and accommodate students with disabilities who take online courses. Therefore, faculty training is essential. Martin et al. (2019) reference Palloff and Pratt (2001) in stressing the importance for faculty professional development and training to teaching online given that their role has to be more of facilitator in the technology mediated context. Thus, programs such as individual consultations, targeted workshops and seminars and mentoring in addition to other more specialized instruction offer the best chance to help faculty serve in the facilitator role when they are tasked or have agreed to teach online (Gillespie et al., 2010; Sorcinelli, Austin, Eddy & Beach, 2006). Moreover, while a majority of research has examined faculty knowledge and attitudes regarding accommodating students with disabilities in face-to-face classroom settings, there is limited research on the knowledge, practices and supports faculty need to support students with disabilities online (Gladhart, 2010; Jensen, McCrary & Krampe, 2004; Leyser, Greenberger, Sharone, & Vogel, 2011; Lombardi & Adam, 2017; Lombardi & Murray, 2011; Zhang, Landmark, Reber, Hsu, Kwok & Benz, 2010).

CHAPTER 3: METHODOLOGY

This chapter presents an overview of the research methodology, research questions and research design established for the current study and to provide a detailed description of the settings and participants as well as the data collection procedure and analysis. A summary reviewing all that is discussed will follow. The purpose of the study is to examine faculty perceptions of their knowledge and practices on designing and implementing accessible online courses. Furthermore, it focuses on assessing the relevant professional development support that faculty consider is important. The goal of the study is to expand upon the existing research to better inform practice on the need to develop, design, and implement online courses that are accessible to students with disabilities. The study will help to raise faculty awareness and present opportunities for rethinking approaches to make online learning accessible for all students.

Research Questions

Academic progression of students with disabilities taking online courses through traditional higher education institutions is of significant concern as it relates to the high attrition rate among this population. Review of literature reveals that course content that is not accessible and usable to students with disabilities are a hindrance to their progress and retention. The literature also reveals that faculty are often unaware of how to develop accessible online content.

My dissertation investigates the following questions:

The research questions addressed by the study are:

1. What are faculty perceptions of their knowledge in terms of creating accessible online courses for students with disabilities?

2. What are faculty perceptions regarding practices to create accessible online courses for students with disabilities?
3. How important do faculty think professional development supports are to help them incorporate accessibility considerations in their online courses?
4. Do faculty perceptions vary by key background factors for their capacity to design and implement accessible online tools for students with disabilities?

Research Design

I utilized a survey research design that was mainly quantitative but also included two qualitative open-ended questions. Survey research is an effective and cost-efficient way to collect information about many individuals in a particular population and often the best means available for collecting data from the representative population (Dillman, Smyth & Christian, 2014; Hazel, Newman & Barrett, 2016). Because the objective of this study is to make inferences about faculty perceptions of their knowledge of laws, institutional policies, online pedagogical practices and professional development support at a single point in time, a survey was the preferred method of data collection due to the potential for rapid turnaround and capacity for wide coverage and broad application.

Survey Development

As illustrated in Figure 3, the survey for the study was developed in three phases. These are: 1) background review of published literature and existing comparable survey instruments, 2) survey construction, and 3) pilot testing of the survey instrument for the study. Detailed activities for each phase of the survey development are presented below.

Phase one - Survey Background Review. During phase 1, I conducted a detailed review of published literature in areas related to students with disabilities and the

challenges that they face in accessing online courses. I also examined disability laws and their implications for higher education. Further I looked at questionnaires related to assessment of institutional support for faculty who teach online courses and programs. Finally, I examined other surveys to gauge whether a similar instrument and rating scale existed that could be used to create a preliminary version of the survey. The data gathered during Phase I led to the development of a draft version of the survey. Existing research surveys by Gladhart (2010), Huss and Eastep (2016), Phillips, Terras, Swinney and Schneweis (2012), and Steven, Schneider and Miller (2018) employ approaches, terminology, content areas, and scales that are similar. The surveys sought perceptions of faculty knowledge of disability laws, practices and tools used. Surveys collected data for face-to face as well as online instructional delivery. Some of the surveys were part of a mixed-methods research design. While questions and content inclusion were very useful, neither survey was suited to the specific research questions and context for this study. Therefore, it was necessary to develop a survey to

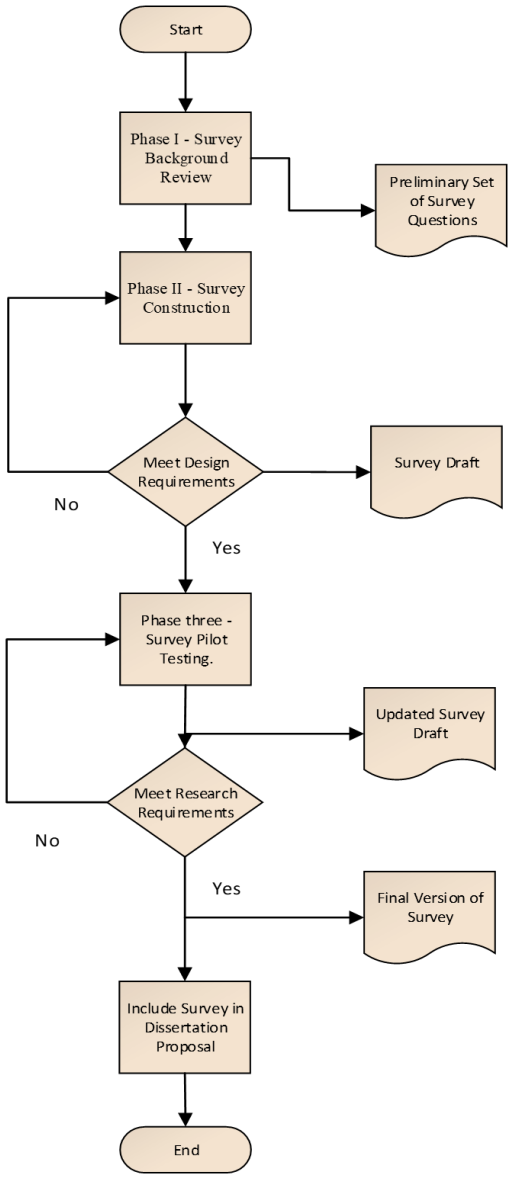


Figure 3. Survey Development Process

specifically gather key data from particular content areas related to accessible online course design and implementation to students
with disabilities.

Phase two - Survey Construction. During phase two, questions were developed, and some others were refined based upon knowledge gained from the literature review. The resulting survey that was developed has three major content areas that are constructed to accommodate various faculty responses to items on the questionnaire. The major sections (categories) are: 1) Accessibility knowledge, 2) Accessibility Application/Practice, and 3) Accessibility Professional Development and have 66 fixed-choice items combined with two open-ended questions to provide additional insights. The survey requires responses to five-point Likert scales to measure faculty awareness and perception of their knowledge and practices in their online course. According to Babbie (2009), the use of standardized questions enhances reliability. A methodology expert who has considerable experience in survey design was consulted during the process.

The first of the three categories address accessibility knowledge. It is comprised of five subcategories with 24 items that make up the following content areas: a) accessibility standards and laws, b) institutional policy, c) design guidelines, d) terminology, and e) accessibility features. The Likert-scale question for the subcategories address level of awareness for each item on a range: 1= Not at all aware, 2= Slightly aware, 3= Somewhat aware, 4= Moderately aware and 5= Very aware.

The second major category addresses accessibility application. It is also comprised of five subsections with 31 items that make up the following content areas: a) application/practice using online tools, b) MS Word and PDF documents, c) Learning

Management System (LMS), and d) audio and video. The Likert-scale question for the subcategories address degree of use for each item on a range: 1= Never, 2= Rarely, 3= Sometimes, 4= Very often and 5= Always.

The third and final category focuses on accessibility professional development. It is comprised of four subcategories with 17 items that address a) challenges to application/practice, b) institutional/technology support, c) standards and policies, d) knowledge of disability of learner. The content area lists the types of professional development trainings faculty perceive as beneficial. The Likert-scale question for the subcategory, Challenges to Application/Practice addresses level of agreement for each item on a range: 1= Strongly Disagree, 2= Disagree, 3= Neither agree or disagree, 4= Agree and 5= Strongly agree. The other subcategories address level of importance for each item on a range: 1= Not important, 2= Slightly important, 3= Moderately important, 4= Important and 5= Very important.

The topics addressed within the survey were influenced by survey research on the topic, the laws that mandate accessibility in higher education institutions and quality standards. The individual items encompassed the fundamental elements we felt would best inform and sensitize faculty on best practices for creating and implementing accessible online content. After an initial draft was created of the survey, it was assessed for content validity by four expert reviewers in higher education. The expert reviewers are: 1) Director of Disability Services, 2) Assistive Technology Specialist, 3) Instructional Designer at the Center for Teaching and Learning and 4) specialist in Quality Matters and Online Learning. The reviewers were asked for their ideas on what needed wording modification for optimal coverage of content. The reviewers were in

general agreement of the content of the questions but had some suggestions for slight wording changes for improved comprehensibility, which were then incorporated. Some questions were modified, two items were added, and one item deleted based on reviewer feedback.

Phase three – Survey Pilot Testing. In the last phase of the survey design, focus was on testing the instrument for usability and content accuracy. Six faculty representing the three institutions who also teach online were asked to answer the questions developed and provide feedback on any aspect of the instrument. Additional revisions were made to the instrument based on feedback received from the faculty involved in the pilot testing phase. This led to the inclusion of several questions regarding demographics and a wording change from accommodation to accessibility on online courses. The final version of the survey ultimately contained a section on training history to ascertain the number of sessions related to teaching online faculty attended, communications received on training opportunities, in addition to the amount of time and money faculty invested on training, annually.

Setting

Selection of Universities

Three universities representing four-year public universities are included in my dissertation study. These three universities were chosen primarily by convenience since contacts to the institutions were established through mutual colleagues. All three institutions are located in the southeastern region of the United States. The universities have different size enrollments, and due to their size and scope of activities, provide different experiences in offering distance courses and programs. All three are primarily

residential with a significant undergraduate student population. The universities offer various courses, certificates and degree programs online. The researcher assumes that the faculty members who participate in the survey are the primary instructors and creators of the hybrid or online courses. The institutions have a professional development center and offer programs, courses, workshops throughout the year for which faculty have access. All three of the institutions have an Office of Accessibility to support students with disabilities from which faculty can consult and receive support in assisting the students.

The faculty teaching at the universities hold either a doctorate or a master's degree and hold positions of tenure, non-tenure, full-time, part-time and adjunct positions. The faculty selected for the study teach either hybrid or fully online courses. More details about the faculty are described in the participant section of this chapter. For this study, the researcher administered an online survey to three public universities located in southeastern United States**.** The institutions are given the following pseudonyms: Smallville University, Mountainville University, and Urbanville University.

Smallville University is a fully accredited public four-year residential liberal arts university of five colleges located in a small-town setting. Student enrollment is about 5, 000 undergraduate and 926 graduate students. The undergraduate population is 29% male and 71% female. The university has 509 (280 full-time, 229 part-time) faculty. The faculty to student ratio for the college is 14 to 1. Student demographics consist of 60% White, 29.35% Black/African American 3.95% International, 4.88% Latino/Hispanic, 1.41% Asian, 0.31% American Indian. There are degrees and certificates that can be obtained all online. Smallville University has a disability resource center, as well as a professional development center that provides developmental support to faculty,

administration and staff through various workshops and trainings and one-to-one support. They also have an Office of Online Learning from which the online programs are administered. They administer 5 online master's degrees.

Urbanville University is a research-intensive public four-year residential university located in a suburban setting with three campuses, composed of nine colleges. Student enrollment is comprised of over 29,000 undergraduate and 5,000 graduate students. The undergraduate population is 53 % are male and 47% female. 0.4%American Indian/Alaskan Native, 6.7% Asian, 16.9% Black/African-American, 10.0% Hispanic/Latino, 4.6% Multi-race (not Hispanic/Latino), 0.1% Native Hawaiian/ Pacific Islander 58.9% White, 2.4% Unknown. Student to Faculty ratio is 19 to 1. The school has more than 1,000 full-time faculty. Urbanville University offers about fifteen degree and certificate programs via distance education. These courses are provided from 25% to 100% online. Over 15,500 students enroll in online courses annually.

Urbanville University has a disability resource center, center for teaching and learning that provides support and trainings through various workshops and trainings and one-to-one support. They also have an Office of Distance Education where online degree programs are administered. The online programs include 15 graduate certificate programs, six bachelors, 17 masters, one doctoral degree.

Mountainville University is a research-intensive public four-year land grant residential university, composed of 17 schools and colleges. Mountainville University offers 116 bachelor's degree programs through its seven undergraduate academic colleges, 160 master's and doctoral degree programs through the Graduate School and a school of Veterinary medicine. Student enrollment is over 37,000 which is comprised of

28,848 undergraduate and 8,758 graduate students. The undergraduate population is 43.2% are male and 56.8% female. The school has over 3,000 faculty. The student-faculty ratio at Mountainville is 14 to 1. Of the over 30,000 students enrolled at Mountainville, about 29% take some form of distance or online learning. About 1,000 students take classes exclusively online. It has a disability resource center, a center for teaching and learning an office of online learning. The online programs include 16 certificate programs, 2 bachelors, 17 masters.

Survey Participants

Participants were selected from a nonrandom (nonprobabilistic) convenience sample of instructional faculty who have taught or who currently teach their course online. Instructional faculty refers to faculty members employed by the institution either full-time, part-time, or as an adjunct. SurveyShare, an electronic survey tool used at the researcher's institution, was sent out to the appropriate contact at each institution in August 2019 after obtaining IRB approval. As an incentive to encourage participation, a statement was made in the introduction to the survey that for every completed survey submitted, a donation of fifty cents would be given to the Think College organization in support of inclusive higher education opportunities for people with intellectual disability in the United States. A follow-up email was sent out from each location after two weeks of the initial email. The survey remained open for 30 days.

The faculty at the higher education institutions were from various disciplines, have different years of teaching experience, levels of education, and represent statuses and rank. With cooperation from various offices at each university, faculty who teach online were invited to participate in the study by accessing a link to the electronic

researcher-created survey instrument for data collection. Some key variables were consolidated for simplicity and because of uneven responses for analysis. Because 51% of the responses received came from one school, comparisons between the schools was not feasible. An attempt was made to receive at least 150 faculty responses from the institutions, with the minimum numbers specified as follows based on prior studies on similar topics: Urbanville (n= 75), Mountainville (n= 43), and Smallville (n= 32). Faculty were prompted to provide basic demographic information and the amount of professional training received related to online course delivery. They were also asked to rate their response to a Likert-scale questionnaire on their perceptions of knowledge of disability law, institutional policies and online design guidelines, as well as their use of tools and practices in online courses and the importance of professional development.

A total of 182 faculty responded to the survey. The study had a 17% response rate. The participants were female (n = 103, 56.6%), male (n= 67, 36.8%), and those who preferred not to answer (n=12, 6.6%). Table 3 presents a description of the participants, including age, gender, rank, primary online delivery method, level of teaching, years teaching, years teaching online, support received to teach online and funds used for training and development.

Table 3

Faculty demographic characteristics (n = 182)

Variables	Level	Frequency	Percentage
Faculty Status			
Rank	Professor	32	18%
	Associate Professor	37	20%
	Assistant Professor	32	18%
	Instructor	23	13%
	Adjunct	28	15%
	Clinical Faculty	10	5.5%
	Other	17	9.3%

Age Range	21-30	4	2.2%
	31-40	36	20%
	41-50	61	33.5%
	61+	40	22.0%
Years Teaching Online	0-2	37	20.3%
	3-5	55	30.2%
	6-10	41	22.5%
	11+	42	23.1%
Disabilities Accommodated Online	Cognitive	10	5.5%
	Hearing	7	3.8%
	Mental Health	14	7.7%
	Physical	7	3.8%
	Vision	9	4.9%
	Multiple	95	52.2%
	None	36	19.8%
Number of Training in Online	None	69	37.9%
	Some	112	61.5%
Communications on Training	None	20	11.0%
	1-3	54	29.7%
	4-7	39	21.4%
	8-12	27	14.0%
	13-17	11	6.0%
	18-24	4	2.2%
	25+	19	10.4%
Funding for Training and Development	100 or less	131	72.0%
	101 or more	30	16.5%

Since the institutions have different sizes in student enrollment and faculty numbers, a target sample pool was based on samples from published survey research of similar type and size universities.

Data Analysis

In order to address the proposed research questions, various descriptive and inferential statistical analyses were conducted using SPSS25 software.

1. To gain a basic understanding of the faculty profile in the sample, I conducted descriptive statistical analyses of key demographic and academic background variables. These background variables include gender and age range, number of years as faculty at their institution, higher degree, faculty status, primary level of teaching, primary delivery method, number of years teaching online, and amounts of training received.

2. Descriptive statistics (Means and Standard Deviations) are reported both at the categorical and sub-categorical (Knowledge, Practice and Professional Development) level, and also by various demographic factors. Cronbach's alpha is used to check the internal consistency of the responses to the survey items.

3. A 4 X 4 X 2 between-subjects factorial ANOVA was conducted for professional development of participants who are grouped in one of four age ranges, and teaching online in one of four year ranges, and who received some online training versus no online training.

4. To expand upon the findings with additional context, two open-ended questions are included at the end of the survey to provide additional input using participants' own words. They are:

1) What other feedback do you have regarding accessible design in your online courses?

2) What other support would be helpful in assisting you in designing and implementing an accessible online course?

The qualitative data process began with a classification known as open coding using content analysis as described by Creswell (2013) and Hsieh and Shannon (2005). Content- analysis, evaluates narrative responses, and places similar texts into content

categories. This approach allows for the participants to relate their experiences free from any predetermined theory. The steps in the open coding involved manually grouping repeated phases and statements made by the respondents and organizing them into categories (Curtis, Wenrich, Carline, Shannon, Ambrozy & Ramsey, 2001). Themes were identified based on the patterns identified from the categories. Then, relationships between themes were consolidated and assigned a label based on findings that emerged.

Limitations

There are a few limitations of the proposed study. First, the sample data come from convenient sources where the researcher is granted access. Limitations that could influence the findings of the study involve the fact that data was collected from faculty at only three universities and therefore generalization to the wider population cannot be assumed. Second, this study does not permit triangulation of data. Therefore, findings will not be representative of the population. However, the study will reveal findings of similar problems, challenges, and experiences in designing and implementing online courses that could be generalized to faculty at other colleges and universities across the United States. Third, other factors that may influence the generalizability of findings to other postsecondary settings include the population of students served, and colleges' philosophies of course design and support.

Despite these limitations, my dissertation will first and foremost shed light on existing faculty knowledge and practices related to accessible online learning. These will then serve to inform training and support offerings to faculty that will help them make accessibility transparent in designing their online courses. Second, the research will highlight approaches and interventions that centers on making online accessibility a key

component of course design and not an afterthought. Finally, the research will delineate the role that online quality assurance interventions and practices with the support of IT and Administrators can play to ensure sustainability in the implementation and roll-out of accessible course and program offerings.

Ethical Considerations

Before any data was collected, approval from the institutional review board (IRB) was obtained. Surveys were administered online through the Distance Education Office at each university. At the start of the survey, participants were asked to read and check consent to participate in the research. No identifying information was collected. Faculty received an email explaining the purpose for the research and that participation is voluntary. In the email communication, faculty was assured of confidentiality and complete anonymity. A code was associated with the surveys to identify the institution only.

Summary of Methodology

This chapter presented the purpose of the study, established research questions and explained the research design, setting, participants, data collection procedures, data analysis procedures, and addressed the potential limitation of the study and ethical considerations.

The study uses quantitative and qualitative analyses to identify factors, based on the faculty background variables and perceptions of knowledge and online design practices. After the analysis of data, the results are presented in Chapter 4, followed by a discussion, interpretations, and implications of the findings in Chapter 5.

CHAPTER 4: RESULTS

In this survey-based research study, the quantitative information was used for descriptive purposes, to show trends, and qualitative data was used to provide clarification and additional insight into findings. Descriptive statistics (means and standard deviations) are reported at the category and subcategory levels. Cronbach's alpha was used to check the internal consistency of the responses to the survey items. A 4 X 4 X 2 between-subjects factorial ANOVA was conducted for professional development of participants who are grouped in one of four age ranges, and teaching online in one of four ranges by year, and who received some training for online teaching versus no training for online teaching.

Reliability of the Instrument

Cronbach's alpha was used to show the internal consistency (reliability) of the participants' responses to the survey. Cronbach's alpha for all the items was .943. Cronbach's alpha for Knowledge of Laws/Standards was .954 for 25 items, Application/Practice on Accessibility in course design was .882 of 25 items, and for the importance of Professional Development opportunities was .898 of 17 items. For *accessibility knowledge category*, the law and standards subcategory consisted of five items (α= .852), institutional policy subcategory consisted of five items (α= .844), the design guideline subcategory consisted of four items (α= .865), the terminology subcategory consisted of seven items (α= .926), the accessibility checking feature subcategory consisted of four items (α= .936). For the *accessibility application and practice category*, the application of

online tools subcategory consisted of eight items (α= .786), the accessibility practice of Word and PDF subcategory consisted of six items (α= .844). The accessibility practice for LMS subcategory consisted of five items (α= .641), which shows a relatively lower internal consistency. A possible explanation for this lower internal consistency could be that particular sub items were not perceived as being directly related to enhancing accessibility in the LMS. The small number of items may have also contributed to low internal consistency. These items could be separated into another category for improvement in the future. The accessibility practice of audio and video subcategory consisted of six items (α= .833). In the *accessibility professional development* category, Cronbach's alpha for the six items for subcategory challenges to accessibility practice and training was .820. The Cronbach's alpha for the following: the three items for subcategory institutional and technology support was .736, four items for standards and policy was .908 and knowledge about the disability of the learner was .911 for importance of professional development to support accessibility practice.

Faculty Perceptions on their Knowledge and Practice on the Design of Accessible Online Courses

Descriptive Statistics (Means and Standard Deviations) for each of the three categories knowledge, application/practice, and professional development and subcategories are reported in Table 4. Most of the items on this survey were rated according to faculty's perceptions of their level of awareness of standards, laws and policies, uses of tools. The Knowledge category (*M*=2.99) rated level of awareness of standards and law, institutional policy, design guidelines,

terminology and accessibility checking protocols of tools. The Accessibility Application and Practice category (*M*=2.93) rated level of use and practices with Word and PDF documents, the LMS and audio and video. The Professional Development category (*M*=3.74,) rated faculty's perceptions on challenges to practice, and importance of training on standards and policies, technologies and knowledge of specific learner disabilities.

Table 4

Descriptive statistics on survey responses by item composite direct variable group

Dep Variable	Description	Items	M	SD
DV1 Knowledge				
DV1 AK1	Accessibility Standards/Law	5	2.43	1.04
DV1 AK2	Institutional Policy	5	3.93	0.91
DV1 AK3	Design Guidelines	4	2.70	1.29
DV1 AK4	Terminology	7	3.55	1.42
DV1 AK5	Accessibility Checking Feature	4	2.34	.75
	DV1 Knowledge		**2.99**	**0.94**
DV2 Application/Practice				
DV2 AP1	Application Practice/Online Tools	8	3.36	1.42
DV2 AP2	Application Practice/Word and PDF	6	3.04	0.94
DV2 AP3	Application Practice/LMS	5	2.67	0.85
DV2 AP4	Application Practice/audio and video	6	2.70	1.04
	DV2 Application/Practice		**2.93**	**0.66**
DV3 Professional Development				
DV3 PD1	Challenges to application/practice	6	3.70	0.82
DV3 PD2	Institutional Technology/Support	3	4.04	0.84

DV3 PD3	Standards & Policies	4	3.55	1.03
DV3 PD4	Learners with Disability Knowledge	4	3.74	1.00
	DV3 Professional Development		**3.74**	**0.69**

R1 What are faculty's perceptions of their knowledge of accessibility in terms of creating accessible online courses for students with disabilities?

Descriptive Statistics (Means and Standard Deviations) for the category and for each of the five subcategories for faculty's perceptions of their knowledge of accessibility: accessibility laws and standards, institutional policy, terminology, design guidelines, and accessibility checking features are reported in Table 4. The items on the subcategories of the category were rated according to level of awareness. For the overall accessibility knowledge category, faculty reported on average that they were somewhat aware (M = 2.99).

On examining awareness in knowledge within subcategories, faculty rated Institutional Policy (M = 3.93) and Terminology (M = 3.55) the highest as moderate to very well aware. At the item level, knowledge of the institution's legal obligation in providing accommodations to students with disabilities rated the highest (M = 4.24). For the Accessibility Laws and Standards subcategory, overall knowledge was very low as faculty reported being only slightly aware (M = 2.43). At the item level, faculty reported being moderately aware of the Americans with Disabilities Act of 1990 (M = 3.54), and only slightly aware of Section 504 of the Rehabilitation Act of 1973 (M = 2.21). The Design Guidelines subcategory overall rating of (M = 2.70), with faculty reporting

being slightly aware. Awareness of Quality Matters rated the highest (*M* = 3.15) in this subcategory. The final subcategory of accessibility knowledge, Accessibility Checking Feature, faculty rated also as being only slightly aware (*M* = 2.34) with faculty reporting not at all aware of accessibility checking in Adobe Acrobat Pro PDF (*M* = 2.32) and Google Apps (*M* = 2.11).

R2 ***What are faculty's perceptions regarding their own practices to create accessible online courses for students with disabilities?***

Descriptive Statistics (Means and Standard Deviations) for the category and for each of the four subcategories for faculty's perceptions of their own practices for: use of online tools, accessibility practice with MS Word and PDF files, LMS, accessibility practice on audio and video are reported in Table 4. The items in this subcategory were rated as never, rarely, sometimes, very often and always, according to their level of practice or uses. For the overall category, faculty rated their application and practices for using online tools and providing accessibility (*M* = 2.93) for rarely to sometimes.

On examining accessibility application and practice within subcategories**,** for the subcategory for the application/practice with online tools, faculty rated use between sometimes to very often (*M* = 3.36), with MS Word (*M* = 3.78), PDF documents (*M* = 4.08), videos (*M* = 3.87), used the most in online courses. Google Apps (*M* = 2.50) and External applications (*M* = 2.41) ranked the lowest in rarely for use among the faculty.

In subcategory accessibility practice with MS Word and Adobe Acrobat Pro (PDF**)**, faculty overall rating is sometimes for using accessibility features (*M* =

3.09). Of all the features in the subcategory, the faculty reported as near often in use of numbers and bullets to signify a list (*M* = 3.81) and using an identified "header style" to organize content (*M* = 3.48). For accessibility practice with the LMS, faculty reported as practice very often for uploading documents to correct category (example: syllabus to syllabus category (*M* = 3.88). Faculty report using Synchronous Chat (*M* = 2.11) the least. For accessibility practice with audio and video, overall rating for practice was low for rarely to sometimes (*M* = 2.70). Faculty rated very high in always providing a statement on their syllabus regarding disability accommodations (*M* = 4.50). However, with regard to accessibility of videos, faculty reported they sometimes provided captions (*M* = 2.99) and rarely transcripts for video (*M* = 2.57) and audio (*M* = 2.33) for their online courses.

R3 How important do faculty think professional development supports help them incorporate accessibility considerations in their online courses?

Descriptive Statistics (Means and Standard Deviations) for the category, Accessibility Professional Development and subcategories are reported in Table 4. Four new subcategories were created from Institutional and Technology support: challenges to accessibility application/ practice, Institutional Technology/Support, Standards & Policies, and Learners with Disability Knowledge. The items on the subcategories were rated according to level of importance. For the overall category score, faculty reported Accessibility Professional Development as very important (*M* = 3.74). Faculty rated the highest for support using technology to teach students with disabilities (*M* =

4.00) and the need for assistance from (Online Programs, Center for Teaching and Learning, Instructional Designer, etc.) in adapting their online course (*M* = 4.27). Faculty also rated as very important the need for support in video captioning (*M* = 3.85) and training on the policies and procedures for students with disabilities (*M* = 3.73). Faculty rated the need for training on using WCAG Guidelines (*M* = 3.47) and Section 508 of the Rehabilitation Act (*M* = 3.53) as moderately important. For challenges to application and practice, on a scale of strongly disagree to strongly agree, faculty gave an overall rating of strongly agree to several limitations in making online courses fully accessible (*M* = 3.70). At the item level, faculty strongly agree that the greatest limitations were on training and knowledge on the types of changes that need to be made (*M* = 3.90) and challenges to time for designing online content (*M* = 3.86).

Overall, the dependent variables with the lowest were the Knowledge of the Accessibility Checking Feature (*M* = 2.34) and LMS Practice (*M* = 2.67), compared with the highest means for knowledge of Institutional Policies (*M* = 3.93) and Professional Development Institutional Technology Support (*M* = 4.04).

R4 Do faculty perceptions vary by key background factors for their capacity to design and implement accessible online tools for students with disabilities?

A 4 (age) X 4 (years teaching online) X 2 (received training for online teaching or not) between-subjects factorial ANOVA was conducted comparing accessibility knowledge, application and practice and professional development for participants who are grouped in one of four age ranges [21-40, 41-50, 51-60,

61+] and teaching online in one of four year ranges, and in who received some training for online teaching versus no training for online teaching. Assumptions of the Factorial ANOVA were met.

Table 5

Key Variables by Institution

Key Variables	Overall	Knowledge		Application		Professional Dev	
		M	*SD*	*M*	*SD*	*M*	*SD*
Gender							
M	66	2.75	1.40	2.67	1.30	3.56	1.50
F	103	3.09	1.50	3.10	1.43	3.85	1.60
Prefer Not Answer	13	3.65	1.80	2.96	1.42	3.41	1.90
Age range							
*21-40	40	2.90	1.51	2.90	1.40	3.87	1.56
41-50	61	3.00	1.30	2.97	1.42	3.77	1.50
51-61	40	2.84	1.50	2.90	1.42	3.55	1.54
Over 61	35	3.22	1.64	2.93	1.40	3.66	1.70
Years teaching online							
0-2	37	2.77	1.42	2.70	1.20	3.87	1.63
3-5	55	2.95	1.33	3.01	1.40	3.78	1.53
6-10	41	3.17	1.62	3.15	1.60	3.63	1.60
Over 10	42	2.98	1.50	2.80	1.34	3.60	1.56
Teaching Online Training							
None	69	2.46	1.13	2.59	1.22	3.66	1.60
*Some	112	3.34	1.60	3.14	1.45	3.77	1.60
Total	182						

*Note Age Ranges: 21-30, 31-40 were consolidated for analysis
All online training ranges for received were collapsed

Background Factors and Knowledge of Accessibility

A 4 (age) X 4 (years teaching online) X 2 (received training for online teaching or not) between-subjects factorial ANOVA was calculated comparing accessibility knowledge for participants who are grouped in one of four age ranges, and teaching online in one of four year ranges, and who received some

training for online teaching versus no training for online teaching. The main effect for age was not significant (F (3,107) = .798, p >.05). The main effect for number of years teaching online was also found to not be significant (F (3,107) = 2.29, p > .05). A significant main effect for training for online teaching received was found (F (1,107) = 17.5, p < .05).

Instructors who received some training for online teaching did slightly better (*M* = 3.33) than those who had none (*M* =2.45). The interactions were not significant: age and teaching online (F (9,107) = .481 p >.05), age and training for teaching online (F (3,107) = .222, p >.05), Teaching online and training for teaching online (F (3, 107) = 1.053, p >.05), and age, teaching online, and training for teaching online (F (7,107) = .637, p >.05). Post hoc not conducted for difference for training for teaching online because there were only two categories.

Background Factors and Accessibility Application and Practice

A 4 (age) X 4 (years teaching online) X 2 (received training for online teaching or not) between-subjects factorial ANOVA was calculated for application of tools and accessibility practices of participants who are grouped in one of four age ranges, and teaching online in one of four year ranges, and in who received some training versus no training for online teaching. The main effect for age was not significant (F (3,99) = .200, p >.05). A significant main effect for number of years teaching online was found (F (3,99) = 7.374, p < .05). A significant main effect for training received for online teaching was also

found (F (1,99) = 27.751, p < .05) (*M* =3.14) than those who had no training for online teaching (*M* =2.57).

The interactions were not significant: age and teaching online (F (9,99) = 1.201 p >.05), age and training for online teaching (F (3,99) = 2.322, p >.05), years teaching online and training for online teaching (F (3, 99) = 1.150, p >.05), and age, years teaching online, and training for online teaching (F (8,99) = 1.038, p >.05).

Tukey Post hoc test was performed for difference for years teaching online 6-10 years (*M*= 3.16), p> .009 was significantly different than those teaching two years or less (*M*=2.66). Post hoc tests could not be performed for difference for training for online teaching because there are only two categories.

Background Factors and Professional Development

A 4 (age) X 4 (years teaching online) X 2 (received training for online teaching or not) between-subjects factorial ANOVA was conducted for professional development of participants who are grouped in one of four age ranges, and teaching online in one of four year ranges, and who received some training for online teaching versus no training for online teaching. The main effect for age was not significant (F (3,110) = .386, p >.05). The main effect for number of years teaching online (F (3,110) = .917, p > .05) and for training received for online teaching or not , were also not significant (F (1,110) = .255, p > .05).The interactions were not significant: age and years teaching online (F (9,110) = 1.600, p >.05), age and training for online teaching (F (3,110) = 1.233, p >.05), years teaching online and training for online teaching (F (3, 110) =

.593, p >.05), and age, years teaching online, and training for online teaching (F (7,110) = .870, p >.05).

Open-ended questions on Survey

In addition to the Likert-scale items listed on the survey, faculty were provided the opportunity to respond to two open-ended questions. The questions asked:

1. What other feedback do you have regarding accessible design in your online course?
2. What other support would be helpful in assisting you in designing and implementing an accessible online course?

The qualitative data process began with a reading of all of the responses to the questions. Taking a deductive approach of open coding using content analysis as described by Creswell (2013) and Hsieh and Shannon (2005). The steps in the open coding involved manually grouping repeated phases and statements made by the respondents and organizing them into a category matrix (Curtis et al., 2001). Themes were identified based on the patterns identified from the categories. Then, relationships between themes were consolidated and assigned a label based on findings that emerged.

Table 6

Feedback faculty offered regarding accessible design in their online courses (n = 85)

Survey categories	**Frequency**	**Percentage**
Knowledge and Training Needed		
Laws	9	10.6
Standards (QM and other Standards)	7	8.2
Student with disabilities	8	9.4

Accessibility of Tools (Word, LMS)	9	10.6
Training		
Lack of time to attend	13	15.3
Need for flexibility	8	9.4
Need just-in-time	5	5.9
Challenges to Accessible Design		
Too much time to design	14	16.5
Lack of one-to-one support/coach	9	10.6
Captioning/transcription services	7	8.2
Reactive approach to instruction	6	7.1

Note: There was some overlap with faculty responses to both survey questions.

Table 7

Support faculty offered that would be helpful in designing and implementing an accessible online course. (n = 72)

Survey categories	**Frequency**	**Percentage**
Knowledge and Training Need		
Laws	6	8.3
Standards (QM and other Standards)	3	4.2
Student disabilities	4	5.6
Accessibility features in Tools (LMS, word, etc)	5	6.9
Support Services Needed		
Captioning/transcription	9	12.5
Coaching/mentoring	8	11.1
Knowledgeable trainers	3	4.2
Knowledgeable course reviewers	4	5.6

Note: There was some overlap with faculty responses to both survey questions

Feedback from faculty regarding accessible design in their online courses

A total of 85 faculty instructors provided additional feedback by responding to the open-ended question on the survey (see Table 6). Faculty mentioned the need for knowledge and training on disability laws (n = 9), standards (n = 7), students with disabilities (n = 8) and accessibility features of tools (n = 9) to be beneficial in creating accessible design in their courses. For example, one faculty member wrote, “Canvas specific accessibility trainings are

needed and periodic refreshers or professional development on the policies and standards." And another faculty member wrote "...More workshops on Autism and cognitively impaired. We have no idea on specific accessibility issues to assist these populations." Some faculty members reported the lack of time for training (n = 13) and a need for flexible training (n = 8) and just-in-time training (n = 5) as important to consider. One faculty member stated, "Time is the biggest drawback to making courses compliant." Another stated, "The time to develop a course makes it so hard even before accessibility and accommodations are addressed, and as a faculty member, I would develop a much stronger course if I had assistance throughout the process." For support that would be helpful, another wrote, "Workshops or help chats online when I'm not able to physically attend a seminar or workshop." Some faculty members perceived that it takes too much time to design courses (n = 14). Some faculty stated that they would consider a reactive approach (n= 6) to incorporating accessibility into their course design. One faculty member in particular wrote that, "Given the limited time I have as an instructor, I have been reactive rather than proactive in addressing accessibility in my online courses, when I have a student that has a requirement." Several faculty members state the need for coaching (n = 9) as a benefit. As one faculty member wrote, "It also would be helpful to have "coaches" who could assist faculty in redesigning online courses to be more accessible." Also, faculty stated that captioning and transcription support services (n = 7) would be very helpful in alleviating some of the workload.

Supports faculty said would be helpful in assisting them in designing and implementing an accessible online course

A total of 72 instructors completed the second open-ended question that prompted faculty to share beneficial supports not listed on the questionnaire. Faculty provided additional feedback regarding other support by responding to the open-ended question on the survey (see Table 7). Faculty again noted that knowledge and training on disability laws (n = 6), standards (n = 3), students with disabilities (n = 4) and accessibility options in tools (n = 5) would be very helpful to them in creating accessible design in their courses. For example, some faculty stated that support could come in the form of, "Ongoing workshops on QM standards and universal principles, and accessibility." Regarding tools, one faculty member wrote, "I had no idea there were already features built into the software I regularly use to make documents, PDFs, videos, etc." Other supports that faculty wrote would be beneficial are, captioning and transcription services (n = 9), coaching and mentoring (n = 8), and to have Knowledgeable trainers (n = 3) and knowledgeable course reviewers (n = 4) to ensure courses meet accessibility requirements. As one faculty member stated, "it would be helpful to have one-on-one consultations where someone with broad training could sit down with me to make my materials and LMS site more accessible." Others reported, "It would be helpful to have a professional to review those sites just like in the way many universities provide feedback on course design."

CHAPTER 5: DISCUSSION

Higher education institutions have been increasing their online education offerings in recent years to meet demand. However, students with disabilities often cannot fully and adequately access the contents of courses that they take online (deMaine, 2014; Madaus, Kowitt & Lalor, 2012). This study was conducted to investigate the perceptions of faculty members knowledge, practices in the design of accessible online courses and to better understand how to support faculty creating accessible online content for students with disabilities.

The following questions were investigated:

- What are faculty perceptions of their knowledge in terms of creating accessible online courses for students with disabilities?
- What are faculty perceptions regarding practices to create accessible online courses for students with disabilities?
- How important do faculty think professional development supports are to help them incorporate accessibility considerations in their online courses?
- Do faculty perceptions vary by key background factors for their capacity to design and implement accessible online tools for students with disabilities?

A discussion of the results and a summary of the most significant findings, implications, and suggestions for future research and practice is presented. The survey instrument used for the study involved both quantitative and qualitative

items. All of the questions used in the survey pertained to the knowledge, and practice on the topic of online accessibility to support learners with disabilities who take their course. The qualitative questions on the survey solicited input and feedback from participants regarding additional training and support that would be helpful in assisting them in designing and implementing an accessible online course.

The survey yielded important insights regarding faculty knowledge of laws and standards as well as their responsibility to accessibility practices and supports they find beneficial. The results of this study indicate that there is a striving need to promote education and access to information on disability and the faculty role in accommodation of students online.

Knowledge

Faculty perceptions of their knowledge of accessibility laws and standards, institutional design guidelines, terminologies and accessibility checking features were analyzed. Faculty perceptions of knowledge for institutional policy and terminology was high, and their perception on accessibility laws and standards were low. Faculty reported being very knowledgeable on various accessibility terms and in their own legal responsibility in providing accommodations to students with disabilities. They also reported being very knowledgeable on their institution's legal obligation. However, faculty are much less aware of the laws and standards that formed the basis of institutional policies. For instance, faculty are moderately aware of the Americans with Disabilities Act of 1990. However, they were only slightly

aware of Section 504 of the Rehabilitation Act of 1973. They are less aware of how these laws impact their design and delivery of online courses. Nonetheless, higher education institutions are legally bound to adhere to both laws which prohibit discrimination, and which guarantee equal access to all individuals with disabilities (United States Department of Education, 2018). Thus, higher education institutions must continue to take proactive steps to close the gap in faculty knowledge regarding how federal laws impact the design of online courses.

Early studies indicate links between faculty awareness and knowledge of disability laws and being disposed to accommodating the needs of students (Bowman & Marzonk, 1990; Rao & Garten, 2003). The implications are that lack of awareness and knowledge are impediments to faculty accessibility practices. This establishes the need for faculty education on disability laws, standards and accessibility of tools and applications. Faculty awareness of Quality Matters (QM) as rated the highest in terms of knowledge on standards. This is not too surprising, as many universities have adopted the QM rubric to guide the design and review of their online courses (Schaffhausen, 2017).

Faculty knowledge on the *Accessibility Checking Feature* on the typical tools they use in their courses, for example, Word, PDFs and the LMS, was very low. This finding aligns with research from Huss and Eastep (2016), who reported that nearly 70% of instructors were unaware of the accessibility checker included in Word. Yet, the *Accessibility Checking Feature* is a function in the applications that allows the user to run an analysis on their documents to

inspect for accessibility issues. In addition, many faculty members reported that they were not at all aware of the accessibility checking feature in the LMS, Adobe Acrobat Pro PDF and in Google Apps. Possible reasons for this can be that the accessibility function has only been available in many of the applications and tools for fewer than 10 years (Waldman, 2010). Also, only the Pro versions of Adobe Acrobat PDF have the feature. Moreover, as O'Connell, (2018) noted, most people were generally familiar with only about 20 percent of the features of a software that they use. Further, official training for MS Word and PDFs are rarely offered at higher education institutions as it is thought that knowledge of the features of those applications are quite common and routine. Therefore, higher education institutions should consider offering regular training on the latest added features of commonly used software applications to their faculty, particularly those that support accessibility and inclusiveness, as part of the orientation programs for the new academic year. For, as it stands right now, faculty would likely learn about new features by discovering them on their own.

Overall, the findings suggest that faculty perceived themselves as generally knowledgeable about laws and standards on disability. However, only a small percentage of the faculty surveyed said they were familiar with the specific disability legislation related to higher education institutions. The good news is that faculty expressed a willingness to receive professional development on laws and standards on disability in designing their online courses as revealed from open-ended survey responses. According to Seale (2014) instructors know

that it is necessary for them to make their courses and learning experiences accessible to students with disabilities; the challenge is they do not know how.

Practice

Faculty perceptions of their accessibility application and practice in creating online courses were analyzed. Findings reveal faculty perceptions on the use of Videos, Word and PDF documents was high, and perception on the use of Google Apps and audios in online courses was low. Faculty perception in providing a statement on the syllabus regarding disability accommodations was also high. However, faculty perception of use was low in regard to providing transcripts and captions for video. Yet, faculty frequently use videos in their courses as they serve as an alternative to text only instruction. A key advantage to video-enhanced instruction is that it allows students to learn at their own pace. Students also are able to view material as often as needed. As Kay (2012) noted the integration of videos in instruction helps enhance students' engagement with course materials. In addition, videos are beneficial to those with cognitive challenges and different learning styles (Linder, 2016).

Nonetheless, the benefits of video to enhance learning is lost on students that are hearing or visually impaired. Results from the study show that faculty are very generally aware of the need to provide captions for videos used in instruction. This service is not only very important for students with disabilities but also for foreign students and others with low English language skills.

In the open-ended survey responses, faculty reported that captioning the videos themselves was a very time intensive process, and that it would be beneficial to them for a specific department within the university to provide those services or even outsource that task to an external vendor. Findings reveal that faculty do frequently apply practices that facilitate accessibility. For example, when using Word, they often apply numbers and bullets to signify a list, use an identified "header style" to organize content, and upload documents to the correct category in the LMS. However, faculty also report that providing accessibility to online courses takes too much time. Yet, for content to be detected by assistive technology like the screen-reader use by the visually impaired student, information will have to be organized with accessibility in mind to allow such students to access and make use of the content. Consequently, in a time crunch, faculty default to a reactive approach by retrofitting content only when they are notified by the Office of Disability Services that they have a student with a disability taking their course.

Nonetheless, research shows that a reactive approach to course design can cost more and requires more time than a proactive approach to course design (deMaine, 2014). This is because with a reactive design, key sections of the course often need to be altered and adjusted to meet the new user needs and requirements and this takes additional time and effort from the faculty and other support staff of the university. Whereas with proactive design, potential changes are anticipated and thus embedded in the original course development process. The Quality Matters rubric would be very useful as a guide to assisting faculty

incorporate greater accessibility into the course design, as mentioned earlier, faculty are already familiar with the framework. Furthermore, as it is already a common practice for faculty to include a statement on the syllabus regarding accessibility, this student-faculty relationship and commitment to inclusiveness is only a first step in a move beyond a legal obligation.

Professional Development

Participants reported that Professional Development is very important. The data collected show that faculty perception was high for support using technology to teach students with disabilities and the need for assistance from internal units and resources like the Office of Online Programs, Center for Teaching and Learning, Instructional Designer, etc. in adapting their online courses. Faculty also reported a high perception for challenges to accessibility application and practice were training and knowledge on the types of changes that need to be made in their courses, and on time commitment involved in designing online content.

Faculty also rated the need for support in video captioning and training on the policies and procedures for students with disabilities as very important. Faculty rated the need for training on using WCAG Guidelines and Section 508 of the Rehabilitation Act as moderately important. In the open-ended questions, faculty stated, "…accessibility trainings are needed and periodic refreshers, as well as professional development on policies and standards." And another faculty member wrote "...More workshops on Autism and cognitively impaired as we have no idea on specific accessibility issues to assist these populations."

Research also supports that students with disabilities find few of the faculty who are familiar with their disability and need for accommodations (Stevens, Schneider & Bederman-Miller, 2018; Terras, Leggio & Phillips, 2015).

Due to the nature of faculty work and the diversity of needs and teaching schedules, faculty have limited time to attend traditional workshops that require they attend at a specific time and location (Gappa, Austin & Trich, 2007; Lombardi & Adam, 2017). Some faculty reported alternative training program can be beneficial. For example, one participant noted " University should consider workshops or help chats online when I'm not able to physically attend a seminar or workshop." Other faculty reported challenges to negotiating their time with professional and disciplinary criteria of tenure and promotion which rewards scholarly productivity ahead of teaching and other activities such as student advising and community involvement (Austin, 1990). Also, since there is an increase of full-time and part-time non-tenure track and adjunct faculty among the teaching ranks, they have different career needs. Faculty have challenging teaching loads and are expected to integrate new technologies when designing and developing learning experiences for their students.

Key Background Factors

Statistically significant differences were noted with respect to perceptions of knowledge and practices with accessibility in online courses. Results revealed those faculty with online teaching experience between 6-10 years performed slightly better with practice than those who had been teaching 2 years or less. Research on expertise explains how experience and practice

allow people to excel in domain related tasks. It is noted that significant time (at least 10 years or 10,000 hours in most domains) is required to attain expert-level of performance (Chase & Simon, 1973; Chi, Feltovich and Glaser, 1981). Novices, as offered by Ericsson & Chamess (1994) are not able to match the performance level of experts because they lack the opportunity for repeated practice, which is required to master a particular topic or concept. For the study, faculty who fall in the category of 6 to 10 years of teaching can clearly be termed "experts" in online teaching. Whereas those who fall in the category of 2 years or less can be categorized as "novices" in the field. Therefore, the difference in practice with regards to accessibility in online courses between the two groups appears to be linked to expertise. It can therefore be expected that the scores of the participants who fall in the novice category, i.e. 2 years or less inexperience teaching online will most likely improve as they teach longer and thus achieve expert-level performance in the field.

Results also showed that faculty who received professional development training in online learning had a very significant influence on accessibility knowledge and practice than those who had not received any training. These findings are comparable to Wynants and Dennis (2017) findings that training improves faculty accessibility knowledge and practice in online courses. Although faculty perceptions regarding professional development was very important, 37% of survey participants reported that they had not received any training for online teaching in the past year. Our findings are aligned with the 2019 report, “*Online learning at public universities: Recruiting, orienting, and*

supporting online faculty" undertaken by the American Association of State Colleges and Universities (AASCU). According to the report, of the responses from 95 Chief Academic Officers, representing a quarter of AASCU's memberships, only about one-third (37%) require an instructor-led training on online teaching methods. Moreover, the report findings show fewer AASCU members require faculty to participate in self-paced online course design training (Magda, 2019). The report shows that professional development workshops typically focuses on the use of the LMS and other technologies and not on effective accessibility.

Limitations

There were some methodological limitations with the study. First, the response rate of the survey was only 17%. Also, although, 182 faculty members from three institutions participated in the survey, 51% of the responses came from one institution. Second, all the data collected were self-reported. This could result in a response bias. Third, the domain of faculty expertise was not a factor that was examined in the study. Fourth, the data collected did not convey the types and level of training faculty receive at their institutions of focus. For instance, one of the institutions, due to its size and scope, has vast amount of resources both in personal and institutional support capabilities. Therefore, it is conceivable that the same institution was able to provide greater levels of training and development to its faculty than the other two institutions. Consequently, the reader may interpret the results of the study with caution

because they may have limited generalizability in different contexts and settings.

Recommendations for Future Research

Areas for future research may include an examination of the impact faculty background has on their knowledge and competency regarding supporting learners with disabilities who take online courses. The availability, type, and scope of resources and activities related to faculty training e.g., Center of Teaching of Learning, Online Education Office, financial allocation, can be explored to determine their impact on faculty knowledge and practice. Future research may likewise consider exploring the connection between faculty's personal background and experience with disability-related issues and their academic practice. It will also be worthwhile to examine the perspective of faculty without prior experience teaching online or teaching only in hybrid formats on accessibility issues related to learners with disabilities. Lastly, further research can explore whether the types of training that faculty receive have an impact on their knowledge and practice.

Transformative learning is grounded in helping people achieve a change in perspective as it offers a lens to negotiate the relevance, practicality, and appropriateness of what one is being to adopt or engage in (Brookfield, 1986; Jarvis, 1985; Knowles, 1990). Therefore, faculty's own experience can help provide a heuristic device that can be used to explore their awareness and assumptions about the challenges learners with disabilities encounter in online courses. Finally, this study did not explore gender as a factor regarding

accessibility practices in online courses. Research regarding differences in disability practice based on gender have reported mixed findings. However, it may be worthwhile for future studies to examine the role of gender as a predisposition in accessibility knowledge and practices.

Implications and Conclusion

Many students with disabilities are now taking online courses to fulfill their degree program requirements. Consequently, higher education institutions, no matter their size or enrollment level, must take the appropriate steps to ensure that their online courses are legally compliant with all disability-related laws, rules and ordinances. As the results of this study show, higher education institutions must ensure that their faculty members are adequately trained and supported to teach effectively and efficiently in the online learning environment. Moreover, higher education institutions must ensure that their level of investments in both academic tools and personnel resources are in congruence with their focus on increasing their online offerings.

It is recommended therefore that accessibility training provided by higher education institutions include a focus on disability related laws and specific disabilities. Institutions should also emphasize proactive strategies for online course design in their training. This is to avoid having to retrofit online courses to meet legal requirements and the educational needs of learners with disabilities. As important, professional development support needs to also incorporate a transformational learning framework that scaffolds critical reflection and reflective discourse. Such an approach will help provoke

reflection on beliefs and practices regarding inclusive teaching approaches in online courses for all students, including those with disabilities.

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APPENDIX

Online Accessibility Faculty Questionnaire

Accessibility Knowledge

What is your level of awareness with the following?	Not at all aware	Slightly aware	Somewhat aware	Moderately aware	Very aware
Accessibility Standards – Law					
a. Section 504 of the Rehabilitation Act of 1973					
b. Section 508 of the Rehabilitation Act, updated 2017					
c. Americans with Disabilities Act of 1990 and amendments of 2008					
d. Assistive Technology Act of 1998					
e. Higher Education Opportunity Act 2008					
Institutional Policy					
f. How aware are you with your institution's legal obligation in providing accommodations to students with disabilities?					
g. How aware are you with your responsibilities as a faculty member for providing Section 504/ADA accommodations for students with disabilities at your institution?					
h. How aware are you with your institution's administration process of providing instructional accommodations to students with disabilities?					
i. How aware are you with the process that students undergo to document their disability(ies) at your institution?					
j. How aware are you with your institution's policy regarding the students' option to self-disclose their disability to Student Disability Services to receive accommodations?					

How aware are you with the following Design Guidelines?	Not at all aware	Slightly aware	Somewhat aware	Moderately aware	Very Aware
Design Guidelines					
1. Quality Matters (QM) neral Standard 8: Accessibility and Usability					
2. Web Content Accessibility Guidelines (WCAG 2.0)					
3. Universal Design for Learning (UDL)					
4. Other standards					
How aware are you with the meaning of following the terms as defined by the ADA?	Not at all aware	Slightly aware	Somewhat aware	Moderately aware	Very Aware
Terminology					
1. Accessible Technology					
2. Assistive Technology					
3. Disability					
4. Reasonable Accommodation					
5. Reasonable Modification					
6. Usability					
7. Universal Design					
How aware are you that there is an accessibility checker in the following file types to help you identify where ADA issues exist?	Not at all aware	Slightly aware	Somewhat aware	Moderately aware	Very Aware
Accessibility Checking Feature					
8. MS Word					
9. Adobe Acrobat Pro PDF					
10. LMS (Blackboard, Canvas, Moodle)					
11. Google Apps (Doc., Sheets, Forms)					

Accessibility Application/Practice

How often do you use the following in your online courses?	Never	Rarely	Sometimes	Very Often	Always
Application/Practice- Online Tools					
a. Word documents					
b. PDF documents					

c. Videos (YouTube, Vimeo, Screencasts, etc.)					
d. Audio files (podcasts, MP3 files, etc.)					
e. Images					
f. internet/databases					
g. External applications (third party) Examples: Quizlet, Screencast-o-matic, Poll Everywhere					
h. Google Apps (Doc., Sheets, Forms)					

In your use of Word and PDF documents, how often do you use the following features?	Never	Rarely	Sometimes	Very Often	Always
	Accessibility Practice – Word and PDF				
i. Use accessibility checker to identify accessibility issues					
j. Apply Alternative Texts (alt tags) to images in the documents.					
k. Use numbers/bullets to signify a list					
l. Use an identified "header style" to organize content					
m. Use an identified "header row and header column" to identify tables					
n. Use hyperlinks in text for navigation purposes					

In using your institution's LMS (Blackboard, Canvas, Moodle, etc.), do you apply the following?	Never	Rarely	Sometimes	Very Often	Always
	Accessibility Practice – LMS				
n. Use accessibility checker to identify accessibility issues					

o. Add Alternative Text (alt tags) to images					
p. Upload documents to correct category (example: syllabus to syllabus category)					
q. Quiz					
r. Synchronous Chat					

How often do you provide the following in your online courses for the audio/video you use?	Never	Rarely	Sometimes	Very Often	Always
	Accessibility Practice – Audio/Video				
n. Transcripts with audios (podcasts, MP3, AudioBoom, etc.)					
o. Transcripts with videos (YouTube, Vimeo, Screencasts, Kaltura, etc.)					
p. Videos with captions					
q. Verify that external internet sites/databases have accessibility statements on their sites to students with disabilities					
r. Provide an accessibility statement that third party apps used in your course are accessible to students with disabilities.					
s. Statement on your syllabus regarding disability accommodations					

The biggest limitations to making your online courses fully accessible?	Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree
Challenges to Application/Practice					
1. Time for designing online content					

2. Time to attend training					
3. Training and knowledge on accessibility issues.					
4. Training and knowledge on needs of students with disabilities					
5. Tools to make the necessary changes (software to assist with transcripts, etc.).					
6. Training and knowledge on the types of changes that need to be made					

Accessibility Professional Development

How important would the professional development opportunities be in assisting you to accommodate online students with disabilities?	Not Important	Slightly Important	Moderately Important	Important	Very Important
Institutional/Technology Support					
a. Using technology to teach students with disabilities					
b. Assistance from (Online Programs, Center for Teaching and Learning, Instructional Designer, etc.) in adapting your online course					
c. Using Universal Design in instruction					
Using WCAG Guidelines					

e. Training on ADA and 504 regulations/laws					
f. Training in Section 508					
g. Video captioning (YouTube, Screencasts, etc.)					
h. Training on the policies and procedures for students with disabilities					
i. Teaching Blind or visually impaired students					
j. Teaching Deaf or hearing impaired students					
k. Teaching Cognitively impaired students					

What other feedback do you have regarding accessible design in your online courses?

What other support would be helpful in assisting you in designing and implementing an accessible online course?

Demographic Information

For each of the following, please click the response that best describes you.

1. My gender:

Male_____
Female_____
Transgender_____
Gender Variant/Non-Conforming
Not listed _____
Prefer not to answer _____

2. My age range:

21-30_____
31-40_____
41-50_____
51-60_____
Over 61 _____

3. Number of years as a faculty at this institution:

0-5 years____
6-10 years____
11-15 years____
16-20 years____
Over 20 years ____

4. My highest degree is:

Master's degree ____
Education Specialist (Ed.S.)____
Doctorate (PhD.), (EdD.) ____

5. My current faculty status is:
Professor____
Associate Professor _____
Assistant Professor _____
Instructor _____
Adjunct ___
Clinical Faculty _____
Not listed _____

6. Primary Level of Teaching (Choose one)

Undergraduate _____
Masters _____
Doctoral _____

7. Primary Online Delivery Method (Choose one)

Web-enhanced_____
(Traditional classroom setting. Traditional synchronous in-seat class that is enriched by the addition of an online
component and require that students be actively engaged in that online component.

Blended/hybrid _____

Asynchronous Online _____

Synchronous Online ____

Other _____

8. How long have you been teaching online?

0- 2 years_____
3-5 years_____
6-10_____
Over 10 years_____

9. For which disability or disabilities have you provided accommodation in your online class?

Autism Spectrum Disorder (social interaction, communication, restricted interests and
repetitive behaviors) ___
Cognitive Impairment (communication, social skills, self-directed) _____
Hearing Impairment_____
Mental health conditions (bipolar disorder, depression, schizophrenia, anxiety and personality
disorders) _____
Physical disability _____
Vision Impairment _____
Other _____
None _____

Training History

10. How many total training sessions related to online learning have you attended in the past year?

0 ____
1-3 ____
4-8 ____
9-15_____
16+____

11. How many communication messages (email, bulletin board, listserve, announcements, newsletters) have you received from your institution regarding online training offerings?

0 _____
1-3 _____
4-7 _____

8-12_____
13-17_____
18-24_____
25+ _____

12. How much money do you spend on training and development, either sponsored or non-sponsored by your institution?

100 or less_____
101 to 500 _____
501 to 1000_____
1001 to 2000_____
2001 or more_____

Descriptive statistics on survey responses by item

	ITEM	M	SD
	Knowledge - Accessibility laws and standards		
1a	Section 504 of the Rehabilitation Act of 1973	2.21	1.42
1b	Section 508 of the Rehabilitation Act, updated 2017	1.94	1.28
1c	Americans with Disabilities Act of 1990 and amendments of 2008	3.54	1.18
1d	Assistive Technology Act of 1998	2.12	1.28
1e	Higher Education Opportunity Act 2008	2.30	1.25
	Knowledge - Institutional Policy		
2a	How aware are you with your institution's legal obligation in providing accommodations to students with disabilities?	4.24	.954
2b	How aware are you with your responsibilities as a faculty member for providing Section 504/ADA accommodations for	4.18	1.15

	ITEM	M	SD
	students with disabilities at your institution?		
2c	How aware are you with your institution's administration process of providing instructional accommodations to students with disabilities?	4.18	1.02
2d	How aware are you with the process that students undergo to document their disability(ies) at your institution?	3.53	1.27
2e	How aware are you with your institution's policy regarding the students' option to self-disclose their disability to Student Disability Services to receive accommodations?	3.62	1.36
	Knowledge - Design Guidelines		
3a	Quality Matters (QM) General Standard 8: Accessibility and Usability	3.15	1.65
3b	Web Content Accessibility Guidelines (WCAG 2.0)	2.54	1.46
3c	Universal Design for Learning (UDL)	2.70	1.58
3d	Other Standards	2.36	1.39
	Knowledge-Terminology	**M**	**SD**
4a	Accessible Technology	3.24	1.35
4b	Assistive Technology	3.27	1.37
4c	Disability	3.95	1.06
4d	Reasonable Accommodation	4.02	1.09
4e	Reasonable Modification	3.72	1.24

	ITEM	M	SD
4f	Usability	3.31	1.36
4g	Universal Design	3.28	1.47
	Knowledge - Accessibility Checking Feature		
5a	MS Word	2.46	1.61
5b	Adobe Acrobat Pro PDF	2.32	1.57
5c	LMS (Blackboard, Canvas, Moodle)	2.44	1.58
5d	Google Apps (Doc., Sheets, Forms)	2.11	1.43
	Knowledge - Accessibility Application/Practice		
	Practice- Online Tools		
6a	Word documents	3.78	1.16
6b	PDF documents	4.08	0.97
6c	Videos (YouTube, Vimeo, Screencasts, etc.)	3.87	1.05
6d	Audio files (podcasts, MP3 files, etc.)	2.70	1.31
6e	Images	3.80	1.12
6f	Internet/Databases	3.66	1.22
6g	External applications (third party) Examples: Quizlet, Screencast-o-matic, Poll Everywhere	2.41	1.28
6h	Google Apps (Doc., Sheets, Forms)	2.50	1.33
	Practice- Word and PDF		
7a	Use accessibility checker to identify accessibility issues	1.99	1.27
7b	Apply Alternative Texts (alt tags) to images in the documents.	2.13	1.37
7c	Use numbers/bullets to signify a list	3.81	1.04
7d	Use an identified “header style” to organize content	3.48	1.29
7e	Use an identified “header row and header column” to identify tables	3.25	1.37

	ITEM	M	SD
7f	Use hyperlinks in text for navigation purposes	3.46	1.21
	Practice LMS		**SD**
8a	Use accessibility checker to identify accessibility issues	2.11	1.38
8b	Add Alternative Text (alt tags) to images	2.33	1.39
8c	Upload documents to correct category (example: syllabus to syllabus category)	3.88	1.35
8d	Quiz	3.32	1.46
8e	Synchronous Chat	1.81	1.11
	Practice- Audio/Video		
9a	Transcripts with audios (podcasts, MP3, AudioBoom, etc.)	2.33	1.48
9b	Transcripts with videos (YouTube, Vimeo, Screencasts, Kaltura, etc.)	2.57	1.51
9c	Videos with captions	2.99	1.52
9d	Verify that external internet sites/databases have accessibility statements on their sites to students with disabilities	1.97	1.24
9e	Provide an accessibility statement that third party apps used in your course are accessible to students with disabilities.	2.01	1.41
9f	Statement on your syllabus regarding disability accommodations	4.50	1.20
	Challenges to Application/Practice		
10a	Time for designing online content	3.86	1.16
10b	Time to attend training	3.51	1.14
10c	Training and knowledge on accessibility issues.	3.73	1.17

	ITEM	M	SD
10d	Training and knowledge on needs of students with disabilities	3.40	1.21
10e	Tools to make the necessary changes (software to assist with transcripts, etc.).	3.77	1.13
10f	Training and knowledge on the types of changes that need to be made	3.90	1.03
	Accessibility		**SD**
	Professional Development		
	Institutional/Technology Support		
11a	Using technology to teach students with disabilities	4.00	0.90
11b	Assistance from (Online Programs, Center for Teaching and Learning, Instructional Designer, etc.) in adapting your online course	4.27	0.92
11c	Using Universal Design in instruction	3.67	1.21
11d	Using WCAG Guidelines	3.47	1.16
11e	Training on ADA and 504 regulations/laws	3.53	1.17
11f	Training in Section 508	3.48	1.13
11g	Video captioning (YouTube, Screencasts, etc.)	3.85	1.26
11h	Training on the policies and procedures for students with disabilities	3.73	1.12
11i	Teaching Blind or visually impaired students	3.74	1.13
11j	Teaching Deaf or hearing- impaired students	3.77	1.09
11k	Teaching Cognitively impaired students	3.74	1.17