Perception of Universal Design for Learning in Online Higher Education

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Submitted in partial fulfillment of the requirements for the degree of

Master of Arts in Applied Disability Studies

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St. Catharines, Ontario

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Abstract

The application and analysis of online education have grown in higher education. However, the paradigm completely and suddenly shifted to online education in response to the Coronavirus (COVID-19) pandemic. The sudden shift to online education did not allow instructors or students with disabilities (SWD) to systematically adapt their teaching and learning strategies to fit a new education environment. The SWD population faces unique challenges in online education and transitioning to online education changed these challenges and created new barriers. One inclusive education paradigm, Universal Design for Learning (UDL), is considered the best practice for inclusive learning in contemporary education. This thesis explored the instructors' and SWDs' perspectives on UDL in online higher education. Specifically, the instructors' and SWD's perceptions regarding the application and barriers to implementing the UDL guidelines online were investigated. To address this aim, virtual focus groups were conducted with 14 participants from two populations: instructors (*n*= 6) and SWD (*n*= 8). A virtual poll was embedded into the focus groups' discussions to allow the participants to summarize their experiences, rank UDL Guidelines, and then discuss the outcomes. It was found that SWD had both critical and positive perceptions and experiences with UDL in online higher education while instructors primarily noted positive perceptions. However, instructors faced barriers to implementing the UDL Guidelines online including time and effort, resources, and values. Further research is necessary to address the use, implementation, and barriers of UDL in online higher education.

Keywords: *Universal Design for Learning, Higher Education, Accessible Education*

Acknowledgements

First and foremost, I would like to express my deepest appreciation to my supervisor Dr. Mullins. Your invaluable feedback, mentorship, guidance, and patience have inspired and motivated me throughout my studies. I could not have undertaken this journey without the support of Dr. Mullins and my committee members.

I would also like to thank the Mullins Lab members for their encouragement, positive perspectives, and outstanding feedback. A special thank you to my co-M.A and friend Rachel. I could not imagine going through this journey with anyone else. I am grateful to have benefited from your thoughtful perspective, support, and friendship.

Furthermore, I would like to express my sincerest gratitude and love to my mom, dad, and sister for their unwavering support and encouragement throughout my academic journey. Your belief in me has been a constant source of strength. This thesis would not have been possible without your boundless love and unwavering faith in me. Thank you from the bottom of my heart. A special thank you to my Great Aunt Colleen. Thank you for always encouraging me to pursue education and for being an exceptional role model.

Finally, I would like to thank Daniel. Your endless snacks kept me sane through countless late-night research sessions. Thank you for your support and understanding throughout the process. You're the best distraction and motivation rolled into one!

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Background of Education

The first intention of distance education has been referred to as correspondence education and dates to a 1728 advertisement in the *Boston Gazette* (Gasevic et al., 2015; Kentnor, 2015). In the advertisement, Caleb Phillips stated that he would send weekly art lessons to people across Boston (Gasevic et al., 2015; Kentnor, 2015). As correspondence education of this nature does not include two-way conversation or feedback between student and teacher, it is a stretch to refer to it as online education (Kentnor, 2015). Rather, Caleb Phillips' advertisement signals the beginning of a long timeline of online education adaptation and development. Online education has taken many forms from its theoretical inception in the 1720s (Lee, 2017). During the 1960s and 1970s, an open-learning movement began in higher education (Lee, 2017). This movement began with the Open University of the United Kingdom (UKOU) in 1969. From there, 20 open universities and distance education institutions were established in more than ten countries within ten years (Lee, 2017). In the 1970s, the open university Athabasca University was developed in Calgary, Alberta to provide education that is more accessible for learners (Byrne, 1989; Lee, 2017). As access to computers and the World Wide Web grew, so did online education (Gasevic et al., 2015; Kentnor, 2015). Soon after, large-scale online courses using computer conferencing systems were used in kindergarten to grade 12 classes and higher education (Kentnor, 2015). The design and application of online education have developed greatly and profoundly impacted education today. Online education has been credited with increased flexibility and access to education for students and educators (Gasevic et al., 2015). However, the specific outcomes, access, and perceived flexibility required further inspection (Gasevic et al., 2015).

The application of online education and the satisfaction of educators and students within the online environment have been investigated since the 1980s (Lee, 2017; Gasevic et al., 2015). Despite decades of research, there remains a lack of consistency regarding terminology in the literature (Moore et al., 2011; Singh & Thurman., 2019). Various terms have been used to denote online learning, including distance learning, virtual learning, and e-learning (Singh & Thurman, 2019). To date, there has been little resolution regarding what each term means and if specific terms are being used synonymously. It is suggested that the lack of consistent terminology in the literature reflects and contributes to the conflicting viewpoints of educators and researchers regarding the understanding, implementation, and analysis of online education (Moore et al., 2011; Singh & Thurman, 2019). For this thesis, the term online education was used to describe any teaching and learning activities conducted virtually, either synchronously or asynchronously, and are not dependent on being at a physical location for course participation (Singh & Thurman, 2019). According to Singh and Thurman (2019), online learning points more to the method of how the students are learning online (synchronous or asynchronous), whereas online education is a more general term that can be used for either synchronously or asynchronously online education.

Currently, online education has taken more advanced forms and has occurred more frequently than in the last two decades. This advancement involves the addition of social media, instant messaging, and recorded lectures (Harasim, 2000). Harasim (2000) describes the change in online education as a tectonic shift in education. Indeed, according to a survey by the Canadian Digital Learning Research Association (2018), one in five students in postsecondary school takes at least one course online, and there were more than 1.3 million online course registrations between 2016 and 2017 (Johnson et al., 2019). This survey stated that 76% of students felt there would be an increase in online education in the next year. The national survey

indicated that online education was a factor in many students' higher education and that many students believe this increasing trend would continue (Johnson et al., 2019). Lee (2017) highlighted that increasing the accessibility of university education is a complex and multidimensional social issue, one which requires serious and continuing scholarly discussions.

In 2020, the education system underwent a further paradigm shift to online education because of the Coronavirus (COVID-19) pandemic. Based on the declaration of a global pandemic by the World Health Organization, most Canadian universities transitioned from face-to-face learning to exclusively online courses (Public Health Ontario, 2020). In response to these unprecedented circumstances, instructors and students were required to adapt to a new learning paradigm. As online education grew, research was geared toward analyzing the effective implementation of online courses, identifying barriers, and clarifying discrepancies in definitions (Gasevic et al., 2015; Harasim, 2000). However, the sudden switch to exclusive online education left little opportunity to determine the impact on marginalized populations, including students with disabilities (SWD).

Students with Disabilities in Higher Education

The prevalence of SWD in higher education has been on the rise (McGregor et al., 2016). However, the exact statistic can be difficult to determine because discrimination in the academic culture persists, and therefore students do not always disclose visible or invisible disabilities (Pearson & Boskovich, 2019). While the increased prevalence of SWD is a positive trend, it calls for more consideration regarding these students' educational experiences and barriers. Many SWD face unique challenges in higher education compared to their counterparts (Burgstahler, 2015; Mullins & Preyde, 2013; McGregor et al., 2016). Mullins and Preyde (2013) conducted interviews with ten female students attending a Canadian university to explore the unique needs of students with invisible disabilities. Using an interpretive phenomenological analysis (IPA),

interviews were examined, and themes related to subjective experiences of related impairments and social factors' impact on lived experiences emerged. It was concluded that students with invisible disabilities' experiences are dynamic, and the impact of these experiences varied. Participants discussed the perceived negative attitudes of professors, difficulty utilizing accommodations, accommodations not being implemented, difficulty retaining main lecture points, stigma, and discrimination as barriers to education (Mullins & Preyde, 2013).

Similarly, McGregor et al. (2016) explored the experiences of students with learning disabilities (LD) in university. They surveyed 62,803 students with and without LD and compared their responses. McGregor et al. (2016) found that students with LD had more difficulty with assignments, reported more contact with professors, and perceived more bias from professors than other students. Interestingly, only 33% of students with an LD reported the use of accommodations. A small difference was also noted between students with LD having less satisfaction with university experiences than other students (McGregor et al., 2016). Inclusive education and increased awareness of SWD experiences and challenges are necessary to achieve more inclusive higher education. The rapid paradigm shift to online education did not allow for systematic transitions to online platforms for instructors and students (Dianito et al., 2021). As SWD faced barriers in the face-to-face learning environment, it is plausible that new or different barriers would be experienced in online education (Mullins & Mitchell, 2022).

Students with Disabilities in Online Education

Many SWD likely face different challenges in the online environment when compared to their non-disabled peers. To navigate and succeed in the online education environment, students require different skills and abilities than in the typical in-person setting (Conard & Donaldson, 2012; Harasim, 2012). Research has suggested that several skills including high self-learning abilities (ability to teach yourself), management skills, organization, and communication abilities

allow students to achieve meaningful gains in an online education environment (Conard & Donaldson, 2012; Harasim, 2012;)). These specific academic areas can be challenging for some SWD (Burgstahler, 2015; McGregor et al., 2016).

In addition to the previously discussed barriers, SWD face unique barriers to online education including uncaptioned videos, content presented only within graphic images, unorganized content cluttered on a web page, web pages not compatible with reading software, and technical issues (Burgstahler, 2015). To combat these barriers, Burgstahler (2015) suggested consideration for learner diversity and alternatives to digital representations. Additionally, Burgstahler (2015) outlined Distance Learning Program accessibility indicators such as a clear statement for how the student can request accommodations, covering accessibility issues in the course design, and having a monitoring system in place for ongoing assessment of accessibility.

To investigate the different experiences of SWD and students without disabilities, Ronen and Shonfeld (2017) examined the contribution of online courses by comparing the perception of 85 students with and without an LD. Specifically, they examined the students' learning ability, involvement in the online course, activity of the lecturer in the online environment, and student satisfaction. The comparisons between groups indicated that students with LDs ranked professor involvement in the course higher than other students. Ronen and Shonfeld (2017) concluded that when students with LDs reported contributing to lectures through participating in the discussion, reading study materials, and setting study times, they also reported higher satisfaction. These results suggest that when students with LDs have an active role in online education, they were more satisfied with the course. However, there have been mixed results regarding student experiences, success, and satisfaction with online education (Burgstahler, 2015; Ronen & Shonfeld, 2017). These varying results indicate the need for continued examination of SWD experiences in the online education environment. Moreover, despite several services to support

SWD, the duty falls on the student to approach the instructor, disclose their diagnosis, and provide proof of their diagnosis (Cumming & Rose, 2021). After the initial process of disclosing and providing the need for accommodations, SWD must continue to disclose to every instructor to access their rightful accommodations. Occasionally, instructors are unaware of how to provide accommodations and have suggested concerns for integrity, creating additional barriers for SWD (Cumming & Rose, 2021).

Students with Disabilities During COVID-19

While online education presents unique barriers for SWD, the research suggests that it can help rectify other barriers like physical barriers and fewer accommodations (Mullins & Mitchell, 2022). To examine the potential impact of this transition to online education, Mullins and Mitchell (2022) conducted an online survey with 222 students at a Canadian university in Ontario to examine the impact of COVID-19 on the lives and education of SWD. They investigated which aspects of online education created barriers or support learning, students' educational experience, students' online accommodations, and how these accommodations were disclosed and implemented. Students expressed concerns and recommendations to improve online education. Most of the respondents were undergraduate students; the most frequently reported disability was mental health. It was found that SWD reported challenges with technology, studying from home, how courses were facilitated, and loss of access to campus support services. On the other hand, students also reported the removal of physical barriers, requiring fewer accommodations, and added support. While capturing the student experience transitioning online, the authors developed recommendations from the students to develop inclusive online education environments. Some notable recommendations for instructors were minimizing the number of platforms, reducing the number of written assignments, considering a

variety of assessments, and flexibility concerning deadlines and extensions (Mullins & Mitchell, 2022).

Considering the pre-existing disproportionate barriers for SWD in higher education, the sudden and mandatory transition to online education for higher education students in Canada likely exacerbated existing barriers and created new ones. Dianito et al. (2021) investigated the lived experiences, challenges, and coping mechanisms of SWD during the pandemic. Interviews were conducted with ten college students in the Philippines. A phenomenological approach was used todetermine the challenges and positive experiences of students. The themes that emerged from the student's experience related to social exclusions, limitations of assistive technologies, and internet connectivity issues. On the other hand, students reported resilience due to healthy support systems including friends and family. While students endured new barriers in online education, they were able to use the support of their existing support systems to reach their goals (Dianito et al., 2021). Overall, the complexities of creating an inclusive and accessible online education environment are difficult to navigate and implement. Research continues to uncover and examine challenges, positive examples, and methods of best practice for including SWD and all learners in the online education environment.

Pedagogy to Inclusive Education

Inclusive education pedagogy contests current practises that focus on the SWD and their differences as this focuses the problem on the individual differences of the students and creates marginalization and isolation (Guðjónsdóttir & Óskarsdóttir, 2016). Therefore, inclusive pedagogical practices aim to shift the focus away from the SWD and onto the educational system (Guðjónsdóttir & Óskarsdóttir, 2016). To respond to students' diverse needs, educators build or plan flexible and alternative approaches from the onset of a course and create an environment with opportunities to learn in a variety of ways (Guðjónsdóttir & Óskarsdóttir, 2016). There are

various approaches to inclusive pedagogy including Differentiated Instruction (DI), the Inclusive Pedagogical Approach in Action framework (IPAA), and the Universal Design for Learning (UDL).

The DI approach to inclusive education involves providing different levels or instructional techniques for different individual students (Loreman, 2017). For example, an educator may offer different methods for students to submit an assignment including written, video, or graphic images. Differentiated Instruction is not limited to an assessment of the expression of student knowledge, it requires modification and adaptation to materials, content, and assessment to meet students' needs (Loreman, 2017). According to Loreman (2017), DI is an effective approach to inclusive education leading to positive mathematical and reading achievements in mixed-ability classrooms. Unfortunately, DI has been criticized for being individualized and therefore it has been argued that it is not in line with inclusive pedagogy as it may lead to students feeling marginalized when SWD notices their assessment or projects are differentiated from their peers (Florian, 2015; Loreman 2017).

To address these critiques of DI, Florian and Spratt (2013) established the IPAA framework. The IPAA framework differs from DI as it does not modify or adapt the lesson and assessments for SWD, rather it creates a learning environment that is accessible for all learners by identifying potential challenges and barriers for students (Florian & Spratt, 2013). The IPAA framework is based on three overarching principles. First, differences are conceptualized as an essential aspect of human development. Second, teachers must have the belief that they can meet the needs of all learners. Finally, teachers continually create new ways to work with students. While some research provides support for the use of IPPA as an effective approach to inclusive education, it is a new model and requires additional investigation (Loreman 2017).

The UDL framework has been noted to encompass elements of DI and IPAA (Loreman, 2017). UDL is based on the scientific understanding of the learning-teaching process and environment to improve education and provide instruction (Rogers-Shaw et al., 2018; Centre for Applied Special Education Technology, CAST, 2018; Westine et al., 2019). UDL is founded on three principles, including (a) multiple means of *engagement*; (b) multiple means of *representation*; and (c) multiple means of *expression*. DI is captured within the three principles of UDL as they express the use of multiple means for various materials and methods of teaching (Loreman, 2017). UDL principles and applications have been widely explored in research and are largely accepted by practitioners and educators (CAST, 2018; Loreman, 2017). Loreman (2017) stated that IPAA and UDL are similar as they are both focused on all learners and establishing a foundation of inclusive education. Alternatively, IPAA and UDL are based on similar ideologies. However, they differ as UDL is based on scientific understandings and concrete suggestions for teachers, classroom structure, and curriculum. Accordingly, UDL is selected as the preferred method as it has a representation of both DI and IPAA and is an effective approach to inclusive education (CAST, 2018; Loreman, 2017; Westine et al., 2019).

Universal Design for Learning (UDL)

The UDL framework is based on "universal design" dating to the 1980s and 1990s (Rogers-Shaw et al., 2018). Universal design was used by architect Ronald Mace when designing products to create barrier-free environments for all abilities (Rogers-Shaw et al., 2018). The conceptualization of UDL is significant for higher education, as it emphasizes that variation in student learning needs is normal. Under this conceptualization, SWD are provided with the opportunity to engage in the classroom in a manner that meets their diverse needs (Cumming & Rose, 2021). UDL focuses on the scientific processes of teaching and learning. CAST (2018) created the UDL framework and guidelines to establish concrete suggestions for inclusive

learning for all students. UDL is not designed to differentiate learners based on needs or abilities, rather it establishes a foundation of teaching and learning for all learners (Al-Azaweil et al., 2017).

The CAST (2018) grid summarizes the three principles and nine guidelines of UDL and makes connections for each guideline to relevant scientific evidence. Each guideline has 3-5 checkpoints for educators to refer to for concrete examples of how to fully embody the guideline in the classroom environment. As mentioned, UDL is based on three principles of multiple means of engagement, representation, and expression. The principle of multiple means of representation is based on the idea that people have different ways of presenting and understanding information (Rose, 2006 & Westine et al., 2019). The guidelines of this principle include Guideline 1: Perception, Guideline 2: Language and Symbols, and Guideline 3: Comprehension. Within each guideline there are checkpoints and each of these checkpoints is associated with numerous methods of classroom application. For example, Guideline 3: Comprehension includes checkpoint 3.4 which suggests setting concrete examples for teachers to approach maximizing generalization. The concrete examples involve providing learners with checklists, connecting novel ideas with familiar ideas, and opportunities to generalize different types of problems (CAST, 2018).

Multiple means of action and expression outline the guidelines for providing learners with various methods to express their knowledge (CAST, 2018; Rose, 2006 & Westine et al., 2019). The guidelines include Guideline 4: Physical Action, Guideline 5: Expression and Communication, and Guideline 6: Executive Functions. Learners vary in their abilities and preferences for expressing their understanding of class content. By understanding and providing multiple means of action and expression, teachers can create an opportunity for all students to present what they know successfully. The emphasis of all three principles is that there is no

single application of the principles that will increase participation for all students. A variety of UDL methods need to be included and embedded in a course (CAST, 2018).

The multiple means of engagement principle highlights the diversity of what motivates learners and how a person's background, culture, and personal relevance can influence their education and learning (CAST, 2018). The engagement principle sets the stage for why the learner wants to participate and has been referred to as the "why" of learning. There are three guidelines in the engagement principle including Guideline 7: Recruiting Interest, Guideline 8: Sustaining Effort and Presence, and Guideline 9: Self-regulation. Within the engagement principle, checkpoints include offering choice, increasing active learning and participation, and encouraging self-reflection (CAST, 2018; Westine et al., 2019).

Figure 1 outlines the CAST (2018) principles, guidelines, and checkpoints. In an agreement with the US Department of Education, CAST has been developing guidelines for UDL and organizes these principles in a grid based on three areas: access, build, and internalize. According to CAST (2018), the "access" row includes the guidelines that suggest ways to increase access to the learning goals by recruiting interest and by offering options for perception and physical action (Guidelines 1, 4, and 7). The "build" row highlights ways to develop effort, language and symbols, and expression (Guidelines 2, 5, and 8). The final row "internalize" states methods to promote self-regulation, comprehension, and executive functioning (Guidelines 3, 6, and 9).

Figure 1

Overview of UDL Principles, Guidelines, and Checkpoints

Principle	Guideline	Checkpoint
Providing multiple means of representation	1 Perception	1.1 Offer ways of customizing the display of information 1.2 Offer alternatives for auditory (sound) information 1.3 Offer alternatives for visual information
	2 Language, mathematical expression, and symbols	2.1 Clarify vocabulary and symbols 2.2 Clarify syntax (arrangement of words) and structure 2.3 Support decoding of text, mathematical notions, and symbols 2.4 Promote understanding across languages 2.5 Illustrate through multiple media
	3 Comprehension	3.1 Activate or supply background knowledge 3.2 Highlight patterns, key features, big ideas, and relationships 3.3 Guide information processing and visualization 3.4 Maximize generalization (to different areas of study or concepts)
Providing multiple means of action and expression	4 Physical action	4.1 Vary the methods for response 4.2 Optimize access to tools and assistive technology
	5 Expression and communication	5.1 Use multiple media for communication 5.2 Use multiple tools for construction and composition 5.3 Build fluencies with varied levels of support for practice and performance
	6 Executive functioning	6.1 Guide appropriate goal setting 6.2 Support planning and strategy development 6.3 Facilitate managing information and resources 6.4 Enhance capacity for monitoring progress

	7 Recruiting interest	7.1 Optimize individual choice and autonomy 7.2 Optimize relevance, value, and authenticity 7.3 Minimize threats and distractions
Providing multiple means of engagement	8 Sustaining effort and persistence	8.1 Heighten importance of goals and objectives 8.2 Vary demands and resources to optimize challenge 8.3 Foster collaboration and community 8.4 Increase mastery-orientated feedback
	9 Self-regulate	9.1 Promote expectations and beliefs that optimize motivation 9.2 Facilitate personal coping skills and strategies 9.3 Develop self-assessments and reflection

Note. Adapted from "Universal design for learning Guidelines version 2.2," by CAST (2018) and Westine et al., (2019).

Empirical Support for UDL

Several studies have found UDL to be the best approach for inclusive learning in contemporary education (Al-Azawei et al., 2016; Fleet & Kondrashov, 2019). Using a single case design, Smith (2012) examined the reflective practice of one faculty member after applying UDL to a graduate class. Both the instructor's use of the UDL framework and student perspectives on the application of this approach were collected. Smith (2012) found that both instructor and student responses were favourable toward the implementation of the UDL instructional practice. These results suggest that when instructors use the UDL framework to help design courses, goals are more clearly aligned with instructional practices, there is a positive relationship between student interest and engagement, and students are positively engaged in the course. Although single case design allows for the demonstration of effects, it cannot capture the analysis of different perspectives and experiences. To collect a larger snapshot of empirical

support for UDL, a content analysis and systematic review was conducted (Al-Azawei et al., 2016; Fleet & Kondrashov, 2019).

Al-Azawei and colleagues (2016) conducted a content analysis of 12 studies evaluating the implementation of UDL from 2012 to 2015. Ten of the studies were conducted in traditional or blended online and in-person classrooms, and two studies were online. Eight studies were focused on populations after grade 12 and four were focused on the population before grade 12. Eleven studies yielded positive results from implementing UDL principles. Al-Azawei and colleagues (2016) concluded that UDL is an efficient approach for designing flexible learning environments for SWD. While this study suggests valuable information regarding UDL implementation at or below grade 12, limited research was reviewed for high education.

Fleet and Kondrashov (2019) conducted a systematic review to investigate the empirical research on UDL in universities, including their openness to implementing UDL principles, and limitations or gaps in the literature. Twenty articles were included in the review (including 10 qualitative, six quantitative, and four mixed methods designs). Six authors identified UDL to be a positive framework for universities, several suggested improved learning processes for students with and without disabilities. Additionally, two studies found that UDL was more effective when faculty members, administration, and course designers collaborated. Six sources found the UDL framework to be more affordable, more proactive, and accessible. Finally, four studies reported positive use of UDL. It was suggested that while UDL can take more time and effort to implement than traditional accommodations, the investment is valuable as the strategies can be reused in the future. Fleet and Kondrashov (2019) concluded that the existing gaps in UDL research included (a) assessments were typically conducted by professors and did not include students or outside input, (b) no studies are specific to enrolment or retention rates of students, (c) limited research address what barriers instructors face when implementing UDL principles,

(d) the need for more studies focusing on student voices including disabled students, and (e) limited inclusion of instructors in the decision-making process of course development (Fleet & Kondrashov, 2019).

More recently, Cumming and Rose (2021) conducted a rapid review of 52 articles to explore the use of UDL in higher education. Specifically, they analyzed a small body of research from the past 10 years to examine the efficacy, theory, and implementation of UDL in higher education. They found that a key benefit to UDL was increased engagement of students, higher understanding of the coursework, and students not being singled out for needing accommodations. All the studies were found to have reported high student satisfaction with UDL in the classroom. Students noted the specific value of UDL practices in helping clarify course content, increase feelings of engagement, and improve their capacity to participate (Cumming & Rose, 2021). Instructors often reported that UDL practices helped to improve their teaching. However, it is cited in the literature that instructors find the need for more appropriate training and awareness of the advantages of UDL. Additionally, some studies cited that instructors believed SWD had an unfair advantage with accommodations and emphasized the need for a great understanding of the UDL framework in relation to accommodations. Instructors also raised concerns regarding the time and effort to prepare lessons that are in line with UDL. Cumming and Rose (2021) found that further development is necessary for measuring and recognizing the indicators of success in UDL efficacy. Several recommendations for the implementation were highlighted, including information in multiple formats, various means for students to communicate, physical actions that can be carried out, clear instructions, respect for diversity, regular instructor and student interactions, specific feedback, and a variety of assessments. For future research Cumming and Rose (2021) suggested further examination of instructor barriers including attitudes and additional professional development. It was suggested

that instructors have access to UDL peer "experts" who can mentor, monitor, and support instructors in implementing UDL (Cumming & Rose, 2021). Finally, they suggested that online communities of practice (CoP) where instructors share resources experiences and expertise should be developed. The majority of the UDL research was conducted in the United States, the authors called for more research outside of the United States. While UDL has shown success and a high level of satisfaction in over 800 research articles, much more work is needed before it is the standard practice in higher education (Cumming & Rose, 2021).

Instructors' Perspective of UDL

Transitioning courses to the online platform or adding online components to a course provides educators with the unique opportunity to improve access, the quality of a course, and the implementation of UDL. Despite this opportunity, research indicated that instructors face barriers to implementing UDL, including unclear methods of application or limited training and knowledge of the scope of UDL (Alhaznawi, 2019; Hills et al., 2022; Westine et al., 2019). Westine et al. (2019) investigated faculty members' familiarity, use, and interest in learning more about UDL guidelines in online education environments. They surveyed 425 instructors who taught at least one online course during the 2017-2018 academic year in the United States. Sixty-two percent of the respondents reported familiarity with at least one UDL guideline and instructors were most familiar with Guideline 1: Perception and Guideline 5: Expression, and Communication. The guidelines used most in course design were Guideline 3: Comprehension and Guideline 5: Expression and Communication. Guidelines 3 and 5 were rated at the highest levels of implementation with the instructors stating they were able to use them without assistance. The least used guidelines were Guideline 2: Language, Mathematical Expression, and Symbols and Guideline 4: Physical Action. Finally, the instructors reported the most interest in Guideline 3: Comprehension, Guideline 8: Sustaining Effort and Persistence, and Guideline 5:

Expression and Communication. Additionally, instructors reported the barriers to implementation included self-perceived readiness or willingness to provide accommodations when using UDL and the need for more training (Westine et al., 2019). Overall, instructors suggested that they were interested in learning more about UDL and that more training was needed to improve their knowledge and usage of UDL guidelines. Although an important strength of this study is the large sample size, data were collected through a single data collection method (i.e., survey) and not compared to any pre-existing research to triangulate results. Similarly, it would be valuable to compare specific preferences for UDL guidelines between instructors and SWD.

More recently, Hills et al. (2022) identified barriers and bridges to further implementation of UDL in Canadian universities by examining faculty members' awareness and understanding of UDL through interviews and a survey. Nine interviews were conducted with staff at the university with expertise in UDL. Using content and discourse analysis, the interviews were coded for keyword repetition and themes. The interviewees indicated that barriers to UDL implementation included inconsistent understanding of implementation, misconceptions of UDL, limited time and resources, and student discomfort. On the other hand, two bridges that helped instructors implement UDL included a growing awareness of UDL and willingness to learn and implement UDL as well as instructors or institution champions committed to the UDL pedagogy. Results from the initial interviews were used to structure the preceding survey. The preceding survey was completed by 205 faculty members. Hills et al. (2022) found that the survey results were in line with the overall barriers and bridges established in the interviews. Specifically, the survey indicated that only 29% of instructors identified as having a good understanding of UDL. While Hills et al. (2022) state that the survey suggested that instructors are willing to learn more about UDL, no percentage of interest is provided. However, it is shared that 6% of instructors

participated in UDL training sessions over the academic year. The top three UDL practices identified by the faculty were posting course material in advance (Guideline 3: Comprehension), variety in assessment and lecture delivery (Guideline 1: Perception), and flexibility of deadlines (Guideline 8: Sustaining Effort and Persistence). The least implemented practices were noted in Guideline 1: Perception and included documents that can be read with a screen reader, closed captions for videos, and posting lecture recordings. The two greatest barriers to implementing UDL were time or workload constraints and knowledge or awareness of UDL. The findings suggest that increasing knowledge and implementation of UDL practices requires an institutional environment where UDL is more fully embedded into an institution's culture and community. The preliminary analysis of interview data before the survey allowed for the triangulation of data and increased the validity of the results. One notable limitation of this study is that no data was collected to determine if the claims made by the instructors were echoed by the students (Hills et al., 2022). Hills et al. (2022) suggested that future research should examine the perspectives of the students and continue to develop frameworks for the university-wide adoption of UDL.

As mentioned, UDL requires instructors to be flexible and does not replace SWD accommodations (Fleet & Kondrashov, 2019). Alhaznawi (2019) explored the factors that affect faculty members' awareness of disability and self-perceived readiness/willingness to provide accommodations in higher education through interviews. Specifically, this study investigated faculty members' experiences providing accommodations, their level of understanding regarding accommodations, and how instructors interact with accommodations in higher education. The sample consisted of 10 full-time university instructors from Illinois and one full-time faculty member with a disability from a university in a different state as an elite interviewee. Faculty expressed that they have some level of understanding regarding SWD and accommodations in higher education. However, the faculty expressed the need for more training to improve the

depth of understanding and improve their ability to provide the necessary accommodations. This study reinforces the need for agreement between instructors regarding accommodations and UDL definitions and implementation (Alhaznawi, 2019). Similar to the limitation noted by Hill et al. (2022), Alhaznawi (2019) did not compare claims made by faculty to the experiences of students and SWD. Additionally, interviews are based on the uniqueness of the individual and can be limited by their specific knowledge or understanding. A key strength of this paper was the use of the elite interview. Alhaznawi (2019) used the elite interview to achieve a deeper understanding of the faculty member interviews and a unique perspective. Working with a faculty member with a disability and specialization in UDL to analyze the data and explore their unique perspective allowed for triangulation and in-depth interpretation of data.

In higher education, UDL is conceptualized as a framework for inclusive pedagogy that requires a high level of commitment from staff and students (Fornauf & Erickson, 2020). Currently, UDL is often used by instructors and course designers as a response to a problem (Fornauf & Erickson, 2020). This use of UDL is contrary to the intention, which is to create opportunity, and choice, and to provide a scientific process of teaching and learning (CAST, 2018). Another misconception is that UDL was conceptualized as a framework for inclusive instructional design to meet the needs of diverse student populations (Fornauf & Erickson, 2020). However, UDL intends to create opportunities for all learners. Research has highlighted the need for additional training for instructors and course designers on how to implement UDL in the classroom (Izzo et al., 2008). Considering the recent transition to online education, it is likely that additional, or specialized training would be beneficial for instructors to gain knowledge of UDL and practice within an online space (Izzo et al., 2008). Finally, across higher education, there are varying perspectives on what UDL is and how to implement it (Alhaznawi, 2019). For UDL to be successfully implemented, the purpose and foundation of this framework need to be

understood by higher education instructors and staff (Izzo et al., 2008). Until consistency is established regarding UDL and how it should be implemented, it will be challenging to make this best practice common in higher education. It is evident that preliminary research is necessary to explore instructors' awareness of UDL, what barriers they face, and their current preferences (Alhaznawi, 2019; Singleton et al., 2019). After such an exploration of UDL in online higher education, steps can be made to develop clear and concrete examples of best practices and specific UDL training based on relevant barriers and instructors' preferences.

Students with Disabilities' Perspective of UDL

The SWD perspective is essential to understanding their previous experience, and what elements of UDL are helpful and promote learning. As discussed, students face unique barriers in higher education compared to non-disabled peers (Burgstahler, 2015; McGregor et al., 2016). Overall, SWD rated the presence of UDL in the class highly, suggesting that UDL is helpful and well-received (Black et al., 2015). Similarly, SWD in a learning environment with UDL reported higher perceptions and willingness for online education (Al-Azawei et al., 2017). Although UDL is found to be valuable, research has shown that students show a preference for some guidelines over others and that instructors should keep UDL strategies flexible (Griful-Freixene et al., 2017). Gullo's (2021) dissertation examined the positive and challenging factors that contributed to the experience of SWD transitioning to online education during the COVID-19 pandemic. A survey with both open and closed-ended questions was completed by 1,746 SWD. Follow-up interviews were conducted to gain a deeper understanding of the SWD experiences and challenges. Positive experiences outlined by participants included comfort with learning Blackboard software, easy access to grades, instructor helpfulness, and image and video materials. On the contrary, challenges included instructors and peer communication, testing services, confidence and remote learning, and limited knowledge of Student Accessibility

Services (SAS). It was found that 80% of SWD strongly agreed and 20% agreed accommodations helped with online courses. This study suggested that disability services and instructional designers offer UDL accommodation workshops for instructors in multiple formats. Overall, the research indicated that students value UDL strategies, particularly engagement strategies and require choice and flexibility (Griful-Freixene et al., 2017; Gullo, 2021). It was emphasized by SWD that UDL is not a one-size-fits-all approach. The addition of UDL will not eliminate the need for professor flexibility and accommodation (Griful-Freixene et al., 2017; Westine et al., 2019).

Griful-Freixene et al. (2017) examined if the needs of SWD in traditional higher education classrooms were addressed effectively by UDL principles. Ten student perceptions regarding the effectiveness of higher education teaching methods were explored through semi-structured interviews. SWD reported both the barriers they faced when trying to use UDL strategies and their preferred guidelines or strategies. Overall, Griful-Freixene et al. (2017) found evidence to support the use of all three principles. Specific examples of SWD preferences of UDL Guidelines and accompanying strategies were outlined. For example, in Guideline 1: Perception, students considered obtaining class notes and lecture slides ahead of time as a benefit. Similarly, for Guideline 5: Expression and Communication, students perceived choice in assessments and small group discussions as a benefit. On the other hand, students believed written demand tasks and multiple-choice exams were barriers. The authors concluded that Guideline 8: Sustaining Effort and Persistence, aligned best with SWD's perception of their needs for engagement. Although SWD perceptions aligned with the UDL framework, evidence suggested that inflexible implementation of UDL for a whole student population can be problematic and potentially create barriers for others. For example, SWD use and perception of Guideline 4: Physical Action were explained by disability-specific characteristics as assistive

technology was only mentioned as being helpful by the student with visual impairment. This finding suggests that instructors should continue to provide students with choices and keep flexibility in the structure of the course. Interestingly, Guideline 8: Sustaining Effort and Persistence was noted as preferred for both instructors and students (Griful-Freixene et al., 2017; Westine et al., 2019). Comparing SWD and instructor perceptions and barriers can allow for a clear comparison of which UDL guidelines or strategies are well-received as beneficial for both populations. Additionally, identifying preferences and barriers to implementation of the UDL can allow for strategic changes, training, or interventions that are tailored to the needs of the instructors and SWD (Griful-Freixene et al., 2017; Westine et al., 2019). This interview study had a relatively small sample size, it is suggested that future studies compare the results of other research methods (focus groups or class observations) with the results of Griful-Freixene et al.'s (2017) interviews.

Gaps in Research and Practice

Based on the previous research and a recent systematic review conducted by Fleet and Kondrashov (2019) there are numerous gaps in UDL literature. The existing gaps in UDL research can be summarized in the following areas (a) an understanding of barriers instructors face when implementing UD principles; (b) instructors and student preferences for UDL guidelines in online education; and (c) the lack of student or SWD voices in the research. The need for increased SWD voices is based on the idea that SWD face unique challenges in online education and higher education. There is a need for more studies focusing on student voices including SWD and instructors in the decision-making process of course development. Additionally, further investigation of the barriers and challenges of UDL in higher education and online education is needed. Including the voices of SWD and instructors allows for a holistic overview of UDL and an in-depth understanding of preferences and barriers.

Previous research has explored the student and professor experiences of online education in higher education separately (Alhaznawi, 2019; Griful-Freixene et al., 2017; Singleton et al., 2019; Westine et al., 2019). A notable gap in the literature exists in examining UDL principles in online higher education and comparisons between instructors' and SWD's experiences. Specifically, there are potentially varying preferences between students and instructors regarding the useful UDL guidelines and the barriers instructors face in implementing UDL in person and online. Therefore, there is a need for clarity on overcoming barriers to applying UDL in the online environment and the need to include SWD voices.

Current Research

Considering the rise of online education, research on inclusion and UDL within online higher education is valuable for the success of students and instructors. This thesis sought to explore instructors and SWDs' perspectives of UDL in online higher education. Specifically, this thesis examined instructors' and SWD's experiences with online teaching using UDL and their perceptions regarding the application of the UDL principles and guidelines. The research questions were to explore instructors' and SWD's experiences with UDL in online education, the challenges instructors and SWD face when using and implementing UDL, and their preferences for specific guidelines and strategies.

Methods

Philosophical Paradigm

Philosophical assumptions and beliefs guide research inquiries (Creswell & Clarke, 2011). According to Creswell and Clarke (2011), researchers bring their worldviews or beliefs into the research process. Worldviews set the orientation and approach of research. Numerous worldviews have been discussed in the literature, including post-positivist, constructivist,

transformative, and pragmatic (Creswell & Clarke, 2011). Based on the nature of this thesis, a pragmatic worldview was adopted.

A pragmatic worldview is problem-centred and is based on inquiries that challenge specific real-world problems (Creswell & Clarke, 2011; Morgan, 2017). The pragmatic worldview includes both insider and emic perspectives, suggesting that researchers can reflect on their insider perspective and use it to inform the research process while incorporating others' views. According to Morgan (2017), when using the pragmatic worldview, the research begins with a problem or a question to be answered and the methods or methodology needed to address this problem or question. In other words, from the pragmatic perspective, the purpose and the procedure need to focus on the inquiry processes (Morgan, 2017). Additionally, the pragmatic worldview emphasizes natural experience to form the research questions and places an emphasis on the outcome. As mentioned, a strength of the Alhaznawi (2019) study was the use of the elite interview. The elite interview allowed Alhaznawi (2019) to uncover a unique perspective and analyze a deeper understanding of the faculty member's perspective through an interview with a faculty member with a disability. For this thesis, I leaned into the insider perspective to inform the research through reflections on previous personal experiences in online higher education as an SWD and as an Ontario Certified Teacher (OCT). Similarly, my perspective as an SWD and OCT allowed me to analyze the results of the thesis and my personal experiences in line with the pragmatic worldview.

Researcher's Perspective

I decided to investigate this topic because of my personal experiences with online education as a SWD. I avoided online classes as I often found it challenging to navigate course web pages, be self-motivated, use assistive technology at home without support, and get accommodations implemented. Once the pandemic started, I had to switch to online education

with the rest of the world despite these challenges. I was confused as to how my accommodations fit into online education. I began reviewing the literature on online higher education for SWD and found comfort that many barriers I faced were not specific to me. I found support in this realization as studies, including Mullins and Mitchell (2022) and Dianito et al. (2021), shared challenges faced by other SWD that mirrored the experiences that previously made me feel isolated. These experiences, along with the existing literature, informed this project's design, questions, and analysis. That is, I used my experience to inform how I approached and analyzed the research on the UDL courses and how instructors can increase participation in online education and support all types of learners.

In addition, I was motivated to become a teacher because I wanted to help other SWD. In high school, I took a class that allowed me to mentor younger students, and I was paired with another SWD. The experience of supporting another SWD advocate for accommodations, navigating coursework, and battling self-doubt started me on my path to becoming a teacher. During teachers' college, I consistently advocated for my accommodations, continued to battle internal and external barriers, and began speaking up for the inclusion of SWD to my peers. Occasionally, I felt I overcompensated for years of being quiet in class. I felt maybe my reference to personal experience and inclusion was repetitive and unwanted. However, I knew this was an internal barrier as many instructors and peers asked me questions and wanted to hear more. Currently, I still have peers from teachers' college asking me about how to include and support SWD in their classrooms. As an OCT, I understand the value and power teachers have. It is evident from my experiences as an SWD and an educator with a disability that accessible education is at the forefront of my teaching and learning decisions.

Methodology

Considering the pragmatic worldview, the problem and research question informed the methodology (Creswell & Clarke, 2011). For this thesis, the research questions were conducive to qualitative research methods as they focus on investigating participants' experiences and recommendations based on these experiences. Separate virtual focus groups with SWD and instructors were conducted based on the gap in the literature, to enhance accessibility, foster the development of a community, and attempt to balance the power between SWD and instructors.

Focus Group Gap in the Literature

Much of the current research in the area has been conducted through surveys and interviews (Alhaznawi, 2019; Griful-Freixene et al., 2017; Singleton et al., 2019; Westine et al., 2019). However, it is valuable to capture experiences, challenges, and barriers to inclusive education through multiple methods (Griful-Freixene et al., 2017). Using research methods not yet widely used in this area of literature allowed for more exploration of the topic and increased the validity of previous sources. For example, Griful-Freixene et al. (2017) suggested that future studies compare the results of other research methods (e.g., focus groups or direct class observations) with their interview results. In the rapid review by Cumming and Rose (2021), out of the 52 articles, the majority were literature reviews ($n=$ 18), followed by qualitative studies ($n=$ 14). From the qualitative research, seven were case studies, three were policy analyses of course curriculums, one conducted semi-structured interviews with students, one was autoethnographic, and one was informed by instructors and informants. There were eight mixed-methods studies included and only one of those eight involved focus groups. In addition to the need for other research methods (e.g., focus groups), there was also a need for investigation of the perspectives and experiences of diverse populations.

Several studies have called for a comparison of the perspectives of instructors' experiences to SWD (Alhaznawi, 2019; Hills et al., 2022). Comparing the instructor's and SWD's experiences, preferences, and challenges allowed for a holistic view of how UDL is implemented and used in online higher education. Separate focus groups were scheduled for SWD and instructor participant groups. Check and Schutt (2012) suggested that there should be an attempt to limit power differentials within the focus group. There was potential for power differential if instructors were present during the SWD focus groups; therefore the populations were grouped separately. Further, SWD population was selected instead of the general student population as the literature suggests the need for their perspective on UDL in higher education.

Accessibility

The focus groups were conducted virtually via Zoom Videoconferencing. As online education was the topic of the research, it was valuable to stay within the online environment. Given the increased comfort and use of this software during the pandemic, Zoom Videoconferencing had additional advantages to in-person focus groups including the elimination of travel time and expenses for participants and the option to use closed captioning, which can increase accessibility during the focus groups and the accuracy of the transcription.

Development of Community

Focus groups were also selected as they can allow for the development of a community that encourages participation, and the perspectives of one participant may prompt another (Berger & Lorenz, 2015). Additionally, focus groups allowed an understanding of the collective and unique perspectives of challenges, preferences, and experiences that instructors and SWD have with UDL. Check and Schutt (2012) suggested that focus groups are valuable methods to address questions that focus on assessing the range of opinions on an issue or topic. Accordingly,

focus groups provided a timely and efficient review of SWD and instructors' perspectives of UDL in online education.

Balancing Power

In interviews, participants may feel a power imbalance where the researcher or interviewer is in control of the conversation. Therefore, responses from participants may be biased to receive positive social reinforcement from the researcher. Unlike interviews, focus groups can counterbalance the power dynamic by having more participants in the discussion, forming a majority over the interviewer. Additionally, focus groups encourage participants to discuss opinions and experiences regarding UDL in online higher education classes together, fostering a sense of community (Check & Schutt, 2012).

One challenge with focus groups is that they can function as large group interviews. That is when each participant answers the question individually. When there is no discussion between the participants, the intention of the focus group is lost. To rectify this risk and encourage participation, the focus group questions were based on the responses from polls completed by the participants through an anonymous online polling system using Poll Everywhere. The rankings were used as a primary data source and provided context to guide the focus group discussions. After the responses were collected, they were shared with the participants along with open-ended questions to prompt participants to engage in a natural discussion.

Adding the polling feature allowed SWD and instructors multiple methods of expression in line with the UDL principles. The polling feature allowed instructors and SWD who were less comfortable participating in group discussions a method to express their experience, preferences, and challenges. The results of the questions functioned as an additional method of participation and as prompts for the focus group discussion. Using the ranking questions as discussion prompts may have encouraged more natural conversation than a traditional question-and-answer

focus group. Additionally, the generative responses helped me facilitate natural discussion between instructors despite the inherent power dynamics between instructors and myself as a student researcher.

Communicating with others in a focus group can also be empowering and beneficial for SWD participants. The emphasis of the focus groups was to foster an empowering and safe community. All materials used for recruitment (flyers and social media posts) indicated that the focus group was intended to be a safe space to empower SWD (Appendix B & C). A zero-tolerance policy for discrimination was outlined on the consent form and discussed at the beginning of each focus group meeting. A brief demographic survey asked participants to write the name they would like to be represented by over Zoom. That said, one member of the focus group might have used a pseudonym, which might have created a social risk of discomfort with how their selected name compares to the other members of the focus group. This social risk was outlined in the survey and consent forms. Additionally, the SWD were not asked to confirm their disability in the demographic survey or in the focus groups. As mentioned, many SWD do not disclose their disabilities due to discrimination within academic cultures (Pearson & Boskovich, 2019).

Participants and Recruitment

To be included in the focus group, all instructors had to have taught at least one online course in the last two years. The SWD also needed to have been a part of at least one online class in the last two years. Recruitment flyers and emails were sent to Brock Centre for Pedagogical Innovation (CPI), SAS, and posted on social media platforms. Separate flyers were developed for each participant group and contained a link to their respective consent form via Qualtrics.

Recruitment for instructors was purposeful. Instructors were recruited through CPI (Appendix F). The purpose was to ensure instructors who participated were dedicated to

implementing UDL in higher education. Having focus groups with instructors who are passionate about UDL was an attempt to reduce the likelihood that instructors expressed disinterest in UDL. Instructors who are working towards inclusive education and implementing UDL were able to speak to both their preferences and the challenges of UDL in online higher education. Since CPI is committed to developing excellence in teaching and learning, they provided support for the purposeful recruitment process. We sent an email to CPI and asked them to forward the recruitment flyer and invitation to instructors who have participated in UDL professional development or are passionate about UDL in higher education. In addition, they also posted about the research in their February 2023 newsletter.

The SWD were recruited through Brock University SAS, flyers, and social media (Appendix C & D). The SAS office was contacted to have an email sent to SWD, including a digital flyer (Appendix C & D). Hard copies of the flyer were placed in SAS that stated the inclusion and exclusion criteria for the study. Social media posts were uploaded to Facebook on Brock University general student pages and inclusive education pages (i.e., Brock Student Justice Centre).

Procedures

Consent Process

Consent forms were developed in Qualtrics (Qualtrics, Provo, UT) (see Appendix D). The electronic flyers had a link to the consent form and the physical flyers had a QR code linking to the consent form. If interested participants emailed me as the Student Principal Investigator (SPI), they were emailed back promptly with a link to the consent form. Participants had the option to set up a meeting with myself if additional accommodations or information was needed to provide informed consent. The Qualtrics consent page was monitored to see if any participants

indicated they wanted to speak to the researcher for more information. Contact information was shared on the consent form for any additional questions or concerns.

The consent form clarified that participants were informed that they had the right to withdraw from the research at any time or could skip a question during the focus group. Participants were informed that the focus groups would be recorded through Zoom. Participants were able to use their preferred pronouns and a pseudonym if they were indicated in the demographic survey. I hosted the focus groups and changed how participants' names were presented when they were in the waiting room. The consent form clarified that it was not possible to guarantee participants' confidentiality due to the nature of focus groups. While changing participant names and stating that they could keep their cameras off helped keep information and participation confidential, it was not fully anonymous as other people were a part of the discussion. Further, it was not possible to guarantee that participants would not share information shared in the focus group with others. Participants were asked to pledge to keep the discussion confidential and not share what they heard in the discussion with others.

Demographic Information Survey

After providing consent, participants were directed to a brief general demographic information survey (Appendix G). Specifically, the instructors were asked: (a) what academic institution they teach at currently, (b) what department they are a part of, (c) what academic institution(s) they taught online education at in the past, (d) how many years they have been teaching higher education, and (e) how many course(s) they taught in online higher education. The SWD were asked: (a) what school they currently attend, (b) what year they are in, (c) what department they are in, (d) how many online course(s) they have taken in higher education, (e) where they have taken an online course(s), (f) what is their disability, (g) if they are registered

with SAS, and (h) if they have ever withdrawn from a higher education course to avoid online learning.

Scheduling Focus Groups

Following the demographic information survey, participants were directed to a virtual sign-up sheet with predetermined dates and times for the SWD and instructor focus groups. Doodle was used as this website allows the people signing up to remain anonymous from others signing up. Additionally, Doodle restricts the number of people who can sign up for a meeting to allow for a maximum of five people per focus group. Instructors and SWD received the questions before the focus groups. The SPI monitored the sign-up Doodle page as well to see what groups were full. If a focus group only had one participant two days before it was intended to occur, an email was sent to the participants asking them to reschedule.

Two days before the scheduled focus group, the meeting invitations, questions, information on the Poll Everywhere video link, and an overview of UDL were sent to participants. The participants were blind carbon copied to ensure other participants did not have access to other emails. The meeting invitation included the Zoom link and a brief description of how to log into Zoom via computer or phone. A copy of the focus group questions and a description of how to log in to Poll Everywhere were attached to the email. In the overview of the UDL, the principles, Guidelines, checkpoints, and relevant samples were provided.

Ranking Questions

An anonymous online polling system, which had some semblance to the Delphi method (Skulmoski et al., 2007), was used during the focus groups. There were separate polls for SWD and instructors to allow for a comparison across groups. The polls were cumulative and were not reset for each focus group. The questions on the polls were in the form of word clouds and ranking systems (see Appendix A). A word cloud response was used to determine what word

came to the participants' minds when they thought of UDL. The UDL Guidelines were then

ranked, based on what Guidelines the participants had the most experience with, and what

Guidelines they thought would be the most helpful in online higher education. Then, the

instructors completed another word cloud to state the barriers they faced when implementing

UDL online. The SWD completed another ranking question about the most challenging UDL

Guideline for SWD to use. After each word cloud or ranking question, the cumulative results

were shared with the participants, and open-ended discussions on the results occurred (i.e., what

have your experiences with UDL been so far and how did this inform your responses?). The

rankings were a primary data source and provided context for focus group discussions.

Focus Groups

When the participants logged onto Zoom, they were directed to a waiting room. While in

the waiting room, I changed any participant's name to their chosen pseudonym. After everyone

was entered into the Zoom meeting, I reviewed the consent process again. The consent review

included an overview of the zero-tolerance policy for discrimination, the focus group being

recorded, the risks and benefits of participating, and that participation in the research was

voluntary. Participants were reminded that they consented to maintain confidentiality and that

nothing said in this focus group should be shared outside the group. I also reminded participants

that they were free to leave at any time. After the review of the consent, I began the recording

and obtained verbal consent for the recording.

Next, I began the focus group and used semi-structured questions to guide the discussion

(see Appendix A) and reviewed how participants were to access the poll. Once the questions had

been reviewed, I shared my screen. To access the poll, participants entered a short code or

clicked a link in the chat to access the poll on their computer or cell phone. For each question,

participants were verbally and visually prompted to provide an answer to the poll questions.

Once everyone had answered the question on the poll, I showed the aggregated responses and led an open discussion about the results. We worked through one question at a time.

A research assistant (RA) who signed a confidentiality agreement (Appendix E) was available during the focus group with their camera and microphone off to address any participant concerns and technical issues. The RA was able to reach out to any participants who appeared to be having technological challenges. Participants were able to email or direct message the RA and the RA reached out to any participant who lost connection to help them reconnect. If a participant did not have access to secure internet, they were able to call into the Zoom focus group through a conference phone line. I would have described the responses on the poll vocally if this was required.

At the end of the focus groups, participants were asked about their interest in participating in a Community of Practise (CoP) to determine their interest in participating in future research and they were thanked for their time. The recordings were saved directly to the researcher's computer on an encrypted drive until the results were summarized.

Reflective Journal

Immediately following each of the six focus groups I completed a hand-written journal entry. After the focus groups were completed, I transcribed the written notes into electronic copies. The purpose of the journal entries was to reflect on the research process and address my perspective. The first focus group was with two SWD. I had intended to remain neutral during the focused groups and keep personal experiences and opinions out of the group discussions. However, I found I was unable to fight the urge to disclose my disability and contribute to the discussion for the first quarter of the focus group. I ended up disclosing my disability because I felt more connected to the discussion than I anticipated and wanted to be a part of the community that was being formed in the focus groups. After this disclosure, I felt more relaxed and felt a

deeper connection to the discussion as the facilitator. I continued to share my experiences during the rest of the focus groups with the SWD. Interestingly, I chose not to disclose my disability during the instructors' focus groups. I am not exactly sure why I did not disclose my disability with these participants, except that I already felt a slight power imbalance as the student facilitated a discussion between instructors. That is, I believe I did not disclose my disability out of fear of creating a larger power imbalance between myself and the instructors.

All the reflective journal entries had elements that were positive, hopeful, and surprising. In early journals, I expressed sentiments, such as "I didn't think it would go that well" and "I'm surprised they opened up that much" throughout the entries. Toward the end of the focus groups, I became slightly more critical during the journal entries. Specifically, one instructor identified a spelling error on one of the slides that had not been brought to my attention until the last focus group. While a typo might seem small, the impact was huge. I felt embarrassed and concerned about how this mistake made me appear to all six focus groups. Additionally, I reflected on how many times I had reviewed the slide deck and felt ashamed that despite reviewing them several times and many practice runs, I still missed that spelling mistake. I recognized in the journals that these deep feelings over a small mistake were likely rooted in my own experiences as a SWD. This likely has had an impact on my analysis, especially during the beginning of the data analysis. When reviewing and editing the transcriptions, I reexperienced some feelings of shame and embarrassment that resulted in self-doubt. After reflecting on my feelings and refocusing, I was able to continue forward with the analysis confidently.

Overall, the reflective journals showed how I felt a sense of connection and community in my shared experience with the other SWD. When the SWD thanked me for listening, running these focus groups, and doing this research, I felt pride and motivation to continue this work.

During the instructors' focus group, I left with a sense of excitement and optimism that instructors care about teaching and inclusion in online higher education.

Data Analysis

The data from the ranking questions was exported from Poll Everywhere. Poll Everywhere automatically summarizes the responses and provides the cumulative rankings for each group. Poll Everywhere uses a point system based on the number of available options and total responses (Team Poll Everywhere Support, 2022). Poll Everywhere automatically totalled the responses to establish the final rankings. Then, visual analyses were used to examine the highest and lowest-ranked UDL Guidelines and to compare the results of instructors and SWD. A content analysis of the focus group transcripts was used to further address the context of the responses. The content analysis was both inductive and deductive (Erlingsson & Brysiewicz, 2017; Zhang & Wildemuth, 2009) and involved 8 steps (Erlingsson & Brysiewicz, 2017; Zhang & Wildemuth, 2009).

The first step in the analysis involved making the transcriptions of the recordings. The second step was to familiarize myself with the data by reading and re-reading the focus groups to get a general sense of what was being shared by the participants (Erlingsson & Brysiewicz, 2017). I reviewed the transcriptions for accuracy and to ensure relevant information was included (Zhang & Wildemuth, 2009). Then, I organized the data set according to the participant's responses to each of the questions. Each person's statements or positions (Pos) were the unit of analysis. Specifically, when one person started talking, the other person's statement ended, and the next speaker's position began. In the results, 'Pos' indicates where in the transcription the quote was located. Next, I coded the data deductively based on the Guidelines. For example, when a participant discussed why they provided a specific ranking for Guideline 4, I coded the statement under Guideline 4. The semi-structured questions and participant responses were the

inductive coding scheme to capture the context of the Poll Everywhere questions. Inductive coding was also conducted within each Guideline to contextualize the rankings. The inductive coding involved reviewing each of the codes previously organized under their respective Guidelines.

The fifth step included testing the coding schemes on a sample of text. I coded the SWD focus groups and shared the preliminary coding with my supervisor and other MA students under her supervision for feedback and consistency. The first five steps described above were completed with the SWD transcripts then repeated with the instructors' transcripts. Step six involved completing all the coding, which I completed independently. Next, I assessed the codes for consistency. Consistency was assessed by reviewing the codes with my supervisor for feedback and finalized codes that I was unsure about. For example, I was unsure how to code the statements instructors made about choosing to have students use or not use their cameras. When instances where information was discussed that was not directly relevant to the research questions, it was not coded. Additionally, I checked for consistency by reviewing the codes to ensure everything fit within the selected code. In the eighth step, I drew conclusions from the codes and categories. For this thesis, codes were organized into categories related to the research questions. Finally, the results were summarized by balancing the rankings of the Guidelines and the rationales discussed in the focus groups. A one-page summary of the results was sent to the SWD and the instructors for member checking.

Results

Demographics

Focus groups were conducted between February and April 2023. There were three focus groups for SWD ($n = 8$) and three focus groups for instructors ($n = 6$). There were typically 2-4

participants per focus group. The focus groups ranged from 40 minutes to an hour ($M = 51$ minutes).

SWD Demographics

The SWD were not required to confirm their disability but had the option to disclose their disability in the demographic survey. All participants chose to disclose their disability and the following disabilities were represented: medical conditions (n=4), Blind (n=1), hard of hearing (n=1), attention-deficit hyperactivity disorder (ADHD) (n=2), and anxiety (n=2). All SWD attended Brock University and were registered with SAS. Overall, the SWD reported being in either their second year (n= 5) or their third year (n= 3) of undergraduate higher education and were a part of three different faculties including the Faculty of Social Science (n=6), Applied Health Science (n=1), and Business (n=1). The number of online courses the SWD attended ranged from 3-10 course. None of the participants indicated that they had withdrawn from a course because it was online.

Instructors Demographics

All instructors completed a similar demographic survey as the SWD. The demographic information indicated that all participants were affiliated with Brock University. Specifically, the instructors were members of the following faculties, the Faculty of Applied Health Science (n=4), Education (n=1), and Social Science (n=1). The years of experience teaching in higher education ranged from 7-18 years (M= 11.6). Three instructors indicated that had previously taught at higher education institutions outside of Brock. Additionally, one instructor indicated that they had taught an online class at another institution outside of Brock.

Online UDL Experience

The SWD and instructors were asked to share their perceptions of UDL in online higher education through the word cloud feature on Poll Everywhere. The SWD and instructors had to

summarize their perceptions and experience into one word and add it to the word cloud (see

Figures 2 and 3).

SWD's Perception

For the SWD word cloud, the words used reflected a divide between positive and critical

perspectives (see Figure 2).

Figure 2

SWD Perspective of UDL Word Could

Note. The size of the text signifies the number of times the word was added, with larger words
indicating a higher frequency.

Positive Perspective. The main word the SWD used to summarize their online UDL

experience in higher education was "accessibility" (*n*=4). When asked to describe what they

meant by accessibility, one SWD said,

> When I think of the universal design, I think of accessibility. I think of that because it's
>
> kind of giving everyone that opportunity, that universal aspect to it. And, there are
>
> accommodations to allow for students with different needs to get support. (SWD Number
>
> 4, FG 5, Pos. 6)

The SWD focused on the relationship between UDL and their individualized accommodations.

For example,

> I was thinking too, that accessibility and accommodation was a big one because, I guess
>
> the idea is that like all types of learners are under this umbrella of the learning method,

the design and then it gets personalized because you have so many different types of

learners… (SWD Number 5, FG 2, Pos. 10)

Other SWD shared their positive experiences with feeling that their use of accommodations is

not singled out when UDL is implemented in the foundation of an online course,

I wrote inclusion as my first word because as usually, professors will say… the

environment is set up for anyone to be able to participate in the success. So, they try to

cover as many students as possible and then they'll give extra accommodations for those

who require more. So, it's just trying to throw everyone into the same group but at the

same time have the exact same supports, and that one student isn't like in being picked

out as I have accommodation. (SWD Number 5, FG 2, Pos. 3)

The SWD shared their outlook on UDL in online higher education and were able to relate with

both positive and critical experiences.

Critical Perspective. The SWD also used the words "complicated", "vague", and

"frustration" to describe their perception of UDL in online higher education. One student

elaborated on why they chose the word "frustration",

I said frustration. So, I'm legally blind and I find, fully online or not, that materials are

not provided in multiple formats, which is just very difficult when you use a screen

reader. A very common experience that I have is that teachers use PDFs that aren't screen

reader accessible or they just scan pages of a book. So, it's just a picture of the book,

which I'm sure isn't fun for anyone to read, let alone someone with, like a disability that

needs a screen reader. Multiple formats are not being met in most courses. (SWD Number

2 FG 1, Pos. 9)

Another participant shared that frustration comes from a constant need to self-advocate rather

than having your needs already met within the UDL foundation, "It's often hard to kind of

advocate for your own needs, rather than the kind of just being already met within UDL" (SWD

Number 1, FG 1, Pos. 11).

Instructors' Perception

Instructors were asked to complete two separate word clouds related to their experience

with UDL in online higher education and what barriers they face when trying to implement UDL

in the online space (see Figures 2 and 3).

Figure 3

Instructors' Perspective of UDL Word Could

Note. The size of the text signifies the number of times the word was added, with larger words
indicating a higher frequency.

Positive Perspective. Similar to the SWD, the instructors indicated that "accessibility"

was the primary word to summarize their perception of UDL in online higher education. When

describing their choice of word, one instructor said, "Accessibility, obviously the big one. Very

visible, for me, certainly an important thing because I want to make sure that, if it's going to be

universal, I mean that should be accessible by everyone's got a good chance…" (Instructor

Number 4, FG 2, Pos. 14). The instructors discussed that UDL is for all learners rather than

focusing on meeting the accommodations of SWD,

So for me, when I think of UDL, it's not just focusing on creating my courses in a way

that are good for those who require accommodations. It's looking at it as here's just good

solid pedagogical principles that should just happen in every course so that everyone is

able to engage with the material in a way that makes sense for them, and that's

universal, right? (Instructor Number 2, FG 1, Pos. 8)

Other phrases used to summarize the perception of UDL in online higher education related to

inclusive, inclusivity, and belonging,

I was trying to think of other words, because immediately I was like, oh, accessible,

inclusive, like, and I think that those are kind of the catchphrases…I typed in belonging

because I feel like when we do this, people have a better sense of belonging to, in this

case, the classroom or even their education. (Instructor Number 6, FG 3, Pos. 7)

Overall, the instructors expressed the importance and value of using UDL in online higher

education and for all learners.

Instructors Reported Barriers

The responses to the second word cloud are related to the perceived barriers instructors

face when trying to implement UDL Guidelines and checkpoints (see Figure 4). The instructors

identified three main areas of concern related to time and effort, resources, and values.

Figure 4

Instructor Barriers Word Cloud

Note. The size of the text signifies the number of times the word was added, with larger words
indicating more frequency.

Time and Effort

The instructors emphasized the impact of limited time and the amount of effort it takes to implement UDL in online higher education,

> The time needed to prepare a course well, and yeah, the job of, I mean, I'm pretty privileged that I have a tenure track job, so I only have two courses at a time to prep, but for our contract faculty that it's not the case. And yeah, it's, jumping on [Instructor Number 2s] understanding of like, it's not even just the time that you need to create a good course, it's thinking about all these things. (Participant 201 I FG, Pos. 43)

Resources

When discussing the barriers, the instructors face limited training, resources, and difficulty utilizing technology. One instructor shared context on the challenges of utilizing technology and how difficult it is to keep up with the changing tools, software, resources, and limited training for these systems or features,

> And for me it was like, this takes a lot of effort. So YouTube and, all the other instructors, they were just scrambling just to basically narrate PowerPoint slides and turn it into like an mp4 just posting it. And certainly, if I didn't have access to video editing software and if I didn't have a camera that I knew how to operate and edit clips and put stuff together, I can see how incredibly difficult it would [be] to actually put something together that made students, you know, engaged and interested in the topic. So those resources I spent my own money on the camera that I have used. The support CPI, as you mentioned, has been phenomenal. But for me, it was just like, oh, how do I some stuff together and, and put it in a fun way. And a lot of the time they're spent learning how content together the way that would. Accessible to all. (Participant 204 I FG , Pos. 70)

Value

The final barrier that emerged was the limited emphasis on teaching in the University system. Specifically, one instructor contemplated if teaching was valued at the same level of research, they said,

> If I was going to be assessed by how fantastic my courses are in UDL, I really valued that my organization valued that I would put more time into it to do it right. But you, you're right, [Instructor Number 1], it's because we're not, we're not assessed on our teaching like you are, but you're not. So, you kind of have to do it out of the goodness of your heart and because you know it's right. And so, I think. That's where the biggest barriers exist, especially for those new faculty. They're told, don't worry about your teaching, just get your publications up so you can get tenure, and then you can figure that out later. (Instructor Number 2, FG 1, Pos. 45)

Further, some participants stressed that not all educators understood the value of using UDL or shared an appreciation for education research and field of study,

> I find that when I talk to some of my colleagues who are resistant to these kinds of things, it's because, they think that their expertise in a subject matter supersedes somebody's expertise in teaching, like in the research of teaching. And what blows my mind about the disconnect of that is. As far as I know, teaching and education is an actual field of study, and there's a complete disconnect with my colleagues that they don't recognize that people who have done education on teaching and done research on teaching might not have something of use to say to them about teaching, even if they don't know the film, the subject matter (Participant 201 I FG, Pos. 46).

It is clear that the instructors understand and acknowledge the importance of UDL in online higher education but face both internal and external barriers to implementing the UDL Guidelines online.

Guidelines

The SWD and the instructors ranked the Guidelines to determine the order in which they had the most experiences, found helpful, and wanted to know more about. The SWD also ranked the Guidelines from most to least challenging to use (See Figures 5 to 11). The collective responses were used across both populations. After the six focus groups, there were two sets of overall rankings: one from the SWD and one from the instructors. Occasionally, a SWD or instructor expressed that their individual ranking was different from the group ranking. When this was expressed, the individual ranking was shared in comparison to the larger collective ranking.

Guideline 1: Perception

Guideline 1 relates to Perception and was ranked by both the instructors and the SWD as the Guideline they had the most experience with (see Figures 5 and 6). One instructor provided context to this ranking by saying,

> I'm not super surprised. I think the, the first one, I don't wanna say that it's the, the kind of easier one to do, but I think because of some of the technology that enables us to do these things easily, so like, you know, capturing things or I can put my PowerPoint out, but then I throw an audio like a video as a wrap up or a, a summary of that week or, you know, I put more pictures and I've also used H5P, which is a little more graphical of those like interactive things. So that kind of provides that overarching, like hopeful reach to people in different ways. (Instructor Number 2, FG 1, Pos. 17).

Along the same lines, a SWD stated that,

> From my experience, when instructors weren't able to physically teach like in person,
> they relied less on like talking and notes and more the illustrative content, the
> technology aspect, those graphics and videos. And so that's why I saw a lot more of
> those. (Participant 104, Pos. 14)

Figure 5

Poll Everywhere SWD Order of Experiences

🟣 Guideline 1 : Perception
🔵 Guideline 6: Executive functioning
🟣 Guideline 2: Language, mathematical expression, and symbols
🟢 Guideline 8: Sustaining effort and persistence
🔵 Guideline 5: Expression and communication
🟣 Guideline 3: Comprehension
🟢 Guideline 9: Self-regulate
🟢 Guideline 7: Recruiting Interest
🔵 Guideline 4: Physical action

Note: The Guidelines were ranked from most experienced (top) to least (bottom).

Figure 6

Poll Everywhere Instructor Order of Experiences

🟣 Guideline 1 : Perception
🔵 Guideline 6: Executive functioning
🟢 Guideline 8: Sustaining effort and persistence
🟢 Guideline 7: Recruiting Interest
🟣 Guideline 3: Comprehension
🔵 Guideline 5: Expression and communication
🟢 Guideline 9: Self-regulate
🟣 Guideline 2: Language, mathematical expression, and symbols
🔵 Guideline 4: Physical action

Note: The Guidelines were ranked from most experienced (top) to least (bottom).

However, one instructor expressed some doubt as to whether students utilize the recorded

lectures,

> But I feel like for students, those are useful, but I don't always know how much they
> actually listen to all. Like how much they watch the videos and listen to, the lectures or
> the little videos that I've posted. (Instructor Number 3, FG 5, Pos. 47)

Additionally, the SWD ranked Guideline 1 as the Guideline they found the least challenging to use because it aligned well with their accommodations and fit well in the online environment (see Figure 7).

> I know for myself, Guideline one was at the bottom cuz it was the most easy, it was easiest for me to use because my accommodation is that I have period, periods of absence. And so having those videos there and them not. Going away or being on a specific timeline even until like the end of the year was such a blessing because although it sucks that I had to do say six videos when I should, when everyone else is doing three, having them there and knowing I can go back and not being as stressed out, oh my gosh, I missed the lecture notes and things like that. It's just a nice thing to have. (SWD Number 8, FG 3, Pos. 33)

However, not all students ranked this Guideline as least challenging, one student felt it was one of the most challenging Guidelines,

> Any class that I've been provided with audio files as an alternative for the PDFs that I can't read. Like, I took [class code] in [year], and they gave low vision students like access to audio files of the, some of the texts that were not accessible. And even those were like subpar at best. Like they, like you couldn't rewind them. So if you wanted, if you missed something, you had to start from the very beginning. (SWD Number 2, FG 1, Pos. 37)

Figure 7

Poll Everywhere SWD Order of Most Challenging

🟢 Guideline 7: Recruiting Interest (1st)
🟢 Guideline 8: Sustaining effort and persistence (1st)
🟣 Guideline 3: Comprehension (3rd)
🔵 Guideline 4: Physical action (3rd)
🟢 Guideline 9: Self-regulate (3rd)
🔵 Guideline 6: Executive functioning (6th)
🟣 Guideline 2: Language, mathematical expression, and symbols (7th)
🔵 Guideline 5: Expression and communication (8th)
🟣 Guideline 1 : Perception (9th)

Note: The Guidelines were ranked from most challenging (top) to least (bottom). Guidelines 7 & 8 are tired for 1st place. Guidelines 3, 4, & 9 were tied for 3rd place to keep 9th place as the last option.

Finally, the SWD ranked Guideline 1 as the Guideline they are the least interested to know more about (see Figure 8) but did not provide any specific feedback on why they did not want to learn more about this Guideline.

Figure 8

Poll Everywhere SWD Order of Interest

🟢 Guideline 7: Recruiting Interest (1st)
🔵 Guideline 4: Physical action (2nd)
🟢 Guideline 9: Self-regulate (3rd)
🟢 Guideline 8: Sustaining effort and persistence (4th)
🟣 Guideline 3: Comprehension (5th)
🔵 Guideline 5: Expression and communication (5th)
🔵 Guideline 6: Executive functioning (7th)
🟣 Guideline 2: Language, mathematical expression, and symbols (8th)
🟣 Guideline 1 : Perception (9th)

Note: The Guidelines were ranked from most interested (top) to least (bottom). Guidelines 3 & 5 are tired for 5th place to keep 9th place as the last option.

Guideline 2: Language, mathematical expression, and symbols

Guideline 2 relates to Language, Mathematical Expression, and Symbols. Guideline 2 was ranked the second-highest Guideline the instructors wanted to know more about but second lowest for helpfulness (see Figures 9 and 10). One instructor said,

I think. I'm just going to be completely blunt that the bottom two, I wasn't entirely

positive what they referred to or like acronyms I would spell out the first time that they

come up in a lecture, you know? And I would like to write it out. But other than that, I

wasn't entirely positive. (Instructor 2, FG 1, Pos. 19)

One instructor specified how they tried to use Guideline 2 online in higher education,

Sometimes when I was in person, I would, if there was a complex concept. If I found an

intro textbook that had done a good like little box, um, definition of it, I would print those

out so that during the lecture I could hand them out and then they could actually take a

moment, I could pause, they could read it, we could talk about what it means and then get

back into the lecture. (Instructor Number 2, FG 1, Pos. 21)

Figure 9

Poll Everywhere Instructor Order of Interest

🔵 Guideline 4: Physical action
🟣 Guideline 2: Language, mathematical expression, and symbols
🟢 Guideline 7: Recruiting Interest
🟢 Guideline 9: Self-regulate
🟢 Guideline 8: Sustaining effort and persistence
🟣 Guideline 1 : Perception
🟣 Guideline 3: Comprehension
🔵 Guideline 5: Expression and communication
🔵 Guideline 6: Executive functioning

Note: The Guidelines were ranked from most interested (top) to least (bottom).

Alternatively, the SWD ranked Guideline 2 as the second-lowest Guideline that they wanted to

learn more about (see Figure 8). The SWD provided some examples of how instructors have

used Guideline 2 when talking about their experiences with UDL in online higher education. For

example, one SWD said, "So, like, even in that course, like the notes were written in an

inaccessible format, but at least the symbols and all of that were clarified and explained" (SWD

Number 2, FG 1, Pos. 33).

Figure 10

Poll Everywhere Instructor Order of Helpfulness

🔵 Guideline 6: Executive functioning (1st)
🟢 Guideline 8: Sustaining effort and persistence (2nd)
🟣 Guideline 1 : Perception (3rd)
🟢 Guideline 7: Recruiting Interest (3rd)
🟣 Guideline 3: Comprehension (5th)
🟢 Guideline 9: Self-regulate (6th)
🔵 Guideline 5: Expression and communication (7th)
🟣 Guideline 2: Language, mathematical expression, and symbols (8th)
🔵 Guideline 4: Physical action (9th)

Note: The Guidelines were ranked from most helpful (top) to least (bottom). Guidelines 1 & 7 are tired for 3rd place to keep 9th place as the last option.

Finally, despite Guideline 2 coming in fifth for most helpful for SWD (see Figure 11), one student ranked it as the most helpful for them, "I put, Guideline two first [for most helpful]. Just because I found, I find usually, like any sort of visual helpful to. So, if there's any sort of chart that helps explain information, that's extremely useful for me" (SWD Number 7, FG 3, Pos. 19). The SWD ranked Guideline 2 low for perceived helpfulness (see Figure 11), but this does not indicate that it is unhelpful for all students and the instructor's interest in learning more about this Guideline will help to increase the experience with it in online higher education.

Guideline 3: Comprehension

Guideline 3 is focused on Comprehension was ranked in the middle for the instructor's rankings of experience and helpfulness (see Figure 6), but instructors ranked Guideline 3 as one of the Guidelines they did not need to learn more about (see Figure 9). In the focus groups, the instructors provided some context about how they tried to use Guideline 3 when they discussed their experiences. For example, trying to provide students with relevant background knowledge.

Well, I mean, technically I'm a professor in the [Department], so cool. [Department] is like, I think I put that at the top because of that. But the first part of that was, ensuring

everyone has background knowledge and I, whether it's online or in person… (Instructor Number 1, FG 1, Pos. 15)

The SWD also ranked Guideline 3 as the third most challenging Guideline and the third most helpful (See Figures 7 and 11). The only instance when the SWD provided context for their ranking regarding Guideline 3 was when one participant described the value of clarifying pop culture references,

To talk about Guideline 3. This isn't something that's, I guess as relevant to me. I'm sure there are some things that I miss out on. Just because I don't have as much of a visual component, but Brock is very multicultural, so it's definitely important that profs actually put effort to explain, any pop culture references they make. Cause they often don't. (SWD Number 1, FG 1, Pos. 61)

Guideline 4: Physical Action

Guideline 4 related to Physical Action and was ranked as the Guideline both the SWD and instructors had the least experience using and implementing in online higher education (See Figures 5 and 6). Many SWD expressed that they ranked Guideline 4 low on their experience because it did not apply to their learning needs or accommodations,

Four, I kinda put more to the bottom. It was like ranked eighth for me because I'm in, social study or social studies. Yeah, not necessarily mathematic based, so it didn't really apply to me as much as other people who would use manipulatives for math and things like that… (SWD Number 8, FG 3, Pos. 13)

Some faculty shared a similar logic to their ranking, one instructor emphasized that they had not thought about physical action or manipulatives in online higher education prior to this focus group,

I think when I get down kind of lower to the bottom, when I look at like physical action

manipulatives and alternative keyboards. I don't think I've really done that, in a sense,

especially in an online environment, probably is not something that I've kind of really

thought through. (Instructor Number 2, FG 4, Pos. 17)

Both SWD and instructors rated Guideline 4 as the least helpful in online higher education (see

Figures 10 and 11). One SWD said it was because Guideline 4 is subject-specific,

So I'm thinking, Guideline 4's probably at the bottom, just because again, the online

nature and the physical manipulatives in my head, kind of like what [SWD Number 8]

said is more math related. So using it, or even in like a paid one to, that can be helpful for

showing the breakdown of math. But in a university setting where, you know, the online

psychology class, there's, you know, 500 students, I don't think they'd be able to provide

500 manipulatives for everyone, especially when students could very well be taking this

class outside of the country. It'd be near impossible to get these supplies to. So in my

head, just trying to eliminate them entirely helps instead of trying to provide it for

everyone. (SWD Number 7, FG 3, Pos. 23)

Figure 11

Poll Everywhere SWD Order of Helpfulness

🔵 Guideline 6: Executive functioning
🟣 Guideline 1 : Perception
🟣 Guideline 3: Comprehension
🟢 Guideline 9: Self-regulate
🟣 Guideline 2: Language, mathematical expression, and symbols
🟢 Guideline 8: Sustaining effort and persistence
🟢 Guideline 7: Recruiting Interest
🔵 Guideline 5: Expression and communication
🔵 Guideline 4: Physical action

Note: The Guidelines were ranked from most helpful (top) to least (bottom).

However, despite the low helpful ranking, one SWD emphasized the value of Guideline 4 for promoting inclusion,

> Yeah. For me actually, Guideline 4 was like closer to the top. Just like the nature of my disability requires assistive technology and, I don't know. Having access to it is really important so that I would have equal opportunity amongst the rest of my classmates. (SWD Number 5, Focus Group 2, Pos. 30)

Similarly, one instructor expressed that they were unsure about what Guideline 4 looks like in online learning,

> I guess I don't understand what, what is, I know what alternative keyboards are, but what the physical manipulatives would be even. And so if it's things like, I often use the whiteboard or I'll have students. if it's a synchronous course, like go and get items from around their house. But I'm not really sure what's meant by that physical action. (Instructor Number 3, FG 5, Pos. 49)

In line with Guideline 4 being considered least helpful, the instructors also rated it as the one they wanted to know more about (see Figure 9). Many instructors made comments about wanting to know more about Guideline 4, thinking there is more that they can do around this Guideline, wanting to learn more from other fields, and sharing ideas on how they have tried to target Guideline 4. For example, one instructor said, "Yeah, I think same for me as like really, you know, thinking about that a little bit more deeply as physical manipulatives, which, you know, in certain situations, I think I really could do something related to that" (Instructor Number 2, FG 4, Pos. 56). Some of the ideas that were shared on how to use Guideline 4 included having students use objects from around the home environment and other technological options including the thumbs-up or chat functions. For example,

Yeah, so I did, I did try to put extra effort into that. I found number four, obviously a

super large challenge online. Yeah. I did, although like there were instances where I

pulled like, you know, we made a plane, and we like all got a piece of paper and like did

some reflection activity... (Instructor Number 5, FG 6, Pos. 58)

Guideline 5: Expression and Communication

Guideline 5 is related to Expression and Communication. Similar to Guideline 4,

Guideline 5 was not perceived by SWD or instructors as being as helpful as the other Guidelines

in online higher education (see Figures 10 and 11). Specifically, Guideline 5 received the

second-lowest helpfulness ranking from SWD and the third-lowest for helpfulness for

instructors. Many instructors expressed that students were able to utilize Guideline 5 on their

own. For example, one instructor said, "But I'm interested in that, like number five, I think, I

think sometimes students don't necessarily need that. You know, they're doing that on their own"

(Instructor Number 6, FG 6, Pos. 79). However, one faculty shared that they had Guideline 5

ranked as more helpful based on their specific learning style,

> But I've put three and five much higher than seemingly everyone else. Just because I feel.
>
> Whether you're reading it or seeing it on a screen versus your textbook, and me just
>
> reiterating the same thing seems kind of redundant. So, I like to have a little bit of extra,
>
> you know, background knowledge, or try to explain things in a way that's a little bit more
>
> like storytelling or trying to provide more context… (Instructor Number 4, FG 5, Pos. 46)

One instructor discussed how overdoing multiple media can be difficult for instructors to

organize, "There's an increased, risk there too actually. If you have things in multiple formats, in

multiple places, like if something needs to be updated for students, like there's a chance that

something gets missed" (Instructor Number 5, FG 6, Pos. 84).

The SWD also ranked Guideline 5 as the second lowest for most challenging to use in online higher education (see Figure 7). One rationale for the lower ranking in helpfulness and high ranking in challenging was that some SWD didn't feel it was relevant to their learning styles or disabilities. For example, one student said, "Well, I think 4 and 5 are towards the bottom because it's like, I guess what would be, like, what affects at least my disability the least or what I've had the least negative experience with…" (SWD Number 2, FG 1, Pos. 55). Additionally, SWD who identified as Blind ranked Guideline 5 lower as social media typically uses visual methods of expression, "I don't personally find the use of social media and interactive tools to be very useful, especially because they're very visually based. So, it just doesn't really matter as much to me" (SWD Number 2, FG 1, Pos. 55).

Guideline 6: Executive Functioning

Guideline 6 focuses on Executive Functioning and was ranked as the most helpful by instructors and SWD (see Figures 10 and 11). Students expressed that having clear goals, objectives, and due dates helped them to organize their courses online. For example, one student said,

> I think it's important because it helps set those expectations and Guidelines like what you're supposed to be doing and making sure that we're staying on track. Like for me, it helps me make sure that I'm putting my time and energy into what's relevant and important in the course. Instead of trying to focus on things, I'm like, I didn't need to be doing that at all. (SWD Number 6, FG 2, Pos. 26)

Some elements of Guideline 6 that SWD specifically highlighted were the use of grade calculators and posting recorded lectures,

> Guideline six is my first one because I can remember I'm in second year now and I can remember a first-year psych course. They had posted, it wasn't necessarily for checklists,

but it was more for like, calculating your grade and average, but it went right in order in

Excel, and you could access it and you could input your grade in what you got. And the

course coordinator had made that. So, I almost wish that more professors would do that

because everything went in order, and it was just like I could follow along. (SWD

Number 8, FG 3, Pos. 9)

However, the SWD ranked Guideline 5 as the one they were least interested to learn more about

(see Figure 8). The SWD did not provide context for this specific ranking but one SWD

expressed concern about Guideline 5,

And I also find, with Guideline 6, the executive functioning, putting goals and objectives

and schedules in obvious places, kind of like you were saying earlier, that like often it's

just a maze to try to find anything. I remember that most of my courses, if, like at the start

of the semester when I go to try to find the syllabus, it will usually take me 10 to 15

minutes to find the syllabus on page. (SWD Number 1, FG 1, Pos. 43)

The instructors also expressed that Guideline 6 was helpful in assisting students to stay on track,

be organized, and enjoy online learning more. For example, one instructor said,

I think the, the one at the top there in terms of like posting goals, objective schedules, I,

think it just helps to students to stay on track and allows all students to stay on track, not

just those who need some of that extra support or push, but so I think that's a big one for

me. (Instructor Number 2 FG 4, Pos. 34).

Guideline 7: Recruiting Interest

Guideline 7 is related to Recruiting Interest and was tied with Guideline 8 as the most

challenging for SWD to use in online higher education (see Figure 7). When asked to provide

some context for this ranking, the SWD said they see the value of participating in course design

but are not provided with an opportunity to utilize it,

For me, my second one was the recruiting interest, like that participate in the design. And

I found that one very, you know, important because if students are a part of that process,

collectively you can make the course more accessible for everyone and more just, more

interesting for everyone. (SWD Number 2, FG 1, Pos. 51)

However, one student provided context for what is challenging about participating in the course

design,

I would say for learning to participate in the design of the course. Usually, it's at the end

of the year, there's something that's sent out like a questionnaire about how the course

went and everything, but I think that just affects it for the next year when you're not going

to be in the class instead of throughout the year. (SWD Number 3, FG 2, Pos. 22)

Additionally, another SWD mentioned their reason for having Guideline 7 as the most

challenging was because of difficulty accessing it,

Yeah, I think from my experience, if the course is set up in a way that's accessible and

straightforward, then people tend to do better and be more engaged. And I find that often,

with some of my profs, they've tried to get people engaged in the course without making

engagement accessible, and so then they can try as hard as they want to make their

material really interesting and engaging and being like a really good but if it's not

accessible to people, yeah. (SWD Number 1, FG 1, Pos. 53)

Finally, the SWD also ranked Guideline 7 as the Guideline they want to know more about (see

Figure 8). One student said, "Guideline seven is at the top just because again, kind of. Back to

stereotypical, you know, online asynchronous class when everything's already said and done. I'm

just interested, like, knowing how this can be incorporated, you know" (SWD Number 7, FG 3,

Pos. 35). While the instructors did not rank Guideline 7 at the top or bottom position for any

rankings, they did discuss the general challenges with implementing Guideline 7 and some things

they have tried in online learning. One instructor specifically highlighted why they ranked

Guideline 7 as challenging,

> My most recent experience was COVID teaching. So, I had ranked recruiting interest
>
> quite highly, which is like slight, you know, it's number four here. I think I had it as
>
> number two because I found that was the largest challenge during COVID, right? For me.
>
> So that was, that was certainly something I ranked high. (Instructor Number 5, FG 6, Pos.
>
> 48)

Some examples and ideas that the instructors shared in the focus groups centred around check-

ins and reflection,

> So, I am doing a lot more emphasis on the process and emphasis on, like reflection as
>
> well, that their reflection of learning and yeah. So it seems to me like there's a, there's
>
> been a shift in the things that I have to think about in teaching in online learning because
>
> it's not the same. (Instructor Number 1, FG 4, Pos. 35)

The instructors shared some of the methods they used to encourage students to participate in the

course design and expressed that this Guideline felt more natural to implement in-person.

> I was doing more online as that recruiting interest. So, the learners participate in the
>
> design of the course, and I've done that for this fourth-year course that I have. And, it's
>
> amazing. But I find that it's really like, it was really great to do it in person because we
>
> actually talked about like, here are the non-negotiables that we have to have in the course,
>
> but here's like two or three, you know, there's 30% of this course. Like what should we
>
> do? What would be good activities? And then we'll like design the formats (Instructor
>
> Number 2, FG 4, Pos. 17)

Guideline 8: Sustaining Effort and Persistence

Guideline 8 regarding Sustaining Effort and Persistence was tied with Guideline 7 as the most challenging for SWD to use in online higher education (see Figure 7). There are two main reasons the SWD perceived Guideline 8 as challenging to use including quality and timing of feedback. The SWD expressed that it was challenging to get feedback promptly, and they perceived less feedback in online learning compared to in person,

> Yeah, but the other thing that I found really challenging is that especially with online courses, the rate of returning assignments or tests or quizzes, it takes a really long time for some reason to get them back. Or when you do get them back, they don't have a lot of feedback and for me, the kind of faster feedback is a lot more helpful and I feel like I can learn more when I have that kind of instant feedback. (SWD Number 1, FG 1, Pos. 59)

Another SWD added, "So a class kind of felt like you're alone unless you know you have friends in that class. So there's nowhere really to provide feedback other than the course evaluations that were sent out" (SWD Number 7, FG 3, Pos. 15). The SWD also expressed that they relied on rubrics during online learning and group assignments,

> Yeah. Because I find that I'm, when I'm doing an assignment with a group or by myself, I print off the assignment Guidelines and the rubric. And then once I finish that assignment, I go along and I check the rubric and I check the things that I've done and I look over it. And then if I don't check something, then I have to go back and redo it or add it. And so, yeah, I just find rubrics really helpful for that case. (SWD Number 8 FG 3, Pos. 17)

The instructors ranked Guideline 8 as the second most helpful (see Figure 10). Similar to the SWD, the instructors emphasized the value of rubrics. One instructor said, "And, I guess sustained effort and persistence. That one is, again, I think just having rubrics, they're always

asking for those kind of things. And so, you know, it's like, it's important to all of them" (Instructor Number 2, FG 4, Pos. 34). Despite the instructors ranking Guideline 8 in the middle for what they are interested to know more about several instructors expressed general interest during the focus groups (see Figure 9),

> And, and eight and nine, I actually put, uh, quite high, like eight on here is six, but it's number two for me. Even though I ranked it fairly high before its cause, you get students who might feel overwhelmed and, you know, maybe they start to slide in grades and you wonder, what can I do to help, help them, you know, maintain that momentum that they, you know, even though the topics might interesting, they're enjoying it, but whatever reason they start falling behind. (Instructor Number 4, FG, Pos. 80)

Guideline 9: Self-regulate

Guideline 9 is focused on Self-Regulation. Both SWD and instructors ranked Guideline 9 as the third Guideline they want to learn more about (see Figure 9). The instructors expressed that they were unsure how to implement Guideline 9 in online higher education, "I think I said at the very beginning that Guideline 9 on self-regulation was something that I was excited to learn more about. And so that one I think is top for me" (Instructor Number 1, FG 4, Pos. 54).

The instructors shared some helpful ideas during the focus groups to address their limited understanding of Guideline 9. For example,

> I had number nine higher because I, I prioritize that in online and in person. So I do a lot of, you know, I teach mindfulness and meditation to all my students, and really, we work on contemplative. We use contemplative, pedagogic strategies to kind of help students and myself kind of bring our best selves to the classroom (Instructor Number 6, FG 6, Pos. 54)

The instructors also discussed different ways they can try to help students access mentors or coaches,

> Yeah, I think I put it lower probably because I haven't used it as well, as much as I probably should. And, um, in terms of like providing coaches and mentors, you know, that's a, it's a tough one, right? Like how do you actually do that as an instructor? And, but you know, I think about some of the, like a third-year class that could be mentored a bit by the fourth-year class and, you know, is that a possibility? Or, you know, do we link that a little bit more to like the A to Z learning services to so that students know that those kind of mentors and coaching type of approaches are there for them. (Instructor Number 2, FG 4, Pos. 39)

One SWD provided some context on why they ranked Guideline 9 as the one they are interested to know more about,

> I can talk about this, but with the online learning since there's no like physical interactions. There's almost that disconnect. So teachers aren't able to really see how we feel. Maybe they don't, the opportunity to ask, and then it's harder to almost connect with them. To get that mentorship. (SWD Number 4, FG 2, Pos. 20)

Additionally, the SWD ranked Guideline 9 as the third lowest Guideline they have experienced in online higher education (see Figure 5). One SWD expressed that this is likely because it is difficult to ask for help,

> I put Guideline nine as my third choice nine. I know for myself, I'm very big in advocating what I need and when I don't understand things, I advocate that I don't understand it because I want to do what's best, I want to do the best that I can. And so I feel like though it's like down at the bottom more for others because they just don't feel

comfortable, like self, like self-regulating and, finding and asking for help. So it's just a

more difficult topic (SWD Number 8, FG 3, Pos. 11)

Discussion

This thesis examined instructors' and SWD's experiences with UDL in online education

and their perceptions regarding the application of the UDL principles and guidelines. The

research explored instructors' and SWD's current experiences with online education and UDL,

their preferences toward what Guidelines are helpful, what Guidelines they are interested in

learning more about, what barriers instructors face when implementing UDL online, and what

Guidelines are the most challenging for SWD to use online.

Instructors and SWD agreed on various areas (e.g., Guideline 6: Executive Functioning

as most helpful and Guideline 4: Physical A ction as most challenging). Additionally, both

instructors and SWD summarized their experiences of UDL in online higher education by

emphasizing the word accessibility in their respective word clouds. The CAST "access" row

guidelines were ranked at the extremes of most of the rankings. The ranking and the word clouds

exemplify how SWD and instructors notice limited access and appreciate when UDL is

accessible.

Both the SWD and the instructors perceived Guideline 6: Executive Functioning as the

most helpful in online higher education. Additionally, SWD and instructors indicated that they

had the most experience using and implementing Guideline 1: Perception in online higher

education. The agreement between the SWD and instructors on what Guidelines they have the

most experience with and felt were helpful in online higher education shows unity in their

responses and their perspectives on how UDL can be used. Additionally, the instructors and

SWD had ranked Guideline 4: Physical Action as the one they have the least experience with and

the guideline they perceived to be the least helpful. Many participants in both groups expressed

that they ranked Guideline 4: Physical Action as the least helpful because they did not have a full understanding and experience with it in the online higher education environment. Based on that rationale for the helpfulness ranking, it is likely that Guideline 4: Physical Action may not necessarily be the least helpful, but rather, it is one of the Guidelines that both SWD and instructors need to learn more about.

A similar theme of ranking based on limited previous experience and background information is evident as the SWD ranked Guideline 7: Recruiting Interest as the most challenging guideline to use in online higher education and the one they are most interested in learning more about. Also, the instructors' interest in Guideline 4: Physical Action is likely associated with their ranking of Guideline 4: Physical Action as the one they have the least experience with and the one they consider least helpful. With additional knowledge, experience, and training, both SWD and instructors could have a deep understanding of Guidelines 4: Physical Action and Guideline 7: Recruiting Interest, leading to potentially improved perceptions of usefulness.

When asked about their experience with UDL in online higher education, both SWD and instructors emphasized the word accessibility. As mentioned, UDL requires instructors to be flexible and does not replace SWD accommodations (Fleet & Kondrashov, 2019). As both populations summarized their perception of UDL in online higher education primarily with the word "accessibility", the intention for both populations is to include all learners. While it is positive that accessibility is the main point of experience with UDL, many SWD noted experiences of having access to multiple means of expression, engagement, and representations but not being able to use them with true accessibility. Specifically, some SWD expressed that they were not able to rewind podcasts, upload scanned textbook pages to reading programs, or take notes and follow lecture videos. Further, it appeared that the SWD were more focused on

their accommodations than the use of UDL for all learners. Overall, this research indicates that SWD and instructors value UDL strategies, particularly engagement strategies and expressing materials in multiple formats. Griful-Freixene and colleagues (2017) found that the SWD use and perception of Guideline 4: Physical Action) was explained by disability-specific characteristics as assistive technology was only mentioned by the student with visual impairment as being helpful. This finding is reemphasized in this thesis as many SWD did not find this one valuable or did not understand it because they did not feel it was relevant to their disability or learning style. It was emphasized by SWD that UDL is not a one-size-fits-all approach. The addition of UDL will not eliminate the need for professor flexibility and accommodations (Griful-Freixene et al., 2017; Westine et al., 2019).

Further, According to Griful-Freixene et al. (2017), Guideline 8: Sustaining Effort and Persistence aligned best with SWD's perception of their needs for engagement, yet in this thesis, Guideline 8: Sustaining Effort and Persistence was the second most challenging one for SWD to use in online higher education. The instructors perceived that Guideline 8: Sustaining Effort and Persistence would be one of the most helpful ones for students. Additionally, Westine et al. (2019) concluded that the least used guidelines were Guideline 2: Language, Mathematical Expression, and Symbols and Guideline 4: Physical Action. The instructors echoed that Guidelines 2 and 4 are the ones they have the least experience implementing in online higher education. Hills et al. (2022) also found barriers to limited time and training for instructors. The top three UDL practises identified by the faculty in the Westine et al. (2019) study were Guideline 3: Comprehension, Guideline 1: Perception, and Guideline 8: Sustaining Effort and Persistence (respectively). Our results as the top three guidelines that have been implemented or experienced in online higher education were Guidelines 1: Perception, Guideline 6: Executive Functioning, and Guideline 8: Sustaining Effort and Persistence. Therefore, Guidelines 1:

Perception and Guideline 8: Sustaining Effort and Persistence are potentially highly

implemented guidelines in online higher education.

UDL is traditionally discussed in terms of the three principles (i.e., multiple means of

engagement, representation, and expression). More recently, CAST (2018) began categorizing

the Guidelines according to how they could enhance learning (i.e., access, build, & internalize).

The "access" row includes the guidelines that suggest ways to increase access to the learning

goals by recruiting interest and by offering options for perception and physical action

(Guidelines 1, 4, and 7). The "build" row highlights ways to develop effort, language and

symbols, and expression (Guidelines 2, 5, and 8). The final row "internalize" states methods to

promote self-regulation, comprehension, and executive functioning (Guidelines 3, 6, and 9).

When looking at the extremes of the ranking questions, the majority of the time one of the

"access" Guidelines is at the extremes of the responses from both SWD and instructors (see

Figures 5 to 11). However, three questions had Guideline 6: Executive Functioning at one of the

extremes. This means the access row established by CAST is important to the instructors and

SWD. Specifically, these "access" guidelines were at the extremes for SWD experience,

challenging to use, and most interesting to learn more about. Moreover, the "access" guidelines

were at the extremes for instructors' experiences. Additionally, all responses across both

populations included one "access" guideline in the extreme positions. The "access" guidelines

being at the extremes of the ranking can suggest that SWD and instructors have strong opinions

about access to UDL in online higher education. Without "access" the value of the other rows

and guidelines is diminished. Having the "access" row guidelines at the extremes of most of the

rankings shows how SWD and instructors notice limited access and appreciate when UDL is

accessible. This emphasis on access is mirrored in the primary word in both SWD and

instructors' perception of UDL word clouds is "accessibility".

It was evident that the SWD and the instructors had limited insights into how the other population was implementing or using the guidelines. Throughout the focus groups, the instructors expressed that they were unsure if students appreciated or used some of the materials and multiple means of expression, engagement, or representations that they spent time and effort developing. For example, instructors were unsure if students used the recorded lecture videos. Interestingly, the SWD expressed appreciation for these videos and reported using them frequently and that they are a useful resource. This suggests that through the development of a CoP where instructors and SWD can share their thoughts and ideas with each other, more conversations about what resources are improve communication between populations. Additionally, the development of the community will help to target barriers or effort and training as it will allow for a space where passionate SWD and instructors can share ideas, develop training models, and discuss new research.

Reflexivity

Outlining my perspective and acknowledging my position allowed for transparent consideration of the relationship between myself, the participants, and my interpretation of the data. By acknowledging my position and completing reflective journals, the results of this thesis are supported by my personal experience as a SWD and OCT during the interpretation of results. This thesis is personal to me as it stemmed from my personal challenges as a SWD in online higher education. Being able to apply my lens as an educator and a SWD to the results was valuable to me and my personal learning as a researcher and educator. Additionally, leaning into my insider perspective has allowed me to examine and summarize the data and results with empathy, understanding, and care for both populations. Using my insider perspective to allow for a deeper understanding of the results is similar to Alhaznawi (2019). Alhaznawi (2019) had an elite interview with a faculty member with a disability and expertise in UDL to review their

project for a unique perspective and triangulation. In line with this, I have applied my unique perception as an SWD and an OCT to the results and discussion and recommendations for instructors have been triangulated with my unique perspective. For example, when the SWD discussed the challenge of navigating through web browsers and having important course material scattered in different locations online (Guideline 6: Executive functioning), I knew the magnitude of this seemingly small barrier. In the past, I have had to embarrassingly email instructors to help locate course materials after trying for over half an hour. On the other hand, I know that instructors and educators try to utilize the online spaces they are given, and they do not always know how to best use web tools. As a teacher, I know the vaguer the instructions, the more questions from students. Therefore, I recognize that instructors likely want clear goals and objectives available to the students as well. Based on this dual SWD and educator perspective, I provided a unique perspective and emphasized the challenge of using and implementing Guideline 6: Executive Functioning in online education for both populations.

Limitations

While this thesis shed light on the perceptions of instructors and SWD towards UDL in online higher education at Brock University, it was not without its limitations. One limitation was that the instructors' perspective was somewhat under-represented. Several potential factors contributed to the challenges of recruiting instructors to participate. The first potential reason was the inclusion and exclusion criteria. The Critical Appraisal Skills Programme (CASP, 2023) checklist was used to systematically consider areas of limitations. One area noted on this checklist was the recruitment strategy. The general population was left out through purposeful sampling. Instructors were recruited through purposeful sampling. While purposeful sampling leaves some people out, it ensured that the discussions in the focus groups focused on the research questions and purpose of the thesis. It might have been beneficial to have recruited

through multiple methods, such as through the Brock University instructor's social media or placing flyers around campus as opposed to a purpose sample. As mentioned, the instructors' participation was restricted only to those who have taught at least an online higher education course. One of the six responses to recruitment asked for clarification regarding whether instructors could participate. Another indicated that they were passionate about UDL in online education but have not yet had to teach an online class. Having clearer or more open inclusion criteria might have increased the number of instructors that participated. Similarly, two of the participating instructors reached out to clarify if seasonal instructors could be included. Another limitation may have been associated with attempting to schedule focus groups with busy populations, given the many competing expectations and demands on their time. Due to these recruitment challenges, several smaller focus groups were facilitated, consisting of two participants. There are various terms for focus groups, and some research has described focus groups of four or fewer people as mini-focus groups (Hamilton et al., 2020; Jebara et al., 2023).

Beyond the recruitment process, some limitations occurred during the focus groups. It was noted that the SWD typically associated the effective application of UDL guidelines and checkpoints with well-implemented accommodations. It seemed that the SWD linked their recommendations with the UDL guidelines. This perception may have affected the discussions in the focus groups as most of the points were centred around their accommodation. In contrast, UDL is designed to support and promote engagement from all learners and not specifically the capacities of SWD. An additional statement outlining the purpose of UDL may have been helpful for participants to promote their understanding of what UDL is and why it is valuable.

Another limitation was the participants were all from one University. While this provides specific feedback for Brock University, it is not easily transferable. Having participants from other Universities or Colleges across Canada would have increased the ability for the results to

capture a larger perspective. However, the results have been compared to other literature to make connections and comparisons to other locations and perspectives. Further, the SWD demographic survey indicated that the students were all in the second or third year. It would be valuable to get a larger perspective of the SWD experiences and preferences by including additional students in other years or students in graduate studies.

Another limitation was the discrepancy in the way the instructors and SWD were asked to report on the challenges with UDL. Instructors were not asked to rank the guidelines from most to least challenging. The instructors addressed open-ended discussions about what barriers they face rather than ranking the guidelines. While a direct comparison between the instructors and SWD challenges cannot be made, practical movements can be made to target barriers faced by instructors.

Additionally, a more rigorous data analysis could have been used. The CASP checklist highlights the importance of addressing potential bias and influence during data analysis. While some measures were taken to address this limitation, including a reflective journal, and checking for consistency, this area would have been strengthened with additional measures including having an additional researcher complete the coding and comparing the inter-coder agreement.

Strengths and Implications

There were several strengths and positive implications of this thesis. From the beginning, the relationship between the researcher and the different participant groups were considered and reflected on. Additionally, there was a clear purpose and goal of the research topic. The methodology selected was supported by the literature and allowed for the future development of the community. According to the CASP checklist, another area of strength is the ability of the research to help locally. The results of this thesis should help locally as all participants are affiliated with Brock University. I will set a follow-up meeting to review the results and discuss

beginning recruiting for the CoP. Recruitment will include inviting all interested participants and working with SAS and CPI for any additionally interested people. I will continue to support the CoP outside of my thesis. Reviewing the results with CoP will provide more context and initiate the conversation of how to combat identified barriers. Also, reviewing the results with the CoP is a way to triangulate results. In addition to the strengths and implications of this thesis, there are some areas of future research to consider.

Future Research

Future research should continue to explore UDL in online higher education. Specifically, researchers should address the barriers described by the SWD and instructors. Additionally, future research should further investigate the perception, use, and implementation of the "access", "building" and "internalization" rows of UDL guidelines. Moreover, future research is needed to expand the results through surveys and direct observations of the use and implementation of UDL in online higher education. Specifically, if instructors are trained on Guideline 4: Physical Action and Guideline 7: Recruiting Interest (the ones SWD and instructors want to learn more about), it would be interesting to conduct follow-up observations after training. These observations could examine how well instructors are implementing and if students are using the newly trained guidelines. Additionally, it would be interesting to reassess the impact of training and follow-up direct observation on instructors' helpfulness rankings. Finally, it would be valuable to get a larger perspective of the SWD experiences and preferences by including additional students in other years, students in graduate studies, and more Canadian universities or colleges.

Knowledge Mobilization Plan

Based on the literature, it is evident that exploratory research was necessary to understand SWD and instructors' awareness of UDL, what barriers they face, and their current preferences

(Alhaznawi, 2019; Singleton et al., 2019). After this thesis, it is evident that certain guidelines are well understood and used, while other guidelines that are less understood are neglected. This barrier of lack of training and knowledge may be addressed through the development of a CoP. Steps can be made to develop clear and concrete examples of best practices and specific UDL training based on relevant barriers and instructors' preferences. According to Long and Stabler (2021), establishing a community is needed to ensure the development of inclusive learning environments after identifying barriers and challenges. By supporting an ongoing discussion regarding UDL in online higher education classrooms, more consistent discussions and developments can be made at Brock University. The development of the CoP will be centred on building relationships with interested community members. Recruitment will be focused on students, SWD, faculty members and instructors, and CPI. Once interested members are recruited, virtual meetings will be organized to build the foundation and target goals for developing best practices based on current literature, take action as a community to develop tools and learning experiences, and explore new ideas. In addition to the CoP, the results of this thesis will be formed into a manuscript for publication and dissemination at relevant conferences. The results will be shared with Brock News and Brock University social media forms to aid overall knowledge mobilization.

Recommendations for Practice

Cumming and Rose (2021) outlined several recommendations for UDL implementation based on their rapid review. The recommendations included having information in multiple formats, various means for students to communicate, physical actions that are able to be carried out, clear instructions, respect for diversity, regular instructor and student interactions, specific feedback, and a variety of assessments. Based on the results of this thesis and consideration for the online implementation of UDL the following additions to the recommendations are

suggested. First, a change to the recommendation of having information in multiple formats could be adapted to include having information accessible in multiple formats. The addition of the term accessible adds consideration for how students and SWD are able to use the different formats and if they can properly access them. Second, the inclusion of a recommendation for instructors to have multiple formats for assessment and flexibility on due dates. Many SWD and instructors highlighted the benefit of having some flexibility regarding assessments including due dates and multiple formats for representation of assessments. Third, for specific feedback, the addition of specific and timely feedback should be considered. Several SWD mentioned a greater delay in receiving immediate feedback online. Fourth, further understanding and training are necessary regarding physical actions (i.e., Guideline 4: Physical Action). Therefore, the recommendation to ensure physical actions can be carried out should include ensuring instructors understand how to implement physical actions and ensure they are carried out. For example, additional resources or professional development opportunities. Fifth, the respect for diversity recommendation can be applied to instructors and more systemic levels of higher education. As instructors mentioned a lack of support and value towards improving teaching practices and UDL, it is beneficial to broaden this recommendation to a larger systemic level. For example, developing more awareness regarding the importance of UDL in online higher education and the use of inclusive education practises in online higher education. Sixth, more emphasis should be placed on Guidelines 8: Sustaining Effort and Persistence and Guideline 6: Executive Functioning, as those were considered most helpful from the perspectives of SWD and instructors. Accordingly, a recommendation for instructors to emphasize Guideline 6: Executive Functioning is necessary. Emphasizing executive function can look like posting goals, objectives, and schedules in an obvious place and providing checklists. Additionally, emphasis should be placed on Guideline 8: Sustaining Effort and Persistence, which would include calling

attention to the process, effort, improvement, and creating expectations using rubrics. A final recommendation is to encourage instructors to approach relevant resources (CPI or peers) when they experience challenges understanding and implementing a guideline in online higher education. The focus groups allowed instructors to share ideas and examples of what they have done to implement various guidelines in online education, and in each instance, the other instructors indicated that they valued the examples and felt motivated to learn more or try the ideas out themselves.

I hoped this thesis would highlight the challenges instructors and SWD face when using or implementing the UDL framework and provide educators with concrete examples of what UDL guidelines are helpful in an online environment. Ultimately, I aimed to increase the participation of both students and educators to create an open and accepting online classroom in higher education where all members can excel.

References

Alhaznawi, A. A. (2019). Factors that impact faculty members' awareness about disabilities and readiness to accommodate students with learning disabilities in postsecondary education (Doctoral dissertation, Concordia University Chicago). https://www-proquest-com.proxy.library.brocku.ca/docview/2510286011

Burgstahler, S. (2015). Opening doors or slamming them shut? Online learning practices and students with disabilities. *Social Inclusion, 3*(6), 69-79. https://doi.org/10.17645/si.v3i6.420

Byrne, T. C. (1989). Athabasca University: The evolution of distance education. Calgary, Canada: University of Calgary Press.

Center for Applied Special Technology (CAST). (2018). Universal design for learning guidelines version 2.2. Retrieved from http://udlguidelines.cast.org

Creswell, J. W., & Plano Clark, V. L. (2007). Mixed methods research. Thousand Oaks, CA

Critical Appraisal Skills Programme (CAST). (2023) CASP UK-OAP Ltd. Oxford https://casp-uk.net/casp-tools-checklists/

Cumming, T. M., & Rose, M. C. (2022). Exploring universal design for learning as an accessibility tool in higher education: A review of the current literature. *The Australian Educational Researcher*, *49*(5), 1025-1043. https://doi.org/10.1007/s13384-021-00471-7

Dianito, A. J., Espinosa, J., Duran, J., & Tus, J. (2021). A glimpse into the lived experiences and challenges faced of PWD students towards online learning in the Philippines amidst COVID-19 pandemic. *International Journal of Advance Research and Innovative Ideas in Education, 7*(1), 1206-1230. 10.6084/m9.figshare.14033435.v1

Erlingsson, C., & Brysiewicz, P. (2017). A hands-on guide to doing content analysis. *African journal of emergency medicine*, *7*(3), 93-99. https://doi.org/10.1016/j.afjem.2017.08.001

Fleet, C., & Kondrashov, O. (2019). Universal design on university campuses: A literature

    review. *Exceptionality Education International*, *29*(1), 136-148.

    https://ojs.lib.uwo.ca/index.php/eei/article/view/11125

Frumos, L. (2020). Inclusive education in remote instruction with universal design for learning.

    Revista Romaneasca Pentru Educatie Multidimensionala, 12(2Sup1), 138–142.

    https://doi.org/10.18662/rrem/12.2Sup1/299

Florian, L. (2015). Conceptualizing inclusive pedagogy: The inclusive pedagogical approach in

    action. In J. Deppeler, T. Loreman, R. Smith, & L. Florian (Eds.), Inclusive pedagogy

    across the curriculum. *International perspectives on inclusive education* (Vol. 7, pp. 11–

    24). London: Emerald Group Publishing.

Florian, L., & Spratt, J. (2013). Enacting inclusion: A framework for interrogating inclusive

    practice. *European Journal of Special Needs Education, 28*(2), 119–

    135. http://dx.doi.org/ 10.1080/08856257.2013.778111

Fornauf, B. S., & Erickson, J. D. (2020). Toward an inclusive pedagogy through universal design

    for learning in higher education: A review of the literature. *Journal of Postsecondary*

    Education and Disability, 33(2), 183-199. https://files.eric.ed.gov/fulltext/EJ1273677.pdf

Gasevic, D., Siemens, G., & Dawson, S. (2015). Preparing for the digital university: A review of

    the history and current state of distance, blended, and online learning.

    https://doi.org/10.13140/RG.2.1.3515.8483

Guðjónsdóttir, H., & Óskarsdóttir, E. (2016). Inclusive education, pedagogy and

    practice. *Science Education Towards Inclusion*, 7-22.

    https://www.researchgate.net/publication/318775330

Griful-Freixenet, J., Struyven, K., Verstichele, M., & Andries, C. (2017). Higher education students with disabilities speaking out: Perceived barriers and opportunities of the universal design for learning framework. *Disability & Society, 32*(10), 1627-1649. https://doi-org.proxy.library.brocku.ca/10.1080/09687599.2017.1365695

Gullo, D. L. (2021). Supporting students with disabilities to be successful in an online learning environment. (Doctoral dissertation, Wilmington University (Delaware). https://www-proquest-com.proxy.library.brocku.ca/docview/2516260065

Hamilton, K. C., Howard-Baptiste, S., Hahn, K. J., Powell, M. C., E'tienne, F. E., & Graham, M. J. (2020). Mixed methods with strategic collaborations: Systematically designing an after-school physical activity and nutrition program. *Progress in community health partnerships: research, education, and action*, *14*(4), 431-442. 10.1353/cpr.2020.0049

Harasim, L. (2000). Shift happens Online education as a new paradigm in learning. *The Internet and Higher Education, 3*(1–2), 41–61. https://doi.org/10.1016/S1096-7516(00)00032-4

Izzo, M. V., Center, N., Murray, A., & Novak, J. (2008). The faculty perspective on universal design for learning. *Journal of Postsecondary Education and Disability*, *21*(2), 60-72. https://eric.ed.gov/?id=EJ822094

Jebara, T., McIntosh, T., Stewart, F., Osprey, A., Bruce, R., & Cunningham, S. (2023). A qualitative exploration of the implementation of the prescribing course designated prescribing practitioner role in community pharmacy. *International Journal of Pharmacy Practice*, *31*. https://doi.org/10.1093/ijpp/riad021.029

Johnson, N., Bates, T., Donovan, T., & Seaman, J. (2019). Tracking online education in Canadian universities and colleges: National survey of online and digital learning 2019 national report. *Canadian Digital Learning Research Association.*

https://eduq.info/xmlui/bitstream/handle/11515/37850/johnson-tracking-online-eduation-canadian-universities-colleges-cdlra-2019.pdf;sequence=5

Kentnor, H. E. (2015). Distance education and the evolution of online learning in the United States. *Curriculum and Teaching Dialogue*, *17*(1), 21-34.

Lee, K. (2017). Rethinking the accessibility of online higher education: A historical review. *The Internet and Higher Education*, *33*, 15-23. http://dx.doi.org/10.1016/j.iheduc.2017.01.001

Lohmann, M. J., Boothe, K. A., Hathcote, A. R., & Turpin, A. (2018). Engaging graduate students in the online learning environment: A universal design for learning (UDL) approach to teacher preparation. *Networks: An Online Journal for Teacher Research, 20*(2), 2–21. https://doi.org/10.4148/2470-6353.1264

Long, R.-E. M., & Stabler, A. (2021). "This is NOT okay:" Building a creative collective against academic ableism. *Journal of Curriculum and Pedagogy,* 1–27. https://doi.org/10.1080/15505170.2021.1926374

Loreman, T. (2017). Pedagogy for inclusive education. In Oxford research encyclopedia of education.

McGregor, K. K., Langenfeld, N., Van Horne, S., Oleson, J., Anson, M., & Jacobson, W. (2016). The university experiences of students with learning disabilities. *Learning Disabilities Research & Practice, 31*(2), 90-102. 10.1111/ldrp.12102

Moore, J. L., Dickson-Deane, C., & Galyen, K. (2011). E-Learning, online learning, and distance learning environments: Are they the same? *The internet and higher education, 14(*2), 129–135. https://doi.org/10.1016/j.iheduc.2010.10.001

Morgan, D. L. (2017). Integrating qualitative and quantitative methods: A pragmatic approach. Sage publications.

Mullins, L., & Preyde, M. (2013). The lived experience of students with an invisible disability at a Canadian university. *Disability & Society*, 28(2), 147-160. https://doi-org.proxy.library.brocku.ca/10.1080/09687599.2012.752127

Mullins, L. E., & Mitchell, J. (2021). The transition online: A mixed-methods study of the impact of COVID-19 on students with disabilities in higher education. *International Journal of Higher Education*, 11(2), 13-29. https://eric.ed.gov/?id=EJ1341189

Pearson, H., & Boskovich, L. (2019). Problematizing disability disclosure in higher education: Shifting towards a liberating humanizing intersectional framework. *Disability Studies Quarterly*, 39(1). https://dsq-sds.org/index.php/dsq/article/view/6001/5187

Rogers-Shaw, C., Carr-Chellman, D. J., & Choi, J. (2018). Universal design for learning: Guidelines for accessible online instruction. *Adult learning*, 29(1), 20-31. https://doi-org.proxy.library.brocku.ca/10.1177/10451595177355

Ronen, I., & Shonfeld, M. (2017). The contribution of online (web-based) courses as perceived by students with learning disabilities and "average" students. *International Journal on E-learning* (Vol. 16, No. 4, pp. 395-416). Association for the Advancement of Computing in Education (AACE). https://www-learntechlib-org.proxy.library.brocku.ca/primary/p/151917/

Singh, V., & Thurman, A. (2019). How many ways can we define online learning? A systematic literature review of definitions of online learning (1988-2018). *American Journal of Distance Education, 33*(4), 289–306. https://doi.org/10.1080/08923647.2019.1663082

Singleton, K., Evmenova, A., Jerome, M. K., & Clark, K. (2019). Integrating UDL strategies into the online course development process: Instructional designers' perspectives. *Online Learning, 23*(1), 206-235. https://doi.org/10.24059/olj.v23i1.1407

Tandy, C., & Meacham, M. (2009). Removing the barriers for students with disabilities: Accessible online and web-enhanced courses. *Journal of Teaching in Social Work, 29*(3), 313–328. https://doi.org/10.1080/08841230903022118

The Team from Poll Everywhere (2022). Ranking Questions. https://support.polleverywhere.com/hc/en-us/articles/1260801551449-Ranking-question.

Vivolo, J. (2016). Understanding and combating resistance to online learning. *Science Progress, 99*(4), 399–412. https://doi.org/10.3184/003685016X14773090197742

Westine, C. D., Oyarzun, B., Ahlgrim-Delzell, L., Casto, A., Okraski, C., Park, G., Person, J., & Steele, L. (2019). Familiarity, current use, and interest in universal design for learning among online university instructors. *The International Review of Research in Open and Distributed Learning*, 20(5). https://doi.org/10.19173/irrodl.v20i5.4258

Zhang, Y., & Wildemuth, B. M. (2009). Qualitative analysis of content. In B. Wildemuth (Ed.), *Applications of social research methods to questions in information and library science* (pp. 308– 319). Libraries Unlimited. 10.1002/hbm.20661

Appendix A

UDL in Online Education Focus Group Questions for SWD

*Questioned answered via Poll Everywhere.

Experiences
1. * What word comes to mind when you think of UDL? (Word cloud)
2. * What have your experiences been with online education? (Word cloud)
3. What experiences have you had with UDL in online education?
    a. Do you recall any specific online courses or professors who used UDL?

The first UDL principle is multiple means of expression. Within that are 3 Guidelines (Perception, Language and mathematic symbols, and Comprehension).
For Guideline 1, perception examples (checkpoints) include offering ways of customizing the display of information, offering alternatives for auditory information, and offering alternatives for visual information. (*Repeat overviews for all 9 Guidelines*)

* Rank the order of your experience with each Guideline from most experiences to least experience within online education.
4. Why do you think SWD have the most experience with X?
5. Why do you think SWD have the least experience with X?
6. Can you recall any specific courses or professors that used any of these strategies in online education? Tell me about those experiences.

Recommendations
7. * Rank the order of the Guidelines from most helpful to least helpful for students to use in online education?
8. What do you think about these results?
9. Why do you think X has been the most helpful?
    a. Prompt: What about the least helpful, why is it perceived as less helpful than the other Guidelines? Did someone think it was more helpful to them?
10. * Rank what principles have the least to most challenges for students (or yourself) to use UDL in online education?
11. What do you think about these results?
12. Why do you think X is difficult to use?

13. * Rank which UDL Guideline you would like to know more about?
1. * Would you be open to follow-up information regarding the use of UDL in online higher education?
    a. If so, CoP

UDL in Online Education Focus Group Questions for Faculty Members

*Questioned answered via Poll Everywhere.

Experiences
1. * What comes to mind when you think of UDL? (Word cloud)
2. * What have your experiences been with online education? (Word cloud)
3. What experiences have you had with UDL in online education?
    a. Do you recall any specific online courses or professors who used UDL?

The first UDL principle is multiple means of expression. Within that are 3 Guidelines (Perception, Language and mathematic symbols, and Comprehension).
For Guideline 1, perception examples (checkpoints) include offering ways of customizing the display of information, offering alternatives for auditory information, and offering alternatives for visual information. (*Repeat overview for all 9 Guidelines*)
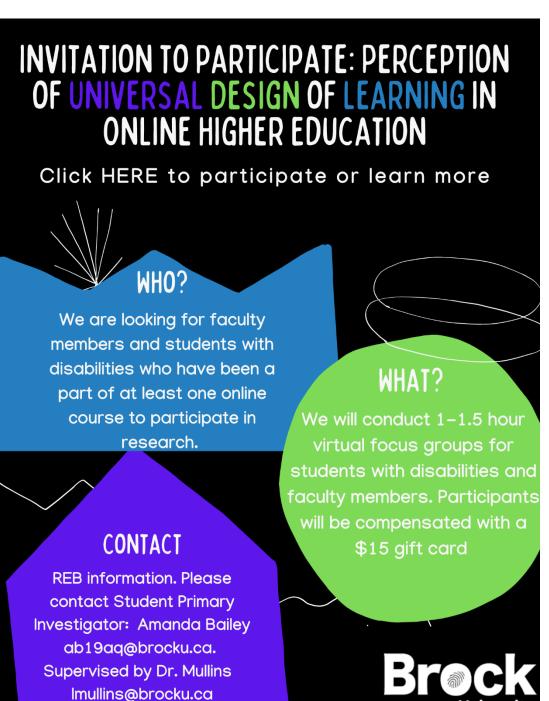
4. * Rank the order of your experience with each Guideline from most experienced to least.
5. What do you think about this ranked order? Why is X the one you all have the most experience with?
6. Why do you think X is the one you all have the least experience with?
7. Can you recall any specific courses or professors that used any of these strategies in online education? Tell me about those experiences.

Recommendations
8. * Rank the order of the Guidelines you think is the most implemented by faculty members to the least implemented in online education.
9. What do you think about these results?
10. Why do you think X is the most implemented?
11. What about the least implemented, why is it implemented the least?
12. *What barriers do you think make it difficult for faculty (or yourself) to utilize UDL in online education?
13. What do you think about these results?
14. Why do you think X makes it difficult?
15. * Rank which UDL Guideline you would like to know more about?
16. * Would you be open to follow-up information regarding the use of UDL in online higher education?
    a. If so, CoP

Appendix B

Recruitment Flyer

INVITATION TO PARTICIPATE: PERCEPTION OF UNIVERSAL DESIGN OF LEARNING IN ONLINE HIGHER EDUCATION

Click HERE to participate or learn more

WHO?

We are looking for faculty members and students with disabilities who have been a part of at least one online course to participate in research.

WHAT?

We will conduct 1–1.5 hour virtual focus groups for students with disabilities and faculty members. Participants will be compensated with a $15 gift card

CONTACT

REB information. Please contact Student Primary Investigator: Amanda Bailey ab19aq@brocku.ca. Supervised by Dr. Mullins lmullins@brocku.ca

Brock University

Appendix C

Social Media Recruitment Post

Hello,

Brock University invites you to participate in a research project to highlight the challenges faculty members face when using or implementing the Universal Design for Learning (UDL) framework and provide educators with concrete examples of how to apply the UDL principles in an online environment. The purpose of the research project is to identify faculty members and Students with Disabilities (SWD) current experiences with online education and UDL, the challenges faculty members and SWD face using and implementing UDL, and their preferences for specific Guidelines and strategies.

We are looking for SWD who have been in at least one higher education course online and are passionate about inclusive education in online education. Participation will involve a focus group over Zoom with other SWD who share a similar interest in UDL and inclusive online higher education. We will have a separate focus group for faculty members. Individual interviews can be arranged if you are uncomfortable with Zoom or need support.

This study has been reviewed and received by Brock University's Research Ethics Board [22-153]
If you have any questions about your rights as a research participant, please contact the Brock University Research Ethics Officer (905 688-5550 ext. 3035, reb@brocku.ca).
If you are interested in participating or have any questions about the research, please follow this link to the consent form LINK HERE. You can also contact me by email at ab19aq@brocku.ca

Thank you,

Flyer (see Appendix E) attached

Appendix D

Consent Form

Title of Study: Perception of Universal Design for Learning in Online Higher Education
Student Principal Investigator (SPI): Amanda Bailey, M.A Student, Department of Applied
Disability Studies, Brock University
Supervisor: Dr. Laura Mullins, Assistant Faculty, Department of Applied Disability Studies,
Brock University

INVITATION
Brock University invites you to participate in a research project to highlight the challenges
faculty members and students with disabilities (SWD) face when using or implementing the
Universal Design for Learning (UDL) framework and provide educators with concrete examples
of how to apply the UDL principles in an online environment. The purpose of the research
project is to identify faculty members of SWD's current experiences with online education and
UDL, the challenges faculty members and SWD face using and implementing UDL, and their
preferences for specific Guidelines and strategies.

WHAT'S INVOLVED
You will be asked to participate in a focus group over Zoom Video-Conferencing platform.
Faculty members and SWD will have separate focus groups. A focus group is a group discussion
with other people who have a family member on the autism spectrum.

The discussion is going to take about an hour and a half to two hours (1- 1.5 hrs). We can take
breaks at any time. To make sure we remember everything that is said in the discussion, we are
recording the focus groups.

POTENTIAL BENEFITS AND RISKS
There is little foreseen risk to participating. You may benefit from learning about the UDL
Guidelines and gaining an understanding of how UDL is being used by other SWD or how it is
being implemented by other faculty members. The results of this research may be published in
professional journals and presented at conferences. We can also provide a summary of the result
upon request (Amanda Bailey email: ab19aq@brocku.ca).

You may experience anxiety or restlessness during the focus group. You may discuss factors that
highlight past negative online education experiences and become distressed when reflecting on
sensitive issues in online education. We will try to make any personal or very specific
information more general so people shouldn't know who we are talking about. Also, please do
not share what was said during this focus group with anyone outside of the group.

CONFIDENTIALITY
Your personal information will be kept separate from the results. You will be given a number
that will be used to keep track of everything without having to use your name in the results. The
tracking sheet for participant names and numbers will be stored separately and securely. During
the Zoom focus group, you will have the option to keep your camera on or off. Your name will
be visible over Zoom. However, you can indicate a pseudonym in the following demographic
survey. When you are in the waiting room of the focus group, the SPI can change your name

before you enter. The focus groups will be recorded through Zoom Videoconferencing and saved directly to the researcher's computer. See Zoom privacy and confidentially policy at: https://explore.zoom.us/en/privacy/

The recordings will be kept confidential on an encrypted drive and on the researcher's secure SharePoint project site (through Brock's account). The recording will be typed out by a Research Assistant who signed an agreement to keep everything they heard or saw in the discussion private. The recordings and written documents will be kept safe on the researcher's secure SharePoint project site (through Brock's account). This consent form and demographic information is being distributed via Qualtrics Software using the PI's University account. See privacy and confidentially policy at: https://www.qualtrics.com/privacy-statement/

LIMITS OF CONFIDENTIALITY
If you tell someone from the research team that you or someone else has been abused, we may have to tell the police about this so you or they can get help. If you say you have abused someone or you are going to hurt yourself or someone else, then we may also have to tell the police to get help and make sure everyone is safe. Also, your personal information will have to be given to the courts if the law requires it. As the focus group is a group discussion is not possible to ensure participants can be anonymous.

DISCRIMINATION POLICY
The objective of the focus groups will be to foster an empowering and safe community. The focus group's intention is to be a safe space to empower faculty members and SWD. There is a zero-tolerance policy for discrimination in the focus groups.

VOLUNTARY PARTICIPATION
It is totally up to you if you want to participate in this research. You don't have to answer any questions you don't want to and can leave the group at any time. But because it is a group discussion, after the focus group is done, we can't take out anything you specifically said**.**

PUBLICATION OF RESULTS
The results of this research may be published in professional journals and presented at conferences. We can also give you a summary of the results of the research if you would like it (Please email Amanda Bailey at ab19aq@brocku.ca). The data may be used by the research team in future projects (within the 7-year period following the completion of the research).

CONTACT INFORMATION AND ETHICS CLEARANCE
If you have any questions about this study, please ask Amanda Bailey at ab19aq@brocku.ca). This study has been reviewed and received ethics clearance through the Research Ethics Board at Brock University [22-153] If you have any comments or concerns about your rights as a research participant, please contact the Research Ethics Office at (905) 688-5550 Ext. 3035, reb@brocku.ca.

QUESTIONS
If you have any questions, please email Amanda Bailey at ab19aq@brocku.ca

FOCUS GROUP CONSENT FORM
- I agree to participate in this focus group
- I know I will be recorded during the discussion
- I have made this decision based on the information I have read or was read to me
- I was able to ask and get answers to all my questions if I had any
- I agree not to share what I hear in the focus group

I agree to participate in this study described above. I have made this decision based on the information I have read in the Information-Consent Letter. I have had the opportunity to receive any additional details I wanted about the study and understand that I may ask questions in the future. I understand that I may withdraw this consent at any time.

Name: _____

Date: _____

Email address: _____

Phone number: _____

Appendix E

Statement of Confidentiality Research Assistants

Title of Study: Perception of Universal Design for Learning in Online Higher Education
Student Principal Investigator (SPI): Amanda Bailey, M.A Student, Department of Applied Disability Studies, Brock University
Supervisor: Dr. Laura Mullins, Assistant Faculty, Department of Applied Disability Studies, Brock University

An important part of conducting research is having respect for privacy and confidentiality. In signing below, you are agreeing to respect the participant's right to privacy and that of the people and organizations that may be included in the information collected. Such information may include interviews, questionnaires, journals, audiotapes, and photographs. You are asked to respect people's right to confidentially by not discussing the information collected in public, with friends or family members. The study and its participants are to be discussed only during research meetings with the Researchers and Advisory Committee.

In signing below, you are indicating that you understand the following:
- I understand the importance of providing confidentiality to research participants.
- I understand that the research information may contain references to individuals or organizations in the community, other than the participant. I understand that this information is to be kept confidential.
- I understand that the information collected is not to be discussed outside of research meetings with the Principal Investigators or others specifically identified by the Investigators.
- When transcribing audio, I will be the only one to hear the tapes and I will store these files and transcripts in a secure location at all times.
- I understand that the data files (electronic and hard copy) are to be secured at all times (e.g., not left unattended) and returned to the Principal Investigator when the transcription process is complete.
- As further evidence of my commitment to respecting the rights of research participants, I have attached a copy of my completion certificate for the TCPS2 CORE tutorial (http://www.pre.ethics.gc.ca/eng/education/tutorial-didacticiel/).

In signing my name below, I agree to the above statements and promise to guarantee the confidentiality of the research participants.

Researcher (or Assistant) Name: _____

Signature: _____ Date: _____

Appendix F

Invitation to Participate in Research for CPI

Brock University invites you to participate in a research project to highlight the challenges faculty members face when using or implementing the Universal Design for Learning (UDL) framework and provide educators with concrete examples of how to apply the UDL principles in an online environment. The purpose of the research project is to identify faculty members of SWD's current experiences with online education and UDL, the challenges faculty members and SWD face using and implementing UDL, and their preferences for specific Guidelines and strategies.

We are looking for faculty members who have taught at least one higher education course online and are passionate about inclusive education in online education. Participation will involve a focus group over Zoom with other faculty members who share a similar interest in UDL and inclusive online higher education. We will have a separate focus group for students with disabilities (SWD). Individual interviews can be arranged if you are uncomfortable with Zoom or need support.

This study has been reviewed and received by Brock University's Research Ethics Board [22-153]
If you have any questions about your rights as a research participant, please contact the Brock University Research Ethics Officer (905 688-5550 ext. 3035, reb@brocku.ca).
If you are interested in participating or have any questions about the research, please follow this link to the consent form LINK HERE. You can also contact me by email at ab19aq@brocku.ca

Please respond by: DATE

Appendix G

Demographic Survey Questions for SWD

1. Name:_____
2. Date:_____
3. Email:_____
4. If you would like a different name to be displayed on your Zoom for the focus group, please add it here:_____
5. If you are comfortable disclosing, what is your disability?
6. Are registered with SAS?
7. What school do you currently attend?
8. What year they are in?
9. What department they are in?
10. Have you ever withdrawn from a higher education course to avoid online learning?
11. How many online course(s) you have taken in higher education?
12. Where did you take the online higher education course(s)?

Demographic Survey Questions for Faculty Members

1. Name:_____
2. Date: _____
3. Email: _____
4. If you would like a different name to be displayed on your Zoom for the focus group, please add it here:_____
5. What academic institution are you currently a part of?
6. What department are you in?
7. How many years have you been teaching in higher education?
8. What academic institution(s) have you taught at in the past?
9. What academic institution(s) did they teach online at?
10. How many courses have you taught in online higher education?