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Online Learning as a Tool for Accessibility for Autistic Higher Education Students

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**ONLINE LEARNING AS A TOOL FOR ACCESSIBILITY FOR AUTISTIC HIGHER
EDUCATION STUDENTS**

by

Keirnan E. Brown

B.A. April 2018, Western Governors University

M.S. November 2018, Western Governors University

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ABSTRACT

ONLINE LEARNING AS A TOOL FOR ACCESSIBILITY FOR AUTISTIC HIGHER EDUCATION STUDENTS

Keirnan E. Brown
Old Dominion University, 2024
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Online learning is becoming more prevalent (Aylmer, 2020) and institutions are seeing an increase in disabled students (HEFCE, 2017; Italian National Agency for the Evaluation of the University System and Research [ANVUR], & National Conference of University Delegates for Disability [CNUDD], 2021; Rao, Edelen-Smith, & Wailehua, 2015). Meanwhile, this group experiences an achievement gap concerning learning and outcomes (ECU, 2017; Eurostat, 2014; Eurostat, 2019; Pearson et al., 2019). Therefore, exploring potential uses of online learning may be beneficial. One related use for online learning is its potential as a tool for accessibility for autistic students. Moreover, a literature gap exists surrounding autistic adult students' perspectives and their experiences in online learning. Thus, a need to explore the intersection of online learning and accessibility within autistic students' experiences becomes apparent.

This phenomenological study aims to explore autistic higher education students' experiences in online learning courses and describe the phenomenon of autistic students' experiences using online learning as a tool for educational accessibility. The following research question and sub-questions guide this study: How do autistic higher education students perceive online learning? (a) How do autistic higher education students perceive the accessibility of online learning? (b) What specific aspects of online learning, if any, do autistic higher education students find beneficial to their learning? (c) What specific aspects of online learning, if any, do autistic higher education students find disadvantageous to their learning?

This study's findings suggest that access to online learning may contribute to an increased perception of educational accessibility for autistic students. Benefits included helpful characteristics like flexibility, different modes of engagement, and ease of issues related to disability (e.g., sensory input). Largely, autistic students preferred online learning over an in-person class setting. However, they encountered some challenges learning online, but these seem small in comparison to the net benefits perceived. For example, students perceived some faculty members to be uncomfortable teaching in an online setting. Accordingly, this study suggests that faculty members participate in relevant training opportunities. Further, the discussion and implications advise (a) Educational Accessibility Offices, (b) higher education instructors and other faculty members, and (c) autistic students.

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NOMENCLATURE

Ableism	Beliefs or practices that discriminate against and devalue disabled people, typically through the belief that disabled people should be “fixed” or otherwise not exist (Smith, 2015).
Accessibility	The practice of creating an environment in which people can enter and move in as well as have complete and equitable usage to all services provided within and by the environment (Davidovitch et al., 2019).
Allistic	Not autistic, though may or may not be otherwise neurodivergent (Cambridge Dictionary, 2020).
Executive Function	Mental processes that contribute to skills like being able to move on to a new task, figuring out how to start or finish a task, or making decisions (Autistic Self Advocacy Network, 2009).
Mask	To “camouflage” or suppress certain autistic behaviors or traits, typically by mimicking allistic behavior or developing complex social scripts, to blend in during social situations (Belcher, 2022).
Neurodivergent	Having a brain that has developed or works differently for some reason such as (but not limited to) being autistic or having ADHD (Cleveland Clinic, 2022).
Neurotypical	Having a brain that has developed or works averagely; not neurodivergent (Cleveland Clinic, 2022).

Online Learning	Courses offered either fully or partially over the internet facilitated through a variety of methods, such as websites, apps, or email, which may be either synchronous or asynchronous (EducationUSA, 2015).
Stim	Repetitive movements or actions that help people, especially autistic people, regulate their senses (Autistic Self Advocacy Network, 2009). Some examples may be rocking back and forth, humming, playing with their hands, or listening to specific music.

Note. Identity-first language (e.g., autistic, disabled) is used in this dissertation as opposed to person-first language (e.g., person with autism, person with a disability) out of respect for the autistic community and their preference, in general, for this style of language (Brown, 2011; Taboas, Doepke, & Zimmerman, 2023).

This dissertation is dedicated to all the disability rights activists and advocates who came before me. Thank you for getting us this far. May we move infinite steps further.

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CHAPTER I

INTRODUCTION

Higher education institutions have a duty to provide accessible education to all students, regardless of background including disability. Nontraditional students are attending higher education institutions more than any time previously and this rate is increasing consistently (HEFCE, 2017; Italian National Agency for the Evaluation of the University System and Research [ANVUR], & National Conference of University Delegates for Disability [CNUDD], 2021; Rao, Edelen-Smith, & Wailehua, 2015). In previous eras of education, adapting learning environments for individual student needs may not have been a consideration for higher education institutions as students who require accommodations may have been disregarded by institutions. Many of these students have non-apparent disabilities, such as autism, or may feel hesitant to disclose a disability to an instructor or school but require alternatives to a more traditional education to be successful (Hernández Encuentra & Barberà Gregori, 2021). Given the increase in disabled students in higher education, the need for this accessibility of learning becomes more apparent.

However, even with increased access points to programs and pushes for more inclusive approaches to higher education, institutions still see a gap in access to learning and opportunities beyond the classroom like employment and higher levels of education between typically-abled and disabled students (ECU, 2017; Eurostat, 2014; Eurostat, 2019; Pearson et al., 2019). Typically-abled students tend to achieve higher levels of education and have more traditionally successful career paths. This attainment gap is indicative of a need for increased accessibility and options for accessibility in higher education for disabled students that would allow for choice and flexibility for students. The attainment gap is also indicative that the standard offerings from

higher education institutions' accessibility programs may not manage some issues within traditional education.

To aid in bridging this gap, online learning has become a popular option for achieving accessibility by higher education students in general (Coleman & Berge, 2018). In this study, accessibility in learning, specifically, is defined as a learning environment that is equitable and provides appropriate access for students (Smarter Balanced Assessment Consortium, 2021) and allows for students to adequately learn in the course (McAlvage & Rice, 2018). Online learning, which may include fully-online distance learning or blended/hybrid learning with time split between an online and in-person environment, has features and aspects to it that lends itself towards positive support of a variety of learners (Kotera et al., 2019; Smith & Basham, 2014). For nontraditional students in general, online learning can provide an opportunity for them to access degree programs and courses that they may not be able to access otherwise (Betts et al., 2013). Many disabled students rely on some level of online education to achieve their academic goals. In addition to this group, availability of online learning courses and programs over previous eras of education makes the need to bridge this gap even greater.

Online learning has the potential to be used to support a variety of learners and their differences. Students who have enrolled in online learning courses tend to appreciate the level of flexibility it offers and the level of control over their education that they receive within it (Adams et al., 2019; Coleman & Berge, 2018; Haas et al., 2022; Kotera et al., 2019). Additionally, disabled students who have enrolled in online learning courses tend to overall feel more comfortable, confident, and able to be more personal regarding their education while within the online environment (Karal, Cebi, & Turgut, 2011; Kotera et al., 2019). From the perspective of higher education institutions, online learning initiatives tend to increase student participation in

courses, more so than any other initiative (Aylmer, 2020). Students also recognize this higher level of participation.

While online learning seems to have a generally positive impact on the learning experiences from the perspective of students, there are specific concerns and gaps in its successes. In particular, for students, high levels of information being presented at once or in a disorganized manner can be a disorienting experience (Habib et al., 2012; Meyers & Bagnall, 2015). Additionally, some students dislike the less-than-personal level of social interaction possible through online learning (Haas et al., 2022). These concerns being acknowledged, institutions still find areas of concern with just creating inclusive educational spaces. From the perspective of faculty members, faculty perceive their ability in terms of knowledge and skill to be lacking when it comes to creating inclusive educational spaces (Davidovitch et al., 2019; Lister et al., 2014; Pearson et al., 2019). Clearly, there is work to be done to create a culture within higher education institutions in which all students feel that they have full access to be successful in their educational goals.

Purpose

For higher education institutions and instructional design, accessibility for all students is important and one area from where this accessibility can be built is from understanding the experiences of groups that may have been disenfranchised historically. The purpose of this qualitative phenomenological study is to explore autistic higher education students' experiences when completing online learning courses. This study also describes the phenomenon of autistic students' experiences of using online learning as a tool for accessibility within their learning. The findings of this study may contribute towards closing the attainment gap and expand the literature through practical insight regarding the experiences of autistic students in online higher

education. It addresses the gap in the literature of educational research, specifically regarding online learning from the perspective of autistic students by centering this group in the research design. Given that autistic students are a marginalized group due to the group's disability status, providing opportunities for their voices to be heard directly within research regarding them is important.

Research Questions

This study aims to answer the following research question and sub-questions:

How do autistic higher education students perceive online learning?

- a. How do autistic higher education students perceive the accessibility of online learning?
- b. What specific aspects of online learning, if any, do autistic higher education students find beneficial to their learning?
- c. What specific aspects of online learning, if any, do autistic higher education students find disadvantageous to their learning?

Method Summary

This study analyzed and highlighted the experiences and perspectives of one specific group of non-traditional students: autistic students. It focused on their experiences and perspectives around online learning, accessibility, and how those two topics intersect, through a phenomenology lens. It provided key insight into student support and facilitating academic success for this group of students through a thematic analysis of the data collected.

Significance of the Study

This study contributes to an increase in the knowledge regarding student perceptions of online learning and how it is used by higher education institutions, including specific aspects of

the current use of online learning that either help or hinder learning within an online learning course. The findings contribute to the research base around adult autistic students, online learning, and increasing the accessibility of learning.

Regardless of the participants' responses, the data collected by this study provide information necessary for higher education institutions to make informed decisions for both in-person and online learning. The primary audience for this study is higher education institutions' educational accessibility offices. These offices are the main departments that make accessibility recommendations for both the university and students who would qualify as well as policy decisions. The results of this study should influence decisions and recommendations institutions make for students with the goal of increasing their levels of academic success. Secondary audiences include faculty members in higher education and autistic higher education students. Faculty members have the opportunity to understand directly from this group exactly what measures they are taking within courses that are positively or negatively impacting the learning success for the students. Autistic students have the opportunity to resonate with and relate to the experiences of the group of participants and use the results as a tool to help them make more informed decisions regarding their education.

Centering autistic students in decisions around them leads to better results (Sarrett, 2018). That idea was used as a mindset and foundation when interpreting results. Keeping that in mind, any and all of the results of this study have the potential to lead to better outcomes for institutions and their students simply for being from a methodology in which autistic students and their experiences have been the primary focus.

The information provided through interviews with the participants provided insight around what is a positive contributing factor and what is a negative contributing factor broadly

for different groups within the autistic population in online learning. For example, when participants tend to find benefit in the accessibility efforts within online learning made by their institutions, this reflects positively on efforts made by institutions. This is a sign to other institutions that they may find it beneficial to their student body to mimic those efforts. However, when participants tend to perceive the accessibility of online learning in a negative light, it may influence institutions to make other efforts to better suit their student body.

Experiences of online learning are nuanced. Even something that receives overwhelmingly negative reviews may still have certain positive aspects and vice-versa. In uncovering the nuance participants experience in their online learning experiences, higher education institutions can know what specific aspects of online learning to promote to faculty. The information gathered concerning the main research question and sub-questions lead to further research and specific professional development opportunities to better online learning across higher education.

CHAPTER II

LITERATURE REVIEW

Understanding the literature surrounding disability, online learning, and accessibility of learning as well as theoretical frameworks is an important action to take in understanding autistic higher education students' experiences within online learning. The theoretical frameworks of Universal Design for Learning (UDL) and Inclusive Pedagogy served as a foundation for the exploration of such experiences and understanding the perceived accessibility of learning within them. Autistic students have unique experiences within the realm of higher education and, generally, nontraditional students are entering higher education at higher rates than previously (Betts et al., 2013). Additionally, online learning is used as a tool to achieve educational goals by nontraditional students as well as to increase student participation by universities (Aylmer, 2020). A full understanding of the relevant literature and theories is a necessary aspect of understanding these students' experiences along with this study. This literature review section introduces the theoretical framework for this study and relevant literature surrounding accessibility through online learning. The theories of Universal Design for Learning and Inclusive Pedagogy provides the foundation for this study.

Theoretical Framework

Autistic students can struggle in traditional, in-person learning in the aspects of executive functioning and social interaction (Ward & Webster, 2018). Additionally, autistic students may also learn best differently in comparison to neurotypical students, particularly regarding sensory input (Ward & Webster, 2018). Given that disabled students in general, including autistic and otherwise neurodivergent students, are enrolling in higher education at increasing yearly rates (HEFCE, 2017; Rao et al., 2015), addressing the struggles of these students and taking steps to

understand them and providing changes to courses to accommodate learning needs, becomes apparent. Faculty members desire this ability and want to make their courses more accessible but feel that they struggle with having the integral skills and knowledge to be able to successfully do so (Davidovitch et al., 2019; Lister et al., 2014). Utilizing the perspectives of autistic students to provide information for higher education institutions and their faculty to bridge the attainment and accessibility gap is a key goal of this study. By providing this information, further studies regarding accessibility and online learning may be informed. Higher education institutions may also look to the participants' perspectives and themes provided by this study to consider new accessibility initiatives. To accomplish this, the frameworks of Universal Design for Learning and Inclusive Pedagogy were utilized.

Universal Design for Learning

Universal Design for Learning conceptualizes the goal of reducing the need for additional accommodations for disabled students in general, including autistic students, by considering what all students will need to successfully learn from the initial point in which designers or educators begin course planning (Rao & Tanners, 2011). Theoretically, if applied correctly, Universal Design for Learning would eliminate or heavily reduce the need for accommodations by providing enough access points, different means for engaging with learning, and a variety of methods for demonstrating learning for all students to approach the course and have an equal opportunity for success regardless of their background. Universal Design for Learning serves as an appropriate framework to enhance perceptions of accessibility in learning for all students and approach this study.

Utilizing technology as a means to provide accessibility for students can be a way to address learning needs proactively (Myers, 2009). Increasing accessibility can benefit all

students in a course, not just those who may have documentation regarding accommodations (Dell, Dell, Blackwell, 2015). Despite being beneficial to disabled students who would receive accommodations outside of Universal Design for Learning regardless, it can be beneficial to all students in a course. The designer should consider whether the learning environment is prepared in a manner to be accessible to the most amount of people possible.

Universal Design for Learning is an appropriate framework to address the idea of accessibility through online learning as the concept of variations between learners is considered (Smith & Basham, 2014). When approaching an online course with the foundations of UDL in mind, an instructor must consider how they will address the potential for variability within their learners in the course. The level of accessibility of the course is dependent on this consideration and determination of how to move forward with presenting and assessing the content. Keeping this foundation in mind when moving forward with the literature review and the study supports the uncovering of participant experiences with accessibility through online learning.

Addressing the accessibility of the learning environment upfront is extremely beneficial. This study observes and analyzes online learning and its usage as a tool for accessibility using the framework of Universal Design for Learning as a lens.

Inclusive Pedagogy

Inclusive Pedagogy is a framework that challenges the concept of “normal” students (Grier-Reed & Williams-Wengerd, 2018). No student can be considered “typical” because all students, regardless of their background, have key differences that must be considered to successfully teach them.

Under Inclusive Pedagogy, the learning environment must be accommodated to address the needs of the student rather than attempting to force a student to fit within the preexisting

learning environment. Traditionally, autistic students have been made to attempt to assimilate into the existing learning environment. This may be overwhelming and detrimental to the level of accessibility of learning for autistic students (Ward & Webster, 2018). Many autistic students do not automatically assimilate to the traditional, in-person learning, online learning may provide the accommodated learning environment for some. Regardless, inclusive Pedagogy encourages educators to establish an environment with the right atmosphere for the students in the course (Grier-Reed & Williams-Wengerd, 2018).

Autistic students can experience some things in different ways to neurotypical students, including the learning process and scenarios around learning such as social situations. Addressing the whole student in planning the learning environment, including the delivery method of learning (in-person, online, or blended), assists in managing the accessibility for not only this group of students but all students (Grier-Reed & Williams-Wengerd, 2018).

Inclusive Pedagogy places significant importance on the “feel” of the learning environment, making it vital to understanding the experiences and perspectives of this group. Utilizing Inclusive Pedagogy as a framework for this study encourages an outlook of understanding the entire participant and how they fit in with their experiences, the online learning environment, and their learning in general.

Literature Review

Following a review of the theoretical frameworks applicable for the context of this study, reviewing literature that provides the additional context of the situations surrounding both accessibility in online learning and the background of autistic higher education students becomes important. This contributes to a better understanding of circumstances contributing to an attainment gap as it relates to learning and success outside of the classroom and potential ways

forward through utilizing online learning. The following sections address the literature around autistic students and higher education, online learning, and accessibility within education.

Autistic Students and Higher Education

This section focuses on an overview of autistic students' experiences in higher education in general including the positive aspects of their experiences as well as the negative aspects or challenges they tend to face, particularly as it relates to in-person learning. This is crucial in realizing the purpose of this study in understanding that, for some students, the in-person learning environment may not be a generally accessible environment. Importantly, this section also includes an acknowledgement of a gap in the literature, of which this study begins to fill a void.

Areas of General Adequate Support

In higher education, autistic students tend to feel supported and confident when it comes to the academic side of their experiences (Cai & Richdale, 2016; Gurbuz, Hanley, & Riby, 2019). Autistic students tend to report specific strengths in the academic areas of research skills, understanding complex ideas, writing, and analytical skills as well as a strong drive to learn subjects of interest (Ward & Webster, 2018). These academic strengths are highly recognized by students and do not tend to be of concern to them. It seems that the portions of courses in which students are working individually or can otherwise rely on themselves to be successful are the areas in which students report the most success. In and of itself, learning is not a trending area of concern, but autistic students may need support in planning and organization skills as well as managing co-occurring disabilities if applicable (Gurbuz et al., 2019). Providing support in those specific areas would be beneficial for some students although, while recognizing these areas of need, academic experiences are positively viewed by autistic students.

Areas of General Inadequate Support

The support and confidence previously mentioned is not evident to autistic students in the social aspects of higher education (Cai & Richdale, 2016; Gurbuz et al., 2019). Certain aspects of traditional courses tend to bring difficulties for autistic students. In parts of a course that require higher levels of social interaction can be more difficult for autistic students. Certain social interactions, such as class discussions or group projects, are a customary part of most traditional classes. In these situations, autistic students may need some additional social support due to the expectation of neurotypical-style communication standards since this support is not currently felt (Cai & Richdale, 2016; Sarrett, 2018). Communication style differences between autistic and neurotypical people and a lack of understanding from neurotypical people contributes to this perception of a lack of social support (Cai & Richdale, 2016; Gurbuz et al., 2019).

Stemming off from communication as a broad issue, social interactions in autistic students' higher education experience tend to cause the students to feel overwhelmed, they tend to feel that the interactions are unpredictable and superficial (Gurbuz et al., 2019). Additionally, autistic students tend to perceive more stress from a social pressure task than typically-abled students (Bishop-Fitzpatrick, 2017). In understanding that these neurotypical-style social situations are not just difficult but highly stressful, providing some level of accommodations or alternative methods to interact may become apparent for some students.

Another area of concern is that of mental health. Autistic students can experience barriers to success such as isolation, depression, and anxiety coinciding with a lack of social support (Ward & Webster, 2018). A learning environment that is designed while keeping the needs of a

variety of learners, including autistic students, in mind may be beneficial in reducing the concern of poor mental health (Sarrett, 2018).

Higher education institutions tend to provide a mixed experience for autistic students. While some aspects of it can be very positive, such as the ability to focus on preferred topics, other aspects, such as communication style differences, can be more negative. Each student is different, they may perceive various aspects in different ways and to different levels of being positive, negative, or neutral. Since some students may experience the negatives of traditional higher education more strongly, investigating other manners of delivering quality education is fundamental to facilitating academic success.

Literature Gap

A gap in the literature exists in autistic student experiences in online learning, particularly at the higher education level. For this reason, this literature review references literature pertaining to disability students in general, while focusing on literature regarding generally neurodivergent students, when possible, to provide some context of the experiences of students who are nontraditional students in similar, though different, ways.

Online Learning

This section addresses the experiences of disabled students within online learning courses. It includes positive aspects within this group of students' experiences as well as areas of concern, or barriers within online learning, in which students tend to not find as much success. To gain a fuller view of the potential impact of online learning on the perceived accessibility of learning for autistic students, the experiences of students with any disability is considered. This broad perspective of experiences is also considered due to the lack of literature regarding online learning and autistic students.

Benefits of Online Learning

Some disabled students experience greater perceptions of accessibility in online learning in comparison to an in-person course (Karal, Cebi, & Turgut, 2011). In particular, they perceive less instances of ableism due to the constructs of online learning and, therefore, can experience greater social interaction and a more comfortable atmosphere. Students state that online learning provides them with a chance to “prove” themselves, without the barriers that would come with in-person learning (Karal et al., 2011). Online learning, synchronous or asynchronous, can provide disabled students with a more comfortable learning environment in which they can participate in class with a lesser fear of ableism or insecurities.

The ability to feel a sense of control over their learning and the learning environment itself is favorable (Kotera et al., 2019). For neurodivergent students, the tendencies of online learning to provide an elevated level of flexibility and a shift towards higher accessibility of a course’s information are a major contributing factor for academic and social success (Adams et al., 2019; Coleman & Berge, 2018; Haas et al., 2022; Kotera et al., 2019).

Physical barriers become severely minimized within online learning, not only in the way of physical obstacles in a classroom or building but also other obstacles to students attending in person classes such as noise, overwhelming crowds, or other negative social or sensory experiences (Karal et al., 2011). For example, a hypothetical student who may otherwise avoid courses due to struggles with a lecture hall-style learning environment could potentially find success in an online course, even if it contains the same large number of students, due to the more control around social interactions and decrease in quantity of social interactions.

When compared to the general population of a university, autistic students are equally as likely to complete, pass, and obtain satisfactory grades in courses presented through online

learning (Richardson, 2017). Autistic students tend to perform on an equal level with typical peers, suggesting that online learning may not present obvious major barriers to learning at the level of the entire population. While not autistic adult students, autistic K-12 students who have not found success in traditional, in-person learning can find online learning to be a positive learning experience (Haas et al., 2022). Students tend to be more engaged, perceive higher levels of learning, and general improvements in various aspects of their life such as mental health. Younger students can experience a positive level of success within this environment, especially an improvement in their academic success. It would be relevant to explore is whether older adult students might experience similar success.

Barriers of Online Learning

Some neurodivergent students find specific disadvantages to online learning. Some feel overwhelmed by the amount of media and information presented on a given screen (Meyers & Bagnall, 2015). Too much irrelevant information, disorganization of learning materials, and differences between learning management systems can also lead to challenges in online learning for some students (Habib et al., 2012). Hypermedia can be a specific point of concern for some neurodivergent students (Meyers & Bagnall, 2015). Students may feel a sensation of tunnel vision and not know where to go to properly access the course information.

For autistic K-12 students, specific concerns in the areas of a lack of social interactions and assistance with general organization are apparent (Haas et al., 2022). However, given that in-person students struggle with organization as well Gurbuz et al. (2019), this may be an experience not necessarily due to the course being administered online. While children or teens and adults present differently in terms of learner characteristics and behaviors, understanding these specific concerns may be beneficial to determining any concerns apparent in adult students.

Accessibility Within Education

This section addresses accessibility within higher education institutions as well as online learning or using technology in different forms. It discusses the attainment gap between disabled and typically-abled students and a lack of knowledge and skill on the part of educators. It also includes issues and barriers related to accessibility and positive initiatives taken by higher education institutions that have resulted in increased student participation, the impact of other forms of technology on accessibility to learning, and how students tend to perceive online learning. In addition, this section also addresses the utilization of UDL when designing and facilitating online learning to increase accessibility of learning.

Attainment Gap

There is an attainment gap in higher education (ECU, 2017; Eurostat, 2014; Eurostat, 2019; Pearson et al., 2019). This attainment gap describes a gap in current learning and future outcomes, including career success and success in further education, between disabled and typically-abled students. In a course, typically-abled students in general have a better potential for more positive success outcomes than a disabled student in general. Following the course or the degree program, the typically-abled students still have a better potential for more positive success outcomes. The typically-abled students are more likely to return to school to pursue further courses and higher levels of education. They are also more likely to work in higher paying jobs and jobs more closely related to their field of study. This is despite initiatives towards more accessible and more inclusive education. Clearly, if the gap still exists, barriers to learning and a lack of an adequate support structure must exist in a high enough capacity to be affecting learners on a broad scale. These barriers should be addressed, and online learning may be one potential method of addressing them (Coleman & Berge, 2018).

Knowledge and Skills

Any learning environment should lend itself to being an empowering, flexible, and comfortable environment to support students in their learning. However, despite interest and commitment, educators may not have the key background knowledge or skills to make this a reality (Davidovitch et al., 2019; Lister et al., 2014; Pearson et al., 2019). The gap between skills and practice results in a gap in the accessibility and inclusivity of the learning environment the educators are able to create.

While faculty members have a lack of knowledge in steps needed to create this environment, some faculty also experience a lack of knowledge in the realities of their classroom and courses regarding disability through not being able to recognize that they serve or have served disabled students (Lister et al., 2014). To be able to provide an adequate learning environment for students, faculty members must have an understanding of their needs. This lack of awareness is detrimental to progress towards accessibility in higher education courses. Understanding that some disabilities can be non-apparent to others but still very real is an important consideration to ensure full inclusion of and accessibility to all students (Hernández Encuentra & Barberà Gregori, 2021). Regardless of disclosure, or even awareness on the part of students, faculty members should be aware of the potential for disability or learning differences within their courses and access professional development to become trained and skilled in successfully teaching students from many different backgrounds.

An Online Campus

Establishing an online learning campus, an institutional system consisting of a learning management system and asynchronous, synchronous, or blended online learning courses, contributes to an increase in inclusivity, accessibility, and equity in higher education (Aylmer,

2020). Even if an institution has taken other measures towards increasing these aspects, creating an online learning environment is the most impactful as measured through student participation levels. This is true of both disabled and typically-abled students. In other contexts, online learning has been used as a tool to increase accessibility and outreach of academic learning (Gupta & Sengupta, 2021). Students, generally, are interested in attending some number of online classes, especially in higher level education.

Students perceive online learning's flexibility positively and to be beneficial (Aylmer, 2020; Adams et al., 2019; Coleman & Berge, 2018; Haas et al., 2022; Kotera et al., 2019). They perceive their levels of participation to be higher than in-person learning when they are in either a fully online course or a blended course (Aylmer, 2020). Additionally, students perceive in-person learning to be more taxing on them than online learning. Online courses remove many physical and emotional barriers students may have if they were attending in-person courses (Coleman & Berge, 2018). Online learning has features that can lend itself to being appropriate for addressing variability in learners and emerging educational needs (Smith & Basham, 2014). This is particularly true due to the internet's role in twenty-first century technology skill expectations and day-to-day life for many higher education students (Kotera et al., 2019).

While online learning appears to be positive and beneficial to many students, institutions should ensure that accessibility within online learning is highlighted as a focus (Sarrett, 2018). A focus within the lens of accessibility should be communication, both from faculty members to students but also between classmates (Coleman & Berge, 2018). When universities prepare their online learning environments with the knowledge of potential use by disabled students, students experience a positive outcome and have a lower need for additional accommodations to support their learning (Hernández Encuentra & Barberà Gregori, 2021).

Technology and Universal Design for Learning

Universal Design for Learning as a practice can be and should be applied for all students in any learning environment (Rao & Tanners, 2011; Smith & Basham, 2014). Many online tools that support UDL practices have become more commonly available, resulting in positive change for educators who wish to attempt to increase accessibility within their courses. This accessibility to educators of these online learning tools should translate into increased accessibility to the tools for students. Broadly, students entering higher education tend to be more familiar with technology than prior generations of students (Rao & Tanners, 2011). Utilizing this technology is positively received by students.

Institutions must take into consideration the assistive technology necessary for students and its compatibility with the learning environment (Coleman & Berge, 2018). For any learning environment, but especially in online learning, it is important to take this into consideration prior to the full development of the course to avoid necessary redesign and to avoid students not having access to important resources. Even outside of instruction, accessibility must be considered (Pearson et al., 2019). The learning environment itself must be comfortable and empowering for all students. By being proactive in designing online learning environments, designers can prevent unintentionally creating barriers to learning (Adams et al., 2019). Online learning and Universal Design for Learning can go hand in hand (Rao et al., 2015). In particular, the flexibility around interactions, not only between peers but also with faculty members, is favored by students. Additionally, students favored the variety of course materials that can be available in online learning, especially in non-traditional methods such as technology-based instructional materials.

In online courses, certain aspects of courses or the course design process have been found particularly beneficial to increase potential for success for disabled students (Betts et al., 2013). Providing various methods of delivery for course information as well as alternative methods of response for all students is preferable. Additionally, providing access to programs that allow for or support voice recognition assists students in completing assignments. Education for both faculty members and students on those programs and other forms of assistive technology will aid in bridging the gap in learning accessibility.

Technology in an Educational Context for Accessibility

Other forms of technology have been used in educational contexts and have shown a level of contribution towards increased student achievement for disabled students as well as the general population of students. An increase in academic achievement and achievement beyond the classroom suggests that these technological interventions may be contributing to higher levels of accessibility of learning. Several studies review the potential for other technologies outside of online learning to be used for increasing accessibility of learning. Tablets have a high potential for success in being used as a learning support to increase accessibility and student learning (Henderson, Gibson, & Gibb, 2013; Watts, Brennan, & Phelps, 2012). Tablets are found engaging and useful by students as well as accessible and convenient. They hold a significant amount of potential for use as an accessibility tool for learning. Computer-based programs, particularly interactive programs, are useful in closing achievement gaps experienced by at-risk student populations in general as well as increasing motivation towards learning when used as a tool within an educational setting (Nsabayezu et al., 2022; Zheng et al., 2014). Additionally, using the computer can support students in the classroom by providing them with instant access to other virtual accessibility tools (Nsabayezu et al., 2022). When these different technologies are

incorporated into the learning environment using UDL as a guide in the implementation, disabled students can engage in the content in a more accessible and flexible way (Firestone & McMahon, 2022).

University Initiatives

To increase accessibility, not only in online learning but also in in-person learning, disabled students should be centered in initiatives with the intended purpose of increasing accessibility (Sarrett, 2018). Disabled students can be set up for success in online learning when it is designed with accessibility in mind (Hashey & Stahl, 2014). Initiatives towards professional development and reflective teaching practices contribute to accessibility-minded design. Higher education institutions should consider communication between students and faculty members as well as between students through the lens of accessibility. When this is done, students are more likely to complete their course and have higher academic confidence (Karal et al., 2011).

To be successful as an institution in accessible online learning, a cultural shift must happen amongst the faculty (Cooper, 2006). Faculty must approach their practice from the perspective of modernity. While training for a more accessible learning environment is recommended, more specifically, disability focused faculty training created with feedback from disabled students is recommended to create a more inclusive institution (Sarrett, 2018). To create a successful online learning environment, faculty members and designers must ensure that they have the knowledge to implement it as well as take careful time and effort (Cooper, 2006; Pearson et al., 2019). The courses must be created with intention towards producing the highest levels of accessibility possible for all students.

Summary

The theories addressed in this literature review act as the theoretical framework for addressing the potential for accessibility through online learning for autistic higher education students. UDL provides one portion of the framework in addressing the importance of designing for all students and recommending that an instructor keep in mind how they will address the potential for differences within their learners, knowing that how content is presented and assessed determines the accessibility of it (Rao & Tanners, 2011; Smith & Basham, 2014). Further, inclusive pedagogy addresses the idea that educators cannot view any one student as being a “typical learner” since all students are unique and present with different strengths and challenges (Grier-Reed & Williams-Wengerd, 2018). Considering both of these frameworks together forces the idea of online learning having the potential to serve as an alternative to in-person learning for some as an option of accessibility.

Higher education institutions are experiencing a time of change in the general make-up of their student population with increases in nontraditional students in general, in particular: disabled students (Betts et al., 2013). For this reason, it is vital that they stay up to date with any trends in accessible education and best practices surrounding this topic. Additionally, they must be aware of the different options available that may be of particular benefit to any specific student group. With higher rates of disabled students enrolling in higher education, institutions must be able to present the student population with their options for attending courses, whether it includes fully in-person, fully online, or blended/hybrid courses, with an accurate and comprehensive overview of any pros and cons that students may experience in any different offering of a course. In-person learning may still continue to be the norm within most higher education institutions but online learning serves to work towards closing the attainment gap

between disabled and typically-abled students and offers students with an alternative means of achieving their educational goals for a number of reasons, in particular due to the high levels of flexibility provided within online learning (Adams et al., 2019; Coleman & Berge, 2018; Haas et al., 2022; Kotera et al., 2019). The ability of online learning to provide this flexible environment that reduces the impact of different barriers within learning lends credence to it being used as a tool for learning accessibility. However, a lack of organizational skill and high levels of information all at once may be a barrier in online learning continuing to work towards fully proving itself as the future of accessibility (Gurbuz et al., 2019; Karal et al., 2011).

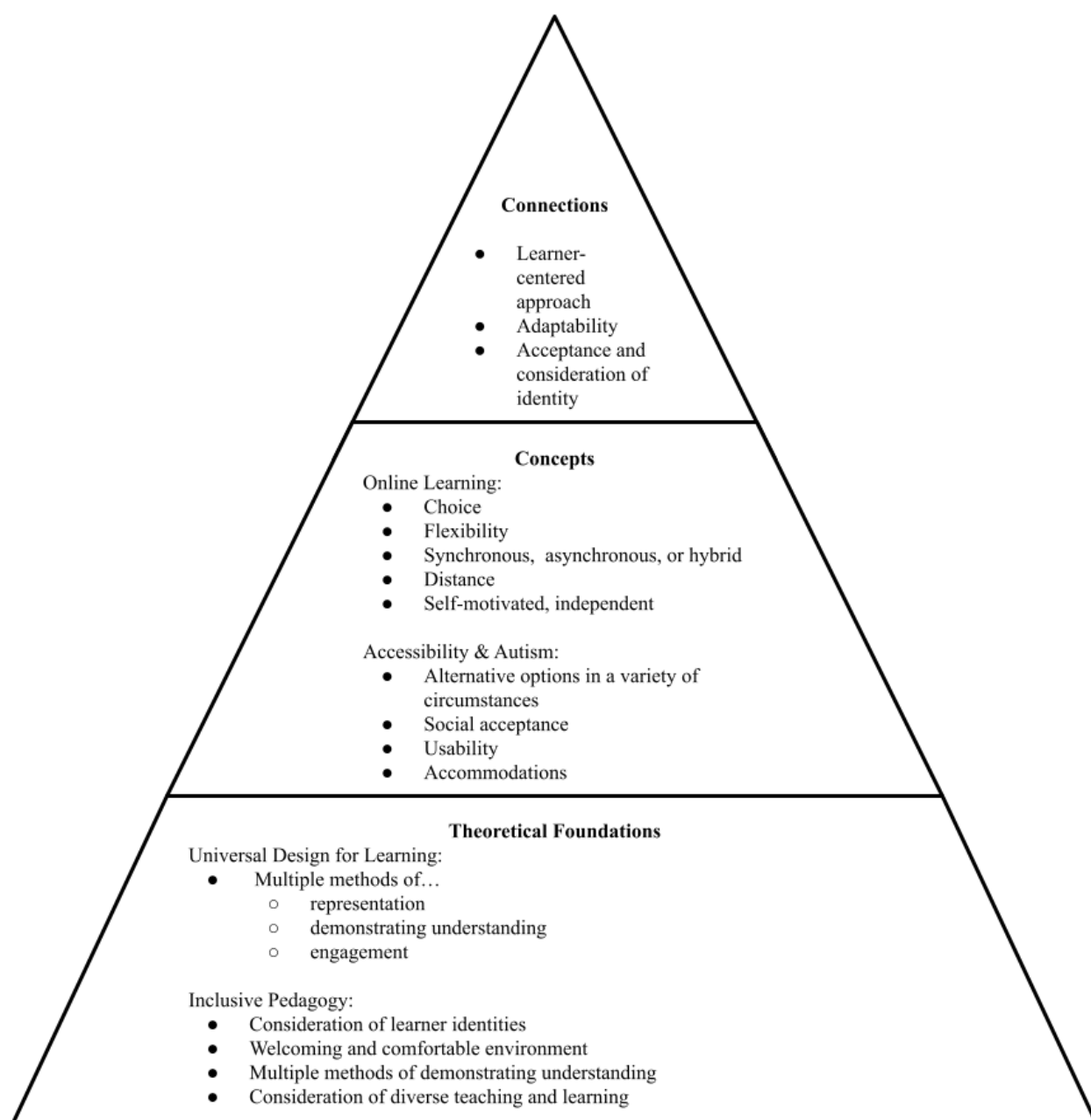
As the need for more inclusive learning environments becomes more apparent and accepted within the higher education community, along with a recognition of a lack of training on how to make this topic a reality, the challenge of providing for specific ways the learning needs of marginalized communities manifest when this has not been a historical consideration exists (Davidovitch et al., 2019; Lister et al., 2014; Pearson et al., 2019). Meeting academic needs of autistic students, just as with many groups of students, goes beyond simply relaying information. It also includes meeting sensory needs, social needs, and more. Figure 1 provides a visual representation of key points from the theoretical foundations and other key points or concepts from the literature review as well as connections made between the points.

These concerns presented suggest a need for a study that explores the experiences of higher education students from marginalized communities in using online learning. For the context of this study, autistic students' experiences were addressed through the lens of accessibility within their learning. Since receiving higher education is an important aspect of many peoples' life goals, this study introduces the potential for online learning to be used as a tool for improving accessibility within education, or as an accessibility tool. The information

provided by this study may be used practically in the context of a college or university setting for the benefit of their students when considering new accessibility initiatives. Additionally, this study also recommends and informs further research into online learning and accessibility. This study focuses specifically on the context of accessibility through online learning for autistic higher education students.

Figure 1

The Key Points of and Connections Between the Theoretical Foundations and Literature Review



Note. The theoretical foundations presented are Universal Design for Learning (including the three principles: multiple methods of representation, demonstrating understanding, and engagement) and Include Pedagogy (including considerations of learner identities, welcoming

and comfortable environment, multiple methods of demonstrating understanding, and consideration of diverse teaching and learning). The main concepts presented are online learning (including characteristics of online learning: choice, flexibility, synchronous/asynchronous/hybrid, distance, and self-motivated/independent) and accessibility and autism (including alternative options in a variety of circumstances, social acceptance, usability, and accommodations). Together, these theoretical frameworks and concepts are connected in the topics of a learner-centered approach, adaptability, and acceptance/consideration of identity.

CHAPTER III

METHODOLOGY

The purpose of this study was to discover how online learning contributes to the perceptions of accessibility of learning within the experiences of autistic higher education students and explore their experiences using accessibility as a frame of reference, within the context of an online learning environment. The findings of this study contribute to the body of literature surrounding autistic education, online learning, and accessibility within education.

This chapter provides a description of the research design, details regarding the participants and the criteria for which they were included, and procedures taken through the course of the study.

Research Design

This study was guided by the following research question and sub-questions:

How do autistic higher education students perceive online learning?

- a. How do autistic higher education students perceive the accessibility of online learning?
- b. What specific aspects of online learning, if any, do autistic higher education students find beneficial to their learning?
- c. What specific aspects of online learning, if any, do autistic higher education students find disadvantageous to their learning?

The research questions focus on exploring autistic higher education students' experiences within online learning and the accessibility of their learning as well as describing the phenomenon related to that topic. This study also describes the phenomenon of the autistic students' experiences of choosing to take courses online as a means, or tool, for accessibility within their learning.

A phenomenological approach was selected for this study based on the purpose of the study. In particular, a phenomenological approach was chosen to gain insight into the experiences of the participants (Goulding, 2005), specifically those formed through participating in online learning courses in higher education. Online learning has become a more prevalent option for students in general, but, commonly, for non-traditional students such as the participants (Betts et al., 2013; Coleman & Berge, 2018; Rao, Edelen-Smith, & Wailehua, 2015). Additionally, autistic higher education students tend to have experiences outside of the neurotypical expectations in higher education settings, leading them to potentially require specific accessibility supports, particularly in situations surrounding social interactions with neurotypical students (Sarrett, 2018). In utilizing phenomenology, I aimed to understand the phenomenon of accessibility within the tool of online learning directly from the perspective of the group being studied.

Participants

Prospective participants were recruited from social media platforms by broadly posting a virtual flier to the social media websites LinkedIn, Facebook, and Twitter as well as to the following Facebook groups: Neurodivergent Graduate Students, Autistic Allies in Education, and Autistic Researchers Researching Autism (ARRA). Together, these Facebook groups have over 10,000 members. Through posting broadly and specifically to these groups, gathering a sufficient number of participants was ensured. The social media post advertising research participation (see Appendix A) included a description of the study, contact information, information about the protection of human subjects, information regarding a \$10 incentive gift card, and a link to a consent form and an eligibility questionnaire should the reader choose to participate. Following completion of the questionnaire and consent form, I reached out to participants to schedule an

interview appointment if they were eligible. To be eligible for this study, prospective participants must have been between the ages of 18 to 35 years old, identify themselves as autistic, and have completed at least one online learning course at the higher education level through a university in the United States as well as some in-person learning at any level. People who expressed interest but did not identify as autistic, were outside of the specified age range, and/or did not meet the education experience requirements for online and in-person learning were not contacted or included in the study. Participants for this study were selected based on their possession of relevant experience and neurotype background.

This study gathered 12 participants with attainment of data saturation as a goal (Guest, Bunce, & Johnson, 2006). Guest et al. (2006) found that data saturation tended to occur with 12 interview participants, with between 88% to 92% of total codes developing by that point, new codes tending to be variations on existing themes, and new themes emerging infrequently. Participants from varying contexts were recruited to ensure a variety of perspectives are represented in this study. Participants from diverse contexts can provide well-rounded insight into the phenomenon being addressed in this study (Arksey & Knight, 1999). The participants had various fields of study (e.g., biology and exercise science, clinical mental health counseling, urban planning, and mechanical engineering). All the participants, except three of them, have completed both synchronous and asynchronous courses. For the remaining participants, one had only completed asynchronous courses while the other two had only completed synchronous courses. The number of online learning courses completed by participants varied, with some completing only two to five and many completing ten or more. Also, many, but not all, of the participants have completed their most recent online course at the graduate level. Table 1

provides the participants' information to include their pseudonym, age, how many courses completed and at what level, their field of study, and course delivery method.

Table 1*The Participants' Demographic Information*

Pseudonym	Age	Number of Online Courses Completed	Level of Most Recent Course Completed	Field of Study	Course Delivery Method	
					Synchronous	Asynchronous
Hayley	27	10+	Undergraduate	Interdisciplinary Studies		●
Pete	34	6 to 9	Graduate	Biology and Exercise Science	●	●
Ray	32	10+	Graduate	Clinical Mental Health Counseling	●	●
Pat	31	6 to 9	Graduate	Special Education	●	
Joe	23	2 to 5	Graduate	Social Work	●	
Andy	29	2 to 5	Graduate	Urban Planning	●	●
Frank	23	10+	Certificate/Professional	Computer Science	●	●
Gerard	27	10+	Graduate	Clinical Mental Health Counseling	●	●
Mikey	23	10+	Graduate	Library Science	●	●
Helena	27	10+	Graduate	Education	●	●
Emily	25	10+	Certificate/Professional	Information Science, Systems, and Technology	●	●
Maya	23	10+	Graduate	Mechanical Engineering	●	●

Instruments

Two instruments were used when conducting this study: an eligibility questionnaire and an initial structure for a semi-structured interview. The first instrument used was an eligibility questionnaire (see Appendix B). In addition to establishing eligibility, the eligibility questionnaire gathered participants' demographic information including information surrounding the context of their participation in an online course such as the level the courses were offered, how many courses they have participated in, and what field of study their courses were in. Participants from a variety of backgrounds who can offer different frames of reference were recruited to ensure a variety of perspectives are represented in this study. It was preferred to include participants who can provide a balanced understanding of the phenomenon being addressed in this study through having different contexts behind their perspectives (Arksey & Knight, 1999).

The second instrument used was an initial structure for a semi-structured interview (see Appendix C). To align with the methodology of a phenomenological research approach, one-on-one conversational interviews were conducted between the participants and myself. The initial structure provided a framework of questions that were asked of participants and the characteristics of a semi-structured interview allowed me to uncover deeper awareness of participant experiences through follow-up questions and general conversation. These initial questions were developed with the research questions and frameworks in mind.

Data Collection Procedures

Data collection outside of the eligibility questionnaire were conducted through semi-structured interviews that take place via a web-conferencing platform. The duration of the interviews was between about 9 to 46 minutes in length with an average time of about 24

minutes in length. Due to accessibility needs, two participants (Helena and Emily) took part in a text-based interview via email. Conducting a text-based interview for these two participants was an important measure for including perspectives from different frames of reference by clearly including participants with different accessibility or support backgrounds. For these two participants, I emailed them the questions provided on the Interview Guide, received answers back from them via email, and followed up to ensure I understood their points and perspectives.

During the interviews, I took notes in an effort to summarize any key points in real time which I typed following the interview. These interviews were audio recorded. Additionally, an auto-transcription tool was used to gain an initial transcription of the interviews. Following the interviews, I reviewed the audio recordings and auto-transcriptions together and corrected any errors in the transcripts. Finally, I sent an email to the participants to thank them for their participation in the study and include the transcript and my key point notes to allow them to add any missing insights or clarifications they deem necessary before moving forward with data analysis.

Data Analysis

This study utilized Braun and Clarke's (2006) thematic analysis technique. This technique was utilized to uncover important and emerging themes from the lived experiences of the participants through finding meaning and important patterns in the data (Braun & Clarke, 2006). For research questions addressing people's lived experiences and perspectives, thematic analysis is appropriate (Clarke, Braun, & Hayfield, 2015). Six phases of thematic analysis are suggested by Braun and Clarke (2006): familiarizing oneself with the data, generating codes, constructing themes, reviewing potential themes, defining and naming themes, and producing the report.

Familiarizing Oneself with the Data (Phase 1)

After completing and transcribing interviews, I spent a significant amount of time familiarizing myself with the data. To do this, I read and reread the transcripts repeatedly while taking notes and summarizing any key points that become apparent. Hycner (1999) describes this process of summarizing and taking notes as particularly important to ensure accuracy of the data analysis and overall study. Following these steps, I saved PDF documents with my notes and summary for each participant. The participants were then able to review these documents along with the transcript of their interview as a method of member-checking to ensure validation of these two documents per participant (See Appendix D for the instructions given to participants to direct them to member-check).

Generating Codes (Phase 2)

Codes were generated from the transcripts of the interviews conducted with the participants. The first cycle of coding was conducted utilizing in vivo coding, an appropriate coding method for a phenomenological study (Saldaña, 2021). In this process, words and short phrases were identified as codes to convey important and critical points. This coding technique was used to influence more a more powerful narrative and description of the phenomenon with a focus on the participants' own voices (Saldaña, 2021). Performing in vivo coding allowed me to place priority on the participants' own words and ensure that the data being presented is grounded accurately in the perspectives of the participants. The second cycle of coding was conducted utilizing focused coding. This allowed me to begin to identify recurrent patterns and find connections through making sense of shared similarities to group initial codes together (Saldaña, 2021). In this process I began to focus these codes on accordance with the research

questions and sub-questions. Some sample codes generated that addressed RQa include:

- Less stigmatizing than in person classes
- Less stressful
- I was more engaged and can interact in the class more [online]
- I personally, and a lot of other folks, like to have online options because that's the way that we learn best

Some sample codes generated that addressed RQb include:

- Captions
- Rewatch the lecture
- Turn my camera on and off
- Flexibility

Some sample codes generated that addressed RQc include:

- [Online] I couldn't immediately ask for clarification
- Zoom fatigue
- [Instructors] had never really been taught how to teach online
- Technical accessibility issues

Codes were initially kept separated by participant and were then copied to a Google Sheet document for further analysis. Through these processes, 272 codes were identified initially and were grouped into 18 secondary codes. This code generation process identified initial codes through in vivo coding, secondary codes through focused coding, and established a path for the identification of themes. One initial code did not fit within any secondary code groups: “Better systems would be better accessibility.” This code was retained to allow for a more robust reflection into the pattern of participant perceptions and experiences (Saldaña, 2021).

Constructing, Reviewing, and Defining Themes (Phases 3, 4, and 5)

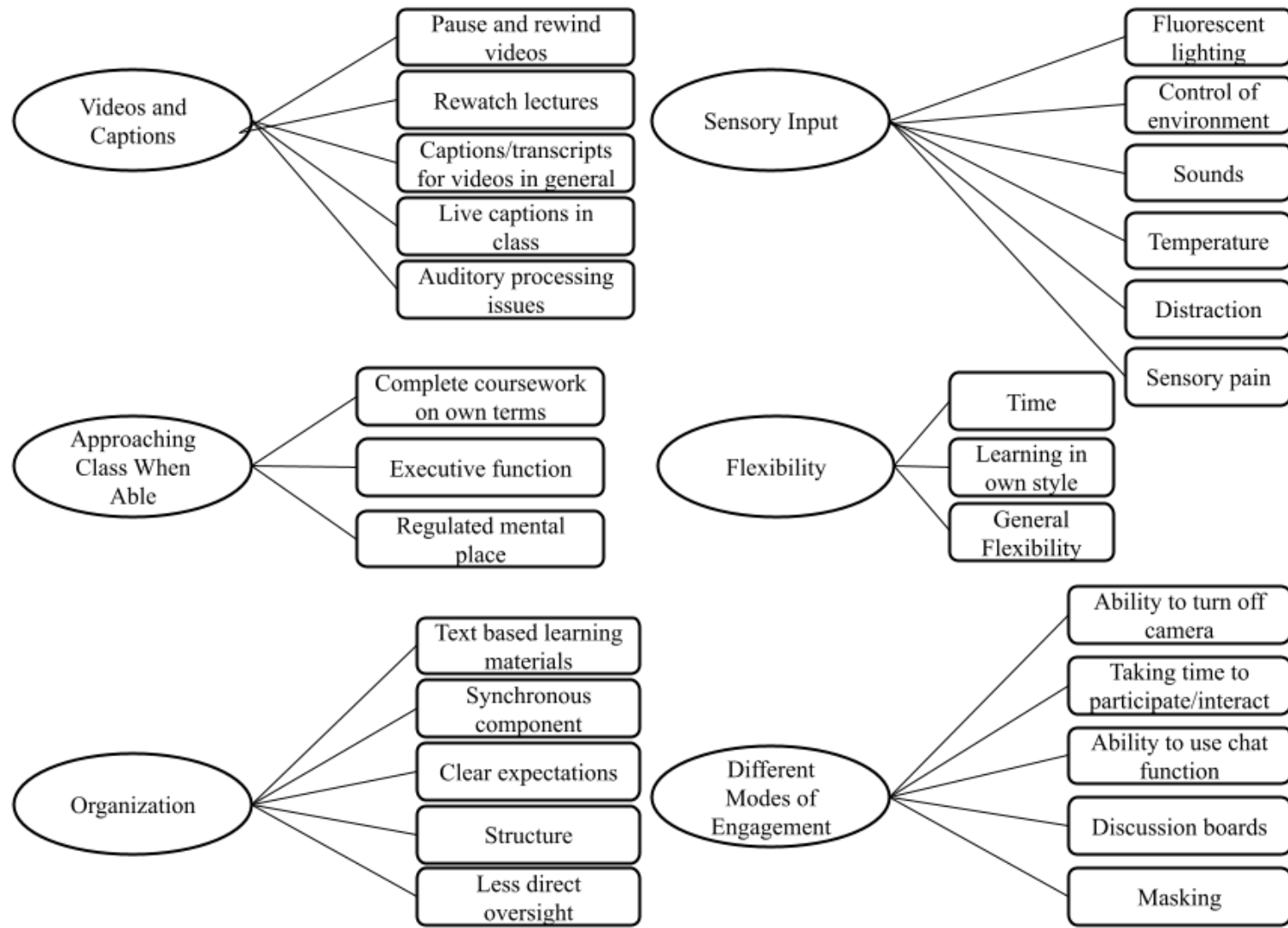
Following in vivo and focused coding, I began to construct themes. To first construct the themes, I reviewed the codes generated and carefully grouped them into initial categories.

During this process, I grouped codes based on their shared characteristics, to further analyze in later steps. In the Google Sheets document, I moved the codes into separated columns based on their similarities.

Next, I reviewed the initial theme groups by attempting to find a logical pattern along the coded data extracts (Braun & Clarke, 2006). I created thematic maps to assist in uncovering patterns and visualize the relationships within the data extracts. Figure 2 displays an example of a thematic map generated during the fourth phase of thematic analysis.

Figure 2

Example of a Thematic Map Generated during Phase 4



Finally, I thoughtfully reviewed the themes that I have developed. I defined the themes by establishing an official name for each theme. At this point, I identified how these finalized themes fit each research question and sub-question, generating sub-themes as needed to provide clarity and meaning when complex themes are apparent (Braun & Clarke, 2006). I also created sub-themes as necessary to ascertain more meaning from complex themes.

Producing the Report (Phase 6)

In producing the report, it was vital to present the results by displaying the evidence and data through the themes developed and examples of experiences shared by participants (Braun & Clarke, 2006). A rich description of the information gathered throughout the research process has been developed to fully and accurately answer each research question to produce the report, providing support for discussion related to the findings and each research question.

Trustworthiness of the Study

The trustworthiness of this study is strengthened by the methodological approaches that were taken. This study utilized a phenomenological approach with data analysis through thematic analysis. In this process, multiple levels of coding and thematizing were conducted to further ensure the trustworthiness of the study (Hays & Singh, 2012).

Several steps were taken to ensure the trustworthiness of this study. Through the multiple steps of thematic analysis, a rich description was developed. This also increased the transferability of the study by providing readers with the opportunity to understand the common characteristics between participants of this study and the broader group, allowing the readers to determine whether information found from this study can be transferred to other situations (Creswell & Poth, 2018; Erlandson et al., 1993; Hays & Singh, 2012).

Participants were also included in guaranteeing the trustworthiness of this study through member checking and collaborating with the participants. This also addressed the consistency and dependability of the findings of the study. Following the participants' interviews, transcription of the interviews, and initial data review, participants were emailed the transcript as well as my notes and were asked to provide any feedback or clarification that they felt was necessary. Asking participants to be involved in providing feedback throughout the research process increases the credibility of the study and allows them to provide critical impressions of data (Lincoln & Guba, 1985; Stake, 1995).

CHAPTER IV

RESULTS

RQa: How do autistic higher education students perceive the accessibility of online learning?

I detected several themes to address RQa: perceptions of value and advantages, physical accessibility, connection and engagement, DIY accommodations, and preference. Table 2 shows the participants' experiences surrounding their perceptions of the accessibility of online learning. The in vivo codes and other quotes from participants are incorporated into the results.

Table 2

Participants' Experiences Surrounding Their Perceptions of the Accessibility of Online Learning

Pseudonym	Perceptions of Value and Advantages	Physical Accessibility	Connection and Engagement	DIY Accommodations	Preference
Hayley	●	●		●	●
Pete	●	●	●		●
Ray	●	●	●	●	●
Pat	●	●	●	●	●
Joe	●	●		●	●
Andy	●	●	●		●
Frank	●	●			●
Gerard	●		●	●	●
Mikey	●	●		●	
Helena	●		●	●	●
Emily			●		
Maya			●		

Note. The symbol ● shows that the respective participant's experience and perspective substantiated the theme.

Perceptions of Value and Advantages

Autistic students mentioned benefits and pluses of online learning. Hayley noted a comparison of online and in-person learning: “You have the same...benefits as in person learning but there are additional benefits to online learning that you wouldn't have versus in person learning.” Autistic students feel that they have found a learning method that has solved many educational issues for them ($n = 10$). For example, Pete describes online learning as being straightforward and comprehensible. Ray directly states that they find online learning to be easier. Likewise, Pete expressed:

I actually found [online courses] to be a lot more accessible than in person classes.

[...]. When online learning stopped...it became so much more difficult. [...]. At an in-person class, I worry so much. [...]. [In person] there's so much anxiety.

The benefits that autistic students have found through online learning are overarching throughout their perceptions of their experiences. Mikey expressed, “Being able to learn online, is a really important tool...and hybrid learning also.” Online learning is a tool valued by autistic students and they recognize a number of benefits associated with and provided by it.

Physical Accessibility

For many autistic students, the in-person classroom or campus environment is not accessible at some level ($n = 8$). Based on the perspectives conveyed by autistic students, “physical accessibility” is being defined in this context as both the ability to be entered and the aspect of utility. For example, Pete, Pat, and Mikey both mentioned struggling with transportation to and on campus. Similarly, many autistic students experience the in-person environment to be stressful to an extent of inaccessibility. Pat also shared that the preparation needed before attending an in-person class is difficult, extending the inaccessibility for them

outside of the immediate classroom experience. In contrast, autistic students feel more of a sense of control over the physical accessibility of an online course, in most part due to the ability to attend class from their own space and have control over a variety of factors, such as distractions, environment arrangement, and interactions with others. Additionally, autistic students felt safer in the security and predictability that attending an online course from their own space allows. Ray summarized this view by saying, “Having to go into a brick-and-mortar building, it be very like hard to achieve the same comfortability or accommodations.”

Connection and Engagement

Having this increased sense of control over their learning environment, along with general characteristics of online courses, led autistic students to perceive an increase in academic engagement, in and out of class, as well as increased connection with faculty and peers ($n = 8$). Pat and Helena expressed feeling like interactions and communication, particularly with peers, was forced on them while attending in-person courses while, for Helena, the online environment allowed them to take their time in interactions and have more choice in the matter. Social cues that would normally be anticipated while interacting in person do not carry the same weight online and autistic students perceived their relationships with peers and faculty online to be more straightforward, citing an ease in communication and having more ways to communicate while online. Furthermore, the space allowed by online courses allowed participants to use and accept input from faculty in a way that was more beneficial to their learning. Ray said, “The instructors kind of weren't there, so that definitely was beneficial,” and added that they appreciated the instructors’ attitude of “you do what you need to do, I'm here if something goes wrong.” Similarly, autistic students felt that they could pay attention more effectively and were more engaged in class when attending an online course. Many autistic students also perceived

increased learning outcomes from online courses. A key characteristic of synchronous online courses that allowed autistic students to have this experience was the chat feature of video conferencing platforms used to host classes. Mikey shared:

If I get lost [in person], I'm kind of stuck, at least until there's a break in the class, or the class ends then I can ask the professor, you know, if I miss something because I've taken notes on the previous thing. [...]. with online learning, in Zoom, I can type in the chat, 'Hey, what was that last bit about blah?' and somebody will be more likely to see it and answer me.

Autistic students enjoy the increased opportunity for options in communication and connection in online courses, allowing them to have more direct relationships with others and increased engagement and learning opportunities in class.

DIY Accommodations

For over half of autistic students ($n = 7$) online learning allowed them to create their own accommodations within the environment. Ray reported:

I think with online learning, especially being neurodivergent, it allows for me to create...the accommodations I need and not needing someone to...help me with those accommodations. I'm able to know...I need this music playing, I need these things left out of my view, I need to be in this...particular place versus....having to go into a brick and mortar building and it be very...hard to achieve the same comfortability or accommodations that I would be able to do on my own.

Ray adds that, when learning online, they could use “tips and tricks for myself that help versus having to do and read things exactly the same way as everyone else.” Autistic students were able to use the flexibility of online learning to assess their learning needs. Joe believes that, although

online classes are not necessarily designed for autistic students in particular, “they just happen to be more accessible because of the fact that there's more flexibility to kind of figure out what works best for you as a student.” Helena agrees, saying, “I wouldn't have been able to complete my degree without online learning. It's really allowed for me to approach my classes the way I need to in order to learn.” Autistic students find advantages within online learning because they are able to create systems and accommodate themselves to better facilitate their own learning. They feel that they can better take their learning into their own hands.

Preference

A recurring theme for autistic students was their preference for online learning over in-person learning ($n = 9$). While nine participants directly stated a strong preference for online learning, the remaining three also found online learning to be a positive method of learning for them. Two of these participants stated that their preference is a bit of both or equal while one generally prefers in-person learning for the courses and university they currently attend but still perceives online learning to be more accessible in general. Pat expressed, “I would [recommend online learning to other autistic students] we all prefer it mostly. [...]. I, personally, and a lot of other folks, like to have online options because that's the way that we learn best.” Having the option to attend online courses is an important feature or tool in relation to accessibility of learning for autistic students.

RQb: What specific aspects of online learning, if any, do autistic higher education students find beneficial to their learning?

To answer RQb, the themes that emerged were flexibility, approaching class when able, organization, sensory input, videos and captions, different modes of engagement, and ableism and stigma. Table 3 shows the participants' experiences surrounding their perceptions of aspects

of online learning they found beneficial to their learning. The in vivo codes and other quotes from participants are incorporated into the results.

Table 3

Participants' Experiences Surrounding Their Perceptions of Aspects of Online Learning They Found Beneficial to Their Learning

Pseudonym	Flexibility	Approaching Class When Able	Organization	Sensory Input	Videos and Captions	Different Modes of Engagement	Ableism and Stigma
Hayley	●	●	●	●	●		
Pete	●		●	●	●	●	●
Ray	●	●					
Pat	●	●	●	●	●	●	●
Joe	●	●	●	●	●	●	●
Andy			●	●		●	●
Frank	●	●	●	●	●	●	●
Gerard	●		●			●	
Mikey	●			●	●	●	●
Helena	●	●	●	●		●	●
Emily			●		●		
Maya			●	●	●	●	

Note. The symbol ● shows that the respective participant's experience and perspective substantiated the theme.

Flexibility

Online learning was perceived as flexible by autistic students and the ability to complete coursework at their own pace was beneficial ($n = 9$). The aspect of time spent regarding flexibility was especially important to autistic students. Gerard described their experience:

It was at my own pace, and it was at during the hours that I could do it so for me,
I worked full time the entire time and so being able to complete schoolwork at
less traditional hours was very helpful.

Gerard later adds that “there is a lot of room for flexibility in online learning.” Helena explained, “I think online learning is just inherently more flexible than an in-person course and it just allows for so many different iterations of itself at one time.”

Approaching Class When Able

Autistic students experienced the ability to approach class on their own terms and when they were able to do so through online learning ($n = 6$). Executive functioning was something that autistic students tended to struggle with, especially having days where classwork, and other tasks that were not necessarily life-essentials, would not be able to be completed. Ray found, “...being able to do things when I was in...a regulated place definitely really helped versus being in an unstructured environment.” Additionally, autistic students felt they were able to better check in with themselves and their capacity to do work while in an online course.

Organization

Most autistic students ($n = 10$) mentioned the organization of online courses. In Andy’s words, “It was more structured [online].” Later, Andy added “...it just really it's not good for autistic people not to be able to know what’s expected of them.” Pete agreed because they felt they do best in a learning environment that is well organized and offers clear expectations, which

they have found through online courses. Ray noted, “I recommend [online learning] to all students, but definitely to other autistic students. For me, it's just being structured in the way I need.” Additionally, in the experience of the participants, online courses provided more text-based learning materials. Joe said, “Having like written out information that you can reference...that’s really helpful.” Within the topic of course organization is presentation of the course, autistic students shared varied opinions on preference for synchronous or asynchronous online courses. However, the premise of choice or options was prevalent, with a highlight on the option for optional synchronous office hours for all styles of class. Andy prefers having some level of synchronicity to the online courses they take, stating, “Having a structured meeting time schedule is definitely important, specifically within professors, so that communication...stays a bit easier to access.” Gerard added that having the opportunity to attend synchronous class times kept them on track with coursework through the accountability built in to interacting with faculty members. Autistic students want to be able to get the most out of their courses and having this connection through an organized meeting time is assisting them in having a positive learning outcome.

Sensory Input

Autistic students ($n = 9$) reported their relief around sensory issues when attending online courses. Because they were attending and completing courses from their own space, autistic students were able to have more control over sensory input. While sensory input issues can be just a distraction for some, for many autistic students they led to issues with overstimulation and experiences of physical pain. For example, lighting, especially the fluorescent lighting common in classroom environments, was a common sensory trigger for participants. Andy explained:

“The fluorescent lights of colleges, it's I can't even, like it's hard to see it's like buzzing in my brain and then just like everything is just like [buzzing], I can't, I can't focus. I'm also ADHD, so just like really my attention is gone, you know. [...]. Just decreasing at minimum, like this just a sensory input of everything [online].”

The ability to control other aspects of sensory input, such as sound and temperature, was also important to autistic students. Mikey added:

“...if you're someone who's prone to being overstimulated by noises, I can definitely see the appeal of - also fluorescent lights, because, you know, they're annoying and they're harsh, and they make that humming noise. So, if your classroom has fluorescent lights or something, then I can definitely see the appeal of online learning in that context where you can give yourself a bit more control over your environment.”

Pete shared that being able to attend courses from home where they could control lighting and temperature fixed a challenge they faced when attending in-person courses. According to Andy's experience, they felt they could better pay attention and focus on class material because they were not “being bombarded by sensory pain and like overload.” Helena added that they hate big lights and loud sounds. The ability to participate in a class from their own environment where they have control is something that makes learning opportunities more accessible to autistic students. Helena reiterated this, saying “I prefer online courses because I'm in my own environment that's accessible to me. I have things around me that make it easier for me to understand.” Autistic students feel a sense of comfort and security in this ability to have lower impact of sensory input when learning online.

Videos and Captions

Many autistic students ($n = 8$) mentioned the way online learning allowed them to use videos and captioning in the videos and video conferencing platforms had a positive impact on their learning experience. In particular, autistic students relied on the ability to rewatch videos and recorded lectures as an educational tool. According to Joe, "...having recordings of the lecture so you can go back and listen to so if you missed something you know, it's not gone forever, that's really helpful." Mikey agreed because in being able to review recordings and check information was a gamechanger for them, they recalled two situations in particular where this was beneficial for them:

My...professor from last year...would schedule...guest speakers and do a Q&A, get some perspectives across the field. [...]. So, you could go back and review your questions and their answers to it. The synchronous sessions for museum scholarship were recorded. That's huge. That's really huge. Because remember how I said sometimes, when you're so busy taking notes, you might miss something you needed to take notes on? Yeah, no longer an issue, no longer a problem, you can always go back and check.

Captions and transcripts also played an important role in increased accessibility of learning. This was especially prevalent in synchronous classes hosted on video conferencing platforms like Zoom. Pat made the point that it can be difficult to hear and understand faculty members, especially in large in-person courses, but having captions through synchronous online courses resolved that issue. Emily recalled, "there were captions in the videos, which were helpful since I have auditory processing issues." Maya learned about captions as a potential tool for

accessibility first through an online course:

So, I like having captions, which is actually something that I didn't know until COVID hit, and everything was online. So, like with Zoom, there was a button just like “display captions” which...in person there's not. And so, I really liked that button because it made it a lot easier to understand what people were saying enough so that then..., when things went back to being in person...I requested that as a formal accommodation. So..., in my in-person classes they give me an iPad that runs the Otter AI app, so it transcribes and gives me captions the same way that Zoom does.

Therefore, autistic students are finding tools embedded within online learning to be increasing the level of accessibility of their courses for them and are bringing these types of tools with them to other parts of their educational journey. Having access to the ability to review materials multiple times, like being able to rewind a lecture or other video and take the information in through a method that works best for their learning preferences, like through captions or a transcript, was a positive characteristic of online learning for autistic students.

Different Modes of Engagement

Most autistic students ($n = 9$) highlighted the opportunities that online learning allows for different modes of course engagement. In particular, the ability to participate and interact in different ways compared to an in-person course was especially important. In Andy's words, “I like that you can...type things along with being able to answer in video or to ask questions in video.” Other autistic students agreed because they felt they were better able to engage in their courses when they could have the option of verbally speaking out or typing questions or

responses in the chat of a video conferencing platform. Maya added that online discussion boards, like the chat section of a synchronous class, was "...more accessible for people who are not comfortable speaking in person but are more comfortable messaging." Outside of in-class discussions, being able to have options for course engagement was important for autistic students. Hayley recalled skipping classes previously to avoid in-person presentations but their experience in an online class was different. They said, "...We would have to do like in person presentations, and I would skip those because I didn't like...speaking in public. But with online courses...I had to take an online speech course because I never did it with my Gen Eds and you just record the speech and turn it in, and for me that was a lot easier, just because I didn't have that audience in front of me." Helena adds, "...Accepting multiple ways of participation is good like allowing discussion to happen verbally during class but also in the chat. I also think the professors have done a good job of providing asynchronous ways of interactions like through Google tools." Accordingly, having different modes of course engagement a positively affected course outcomes for autistic students through having a better opportunity to successfully complete coursework. Joe summarizes this point:

Having different modes of like participation, I think is helpful. [...]. We have the option to participate verbally, but then we can also write down our thoughts.

Which is really nice and not something I've experienced before in an in-person class. But I think like generally with, the online classes if they're synchronous, or asynchronous, you always have like the discussion forums that you can participate in which gives you more time to, like, think about your thoughts.

Autistic students find success in having these options in how they participate as well as being able to take their time in interactions. Similarly, many autistic students found success in

synchronous online classes when they were not required to turn their cameras on. Autistic students generally found having their camera on to be a distraction for a few reasons, mainly because they would be looking at themselves to make sure they were presenting in a neurotypically-expected manner or because they were concentrating on suppressing their stimming. However, when cameras were allowed to be off as needed, autistic students felt they were able to concentrate on what they were learning in class. Helena explains:

For online courses, being able to have control over my camera helps to make it more accessible because I'll mask less when I can be on camera less. For me, masking is a big distraction in class because I'm focused on how people are going to perceive me and making sure I'm doing the "right" thing vs what we're learning in class.

Mikey offered a goal to keep in mind, “True accessibility and true inclusivity is providing as many varied options as possible.”

Ableism and Stigma

More than half of autistic students ($n = 7$) found relief from ableism and stigma when learning online. One way was through not having to constantly mask throughout class. In Pat's experience, “I feel like online learning allows for more folks to be fully engaged, to have more folks have access to things that they need to be successful in learning as less stigmatizing than in person classes.” Autistic students, and others who may also benefit, have more opportunity to do things for themselves to help them learn and be engaged when learning online without drawing attention to themselves and experiencing stigma from peers and faculty. They add, “I thrive in an online space. I find it easier for myself to be regulated..., easier for myself to be thoroughly engaged and authentically engaged. I'm not masking as much because I don't feel like I have to

mask my entire body and if I do feel that I can turn off my video, which is really helpful.”

Andy’s experience supported lesser perceptions of stigma online. They felt, “it was easier for me to like talk and not feel judged [online].” Additionally, autistic students can experience this described relief because they are not having to worry about neurotypical social norms while in online learning. For example, according to Mikey, “there’s the stigma that if you’re not making something eye contact related, you’re not listening.” Another way autistic students experience relief from ableism and stigma when learning online is from having freedom to stim in private.

Mikey explains:

I need something to do with my hands a lot of the time, and when I’m an online learning...I have a coloring book app on my phone, and I can just grab my phone and put my phone on mute and just do that. And because it’s a very basic paint by number thing, it’s, it keeps my hands moving, but...I’m not distracted, I can still listen to the lecture.

Having this relief from judgement has a positive impact on the education experience of autistic students. Pat remarked, “If I’m feeling overwhelmed by the stimulus that’s in the space and I don’t wanna watch what’s happening or I don’t want people to see my reaction to something, I can turn off my video and that’s more accessible to me in terms of my mental health. [...]. I find it easier for myself to be regulated.” This kind of experience is only offered through online learning. Andy offers an overview of their experience, “In an ableist world, in an environment that has not been built or constructed for anybody other than a white man, online is more accessible.”

RQc: What specific aspects of online learning, if any, do autistic higher education students find disadvantageous to their learning?

To answer RQc, the themes that emerged were communication concerns, poor course design, and a lack of faculty training and buy-in. Table 4 shows the participants' experiences surrounding their perceptions of aspects of online learning they found disadvantageous to their learning. The in vivo codes and other quotes from participants are incorporated into the results.

Table 4

Participants' Experiences Surrounding Their Perceptions of Aspects of Online Learning They Found Disadvantageous to Their Learning

Pseudonym	Communication Concerns	Poor Course Design	A Lack of Faculty Training and Buy-In
Hayley			●
Pete			
Ray	●		
Pat			●
Joe	●		
Andy	●		●
Frank			●
Gerard	●	●	●
Mikey	●		●
Helena	●		
Emily	●	●	
Maya		●	

Note. The symbol ● shows that the respective participant's experience and perspective substantiated the theme.

Communication

More than half of autistic students ($n = 7$) had some concerns around communication, especially with faculty members, when learning online. Helena experienced an instance of a miscommunication with a faculty member, they explained that it could be hard to get in contact with faculty members since there was no opportunity to see them in person. When Ray had a question or needed clarification on an assignment, they, “couldn't immediately ask for clarification, which would throw me off because I have all this motivation to do this thing right now and I can't because there's a...wall suddenly put in place.” Gerard added, “There was often a lack of guidance and at times a lack of availability of faculty members, which hindered my abilities to get things done.” Some autistic students also felt there were less opportunities to make connections online. Joe spoke of their experience:

...I feel like for me the one downside is, being neurodivergent, I feel like I'm less likely to make connections in a remote online learning situation and I feel like autistic people are like that too. There's just less opportunities to connect but I think in a remote setting it makes it even harder which depending on...why you're in classes, like if you need a letter of rec and you take all online courses and you never talk to your professor once like I did..., that's not the best.

Andy felt conflicted because, while they felt it was easier to interact in courses online, they also felt it was “a bit harder because I am definitely...self-excluding..., being all online does have an exclusionary aspect of...not being able to make friends.” They suggest that there should be “some sort of way to...make community...online.”

Poor course design

A small number of autistic students ($n = 3$) had concerns about course design in online courses. In Gerard's experience, institutions were "trying to teach an in-person class virtually with an in-person curriculum and trying to make it the same." In their opinion, there is an issue in flexibility and adaptability on the part of institutions when it comes to creating online courses. Maya added that "some classes...just really didn't virtualize well." For the benefit of all students, institutions should consider how to best present courses when attempting to create and facilitate an online course.

A Lack of Faculty Training and Buy-In

Half of the participants ($n = 6$) felt that there was a disconnect between faculty buy-in or training and successful facilitation of online courses. Faculty members are very important to having a successful experience in a course. Mikey described their priorities, "For accessibility purposes, for me, my first concern is the professor." Frank continued, "I think the attitude of the professor makes a huge difference and I do think that sometimes that professors who weren't happy about the online learning thing would be stricter." Faculty members who want to facilitate online courses are providing a better experience for autistic students, and others, than faculty members who are not bought into the idea. Outside of buy-in, training is also a concern. Pat recalled faculty they encountered who were not used to video conferencing platforms. Mikey experienced faculty members who similarly struggled with using video conferencing platforms, they added that they believed these faculty members "had never really been taught how to teach online." Outside of training for online learning, Andy believes that faculty should have more

robust disability training:

It would be really nice if somehow there was some sort of like disability training.

[...]. If we could have...a training seminar on...what disability is and what

disability access requires and that autism and ADHD and all these other

neurodivergences are also disabilities that require accessibility. I think like that

would be...so good.

Mikey looks further beyond faculty and looks to the institutions themselves, “that is university administration making things more difficult for not prioritizing these accessibility measures.”

Gerard summarizes this concern, “There's already been demonstration that you can complete and succeed in an online setting. So, I think the room for flexibility is there, but a lot of professors don't have that same perspective.” Faculty having a higher understanding of disability and best practices for online learning as well as buy-in for facilitating these classes would increase perceived learning outcomes for autistic students and others.

CHAPTER V

DISCUSSION

Overall findings suggest that availability of online learning options for autistic higher education students increases overall perceptions of accessibility of learning. In addition, autistic students reported some suggestions for institutions and faculty members to take to better increase the level of accessibility of learning in their online courses. The discussion of the dissertation findings is presented below, followed by the practical implications, limitations, and recommendations for future research, as well as the conclusion.

Flexibility in Approaches to Learning and Other Advantages

According to the literature review, learners who are utilizing online courses find value in the flexibility that learning online provides (Aylmer, 2020; Adams et al., 2019; Coleman & Berge, 2018; Haas et al., 2022; Kotera et al., 2019). For disabled and otherwise non-traditional students in general, this flexibility is more than just a nice touch and can be an important accessibility factor in completing a course or program (Adams et al., 2019; Aylmer, 2020; Coleman & Berge, 2018; Haas et al., 2022; Kotera et al., 2019). This study was needed to fill the gap in the literature by identifying autistic students' views and perspectives of online learning and its potential for accessibility.

This study's findings align with the literature review regarding the perceived advantages of online learning. Autistic students participating in this study shared their experiences regarding both their perceptions of the accessibility of learning within online learning and aspects of online learning that were beneficial to their learning. They seemed to enjoy a deeper level of flexibility within the online courses they completed.

The autistic students who participated were aware of a need to review material several times to fully understand the content and, when learning online, they were able to do this easily by watching videos again or rewatching lectures. Additionally, when watching these videos, they were able to turn on captions or access a transcript. Using live captions in video conferencing platforms during synchronous class sessions was also a useful tool for autistic students. These two points were perceived by the autistic students who participated as helpful to their learning outcomes. This ability to go back and rewatch lectures or videos, or even one specific topic within a video, multiple times and use captions is being used as an accessibility tool, which can potentially lead to higher accessibility of learning (Coleman & Berge, 2018; Myers, 2009; Rao & Tanners, 2011).

The findings suggested that the participants found the flexibility of having different options for interacting in class and approaching classwork to be an asset for their learning. Many participants used the chat section of video conferencing platforms for synchronous classes as a tool to participate in class without needing to verbally interact. Similarly, in asynchronous classes, participants could participate through assignments like discussion boards and recordings. Both of these options provide a comfortable distance for interacting with peers and faculty. In addition, participants were able to turn off their cameras as needed when attending synchronous courses. This allowed them to have more privacy when needed and be perceived less, easing the mental load caused by masking and allowing them to focus on the class material more. Learners have increased accessibility outcomes when they are provided multiple means of engagement (Myers, 2009; Rao & Tanners, 2011). Therefore, having different ways to engage in class and present themselves to the class may increase the accessibility of learning.

According to UDL, accessibility is increased when learners have multiple means of representation (Myers, 2009; Rao & Tanners, 2011). From the participants' experiences, they found increased opportunities to interact with learning materials that better supported their learning. Primarily, several participants mentioned text-based learning materials being more prevalent in the online courses they completed. Additionally, participants appreciated the organization and structure of the courses. Participants generally had access to well organized courses that offers learning materials in a variety of ways, especially ways that work well for the learners.

Disability Considerations

Access and Security

In general, the autistic students who participated in this study found the in-person environment to be stressful. This environment was described as distracting, anxiety inducing, and, overall, a place where participants struggled to work. In contrast, participants reported having an easier time when they were by themselves. They benefit from being in their own space and setting it up in the way that makes the most sense for them. Disabled students, in general, find value in having control over their learning environment and their learning itself (Kotera et al., 2019). Learning from a predictable and safe space was a positive quality of online learning that lends itself towards increased accessibility of learning.

Further, the in-person campus was largely inaccessible at varying levels to many participants. Participants had issues with in-person accessibility in particular due to transportation, inaccessible buildings, and sensory input. Online learning can present a solution for some in decreasing the barriers to learning that are experienced because of an inaccessible campus (Coleman & Berge, 2018; Karal et al., 2011). Participants did experience an ease in this

inaccessibility when learning online, citing feelings of security and control over social interactions and sensory input.

Ableism is a phenomenon that disabled students, overall, often experience in educational environments, however, they do find relief from this prejudice and judgement in online learning (Karal et al., 2011). Similarly, the participants in this study also experienced lower instances of ableism and stigma online, allowing them to be more themselves. Autistic students are able to mask less online and stim. They find it easier to regulate themselves. Relieving the pressure of ableism was an important benefit of online learning. In turn, this is allowing for the participants to have perceptions of better mental health. Likewise, the participants in Hass et al.'s (2022) study about the experiences of autistic K-12 students participating in online learning also perceived improvements in their mental health. Mental health is a concern for autistic students, generally, stemming from factors including a lack of social support (Ward & Webster, 2018). Further, mental health may be improved by a learning environment that is developed while considering the needs of a diverse group of learners (Sarrett, 2018).

Self-Accommodation

Because of its characteristics, online learning can be used as a tool to address varying learner needs (Smith & Basham, 2014). Relatedly, the autistic students who participated reported using aspects of online learning to create their own accommodations. They pointed out the flexibility of online learning as a feature that allows them to determine what is going to work best for them. Participants recognized that they were helping themselves learn by using their own “tips and tricks” rather than going along with the group.

Given that autistic students tend to experience sufficient academic support and perceive themselves to have academic strengths (Cai & Richdale, 2016; Gurbuz et al., 2019; Ward &

Webster, 2018), it was not surprising that the participants tended to prefer to work alone or on their own terms and engage with peers and faculty either in a way of their choosing or as needed.

Community

Generally, the community and relationships that the autistic students who participated were able to build came easier to them than experienced in other settings previously. Autistic students can have communication style differences compared to allistic or neurotypical students (Cai & Richdale, 2016; Gurbuz et al., 2019), so changing the communication expectations by meeting in an online environment may be a benefit to some autistic students. Additionally, the participants also experienced their relationships online to be more straightforward and less forced. Since autistic students tend to feel more stress from social situations than allistic students, in part due to the nature of the situations being perceived as more unpredictable and superficial (Bishop-Fitzpatrick et al., 2017; Gurbuz et al., 2019), it is reasonable that autistic students would prefer online interactions. This clarity is compounded when the participants' description of online interactions is considered: the participants, in general, did not feel disconnected from others, were able to take their time in interactions and had more options in connecting with peers and faculty, and are not expected to keep up the same social cues.

Along with ease in interactions, participants found increased engagement in class when learning online. Some participants also perceived learning more. Haas et al. (2022), who studied the experiences of autistic K-12 students learning online, also found that their participants reported being more engaged and perceived learning more. Findings of this study and from the literature suggest that autistic students find access to online learning supports their overall quality of learning. The participants reported using the technological tools inherent in online

learning, such as the chat function in synchronous courses, to further their engagement in classes. Technology can be a way to promote broader accessibility for students proactively (Myers, 2009).

Intentional Online Campus

Course Building

Building an online campus and online courses intentionally can contribute to increased accessibility, inclusivity, and equity (Aylmer, 2020). This intentional and proactive online campus building can decrease the potential for accidentally creating obstacles to learning (Adams et al., 2019). The autistic students who participated cited intentional online course building as an important responsibility of institutions and faculty members. They felt that this, along with accessibility measures that go along with this, had been relatively ignored in some instances. Initiatives, like building an online campus, should be conducted with disabled students in mind to keep accessibility measures at the forefront (Hashey & Stahl, 2014; Sarrett, 2018).

Faculty

A broad cultural shift is necessary for institutions to successfully implement online learning (Cooper, 2006). The autistic students who participated felt that some of the faculty members they encountered were not invested in online learning, leading their courses to suffer. Additionally, some faculty members encountered by the participants were not sufficiently trained in both online learning and working with a disabled population. Faculty must have sufficient knowledge and skill to be able to be successful in facilitating an online course (Cooper, 2006; Pearson et al., 2019). Faculty members tend to have positive intentions of inclusion in their courses but lack the knowledge to do so (Davidovitch et al., 2019; Lister et al., 2014; Pearson et al., 2019). This is a concern as an attainment gap exists between disabled and typically-abled students (ECU, 2017; Eurostat, 2014; Eurostat, 2019; Pearson et al., 2019). Training to support

faculty in addressing this gap and offering solutions for inclusion should be developed in conjunction with disabled students (Sarrett, 2018).

Practical Implications

For Higher Education Institutions' Educational Accessibility Offices

Characteristics of online learning like flexibility, control, and a shift towards a focus on higher accessibility are viewed as factors contributing to success, academically and socially, by neurodivergent learners (Adams et al., 2019; Coleman & Berge, 2018; Haas et al., 2022; Kotera et al., 2019). Ease of physical barriers, including sensory issues, are also indicated as factors contributing to success (Coleman & Berge, 2018; Karal et al., 2011). Additionally, online learning is associated with improved mental health for autistic students (Haas et al., 2022) and lower perceptions of ableism for disabled students generally (Karal et al., 2011). These characteristics highlight important features of online learning that can contribute towards increased accessibility of learning for autistic students.

Higher education institutions' educational accessibility offices may consider promoting an online campus to autistic students who may benefit as well as the institution itself. It is valuable to incorporate an intentional online campus into an institution for increased accessibility of learning and other factors. Online courses are perceived by autistic students as having important advantages like flexibility and security. Autistic students reported being able to accommodate themselves using the implicit characteristics of online learning. They found relief from sensory input, judgment, and unwanted or unpredictable interactions. They can have more choices in their learning activities as well as how they engage in their classes. The opportunity to attend online courses could increase the accessibility of learning for autistic students.

For Higher Education Instructors and other Faculty Members

Considering the entirety of a learner is important for accessibility when planning a learning environment (Grier-Reed & Williams-Wengerd, 2018) and technology can be used to address learning needs proactively (Myers, 2009). Therefore, online learning may be suitable for increasing the accessibility of learning. Faculty members must have the knowledge, tools, and skills to be successful in facilitating an online course (Cooper, 2006; Pearson et al., 2019). Since online learning is different than in-person learning, buy-in and a fundamental culture shift must happen by faculty members to have more chance of success (Cooper, 2006). Principally, it is essential to focus on disabled voices in initiatives around this shift (Sarrett, 2018). Also, faculty report having lacking skills in facilitating inclusion in their classes (Davidovitch et al., 2019; Lister et al., 2014; Pearson et al., 2019). Therefore, it may be valuable for faculty members to attend training and professional development opportunities for both online learning and disability.

Instructional Designers

Instructional designers and higher education institutions should build online courses more intentionally. Autistic students who participated in this study experienced some courses that were poorly developed or seemed to not be developed with online teaching in mind. Those building an online course or campus must take care, time, and effort to intentionally create the course or campus (Cooper, 2006; Pearson et al., 2019). Additionally, instructional designers should apply knowledge of online learning methodologies and best practices to create courses that are presenting content in the most effective and appropriate manner possible. Incorporating intentional and purposeful design choices into online courses that offer material presented in accordance with principles of UDL and Inclusive Pedagogy will increase accessibility for all

students, including autistic students. It is important to design courses with consideration of all students and the needs they may present with in relation to their learning. Initiatives taken with disability in mind towards culture, professional development, and intentionality can be leveraged to potentially improve accessibility of learning.

For Autistic Students

Autistic students participating in this study shared the benefits of attending online courses to experience increased accessibility of learning and increase educational outcomes as well as some suggestions for higher education institutions to have more successful online courses. While they perceived the benefits of online learning from many factors, such as more control over their learning environment and choice in interaction, they also faced some challenges. However, they felt that these challenges were greatly outweighed by the benefits. The flexibility, in particular, of online learning lends itself to so many versions of itself at one time. When autistic students are able to use features of online courses to create their own systems for learning, they are likely to experience increased engagement in courses and more positive learning outcomes.

Additionally, experiencing a reduced level of ableism and stigma is important for accessibility of learning, especially for building community and engaging authentically. Online learning can offer this relief of ableism (Karal et al., 2011). Moreover, online learning allows increased physical access to education, which was important to the participants. Online learning has been observed to contribute to academic success for K-12 autistic students (Haas et al., 2022) and the participants also reported similar experiences.

These implications are specifically recommended for autistic students and especially those who may not be experiencing success in a traditional course or program. They are based on the participants' experiences and aligned with the theoretical frameworks of UDL and Inclusive

Pedagogy. Students who are otherwise disabled, or even typically-abled students, may consider these implications with conscious consideration of their learning and accessibility needs.

Limitations and Recommendations for Future Research

By combining the thematic analysis approach and the phenomenological study, this study gathered a pattern of responses (Braun & Clarke, 2006) based on the participants' experiences (Goulding, 2005). Still, there are a few limitations in this study that focus on the number of participants and the self-report qualitative data collection instruments. This study recruited 12 autistic students who had participated in online learning courses in the United States. While an initiative to include participants from a variety of backgrounds was taken, there groups that were underrepresented and the qualifying factors to participate were somewhat narrow (e.g., age, gender, country of origin). Additionally, participants may view different factors and stories as being relevant or irrelevant to the purview of this study, affecting what they choose to share or keep to themselves. If more or different autistic higher education students had participated in this study, a different set of experiences and perspectives would have been acquired. An effort was made to reduce this limitation by achieving data saturation. By collecting enough data to the point where further data collection would not add any novel insights, data saturation was reached (Guest et al., 2006). Self-report qualitative data collection instruments were also used in this study. The findings of this study were derived from the experiences, perceptions, opinions, and stories of the participants. The participants each had their own discernment on what to share during their interviews and this was influenced by their unique contexts and backgrounds. The effect of this limitation was attempted to be reduced by recruiting participants from different contexts, such as field of study and course or program level. This way, multiple perspectives could be considered while analyzing the meaning of the data (Arksey & Knight, 1999).

While these limitations were addressed through data saturation and attempting to acquire multiple perspectives by recruiting autistic higher education students from different contexts around what they are studying and at what level, future research involving more varied data sources may be beneficial. For example, future researchers may consider using a quantitative approach to analyze autistic students' learning outcomes (e.g., grades, instances of in-class participation, etc.) in online learning courses to examine accessibility of learning for this group. Additionally, future research involving a larger group of participants may be appropriate. This would broaden the understanding of the phenomenon of how autistic higher education students perceive online learning and accessibility.

Conclusion

Online learning can be a tool for accessibility (Smith & Basham, 2014). Online learning supports disabled students through its inherent characteristics such as flexibility (Adams et al., 2019; Coleman & Berge, 2018; Haas et al., 2022; Kotera et al., 2019). The advantages of online learning are helpful in this respect. In the context of autistic higher education students, this has looked like creating a secure and comfortable learning environment in their own space and accessing education on their own terms when they are able. However, on the side of higher education institutions, more focus is needed on intentional planning of online courses, including faculty training. Faculty members are not all proficient in facilitating online courses or creating a successfully inclusive class (Cooper, 2006; Davidovitch et al., 2019; Lister et al., 2014; Pearson et al., 2019). In addition, faculty attitudes around online learning must shift to a more positive outlook, they must believe in what they are doing (Cooper, 2006). When online courses are built with care, accessibility outcomes can be increased (Cooper, 2006; Pearson et al., 2019). Online learning can provide increased accessibility of learning for autistic students (Haas et al., 2022).

This phenomenological study was aimed to address the following research question: How do autistic higher education students perceive online learning? This main research question consists of three sub-questions: (a) How do autistic higher education students perceive the accessibility of online learning? (b) What specific aspects of online learning, if any, do autistic higher education students find beneficial to their learning? (c) What specific aspects of online learning, if any, do autistic higher education students find disadvantageous to their learning? This dissertation serves as a study exploring the phenomenon of autistic higher education students using online learning as a tool for accessibility. It is important to state that this research topic is still limited. I used semi-structured interviews and thematic analysis using multiple coding approaches. According to the study findings, autistic higher education students appeared to prefer the availability of online learning as a tool to use to access education and learning.

Autistic students seemed to find value in the flexibility, control of environment, and control over interactions offered by online learning. They were able to find strategies and systems that worked best for them and their learning through online course features. Although some participants in this study shared concerns about course development and faculty training and attitudes, the advantages they found in online learning were greater than these concerns. Findings also support higher education institution faculty pursuing further learning opportunities for themselves surrounding the topics of online learning and disability.

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Appendix A

Invitation to Participate in Study

Hello members of (social media group's name will be inserted here)! You are invited to participate in a study to explore autistic students' experiences in online learning and accessibility.

Through an individual interview, this qualitative study will explore autistic adults' experiences and perception of the accessibility of online learning including any specific aspects of online learning that may be beneficial to learning or disadvantageous to learning. Interviews will take approximately 45 to 60 minutes. Responses are confidential. Following completion of the study participation, participants will be gifted a \$10 Visa gift card.

If you are interested and would like to participate, please click the link included in the social media post with this flier. By clicking this link, you will be directed to an eligibility questionnaire to allow you to provide consent, answer questions related to demographics and context, and provide an email address to be contacted to schedule an individual interview. Your email address will remain confidential.

Appendix B

Eligibility Questionnaire

Section 1

INFORMED CONSENT DOCUMENT

OLD DOMINION UNIVERSITY

PROJECT TITLE: Online Learning as a Tool for Accessibility for Autistic Higher Education Students

INTRODUCTION

The purposes of this form are to give you information that may affect your decision whether to say YES or NO to participation in this research, and to record the consent of those who say YES. This project, entitled Online Learning as a Tool for Accessibility for Autistic Higher Education Students, is being conducted by Dr. Tian Luo and Keirnan Brown.

RESEARCHERS

Tian Luo, PhD, Responsible Project Investigator, Associate Professor, Instructional Design & Technology Program, College of Education and Professional Studies, Department of STEM Education & Professional Studies, Old Dominion University

Keirnan Brown, PhD Candidate, Investigator, Instructional Design & Technology Program,
College of Education and Professional Studies, Department of STEM Education & Professional
Studies, Old Dominion University

DESCRIPTION OF RESEARCH STUDY

Several studies have been conducted on the subject of online learning and disability. Several studies have identified benefits provided by online learning such as reduced perceptions of ableism, greater flexibility and control, and a lack of physical barriers (Adams et al., 2019; Coleman & Berge, 2018; Haas et al., 2022; Karal, Cebi, & Turgut, 2011; Kotera et al., 2019). Likewise, several studies have identified barriers introduced by online learning such as a feeling of being overwhelmed by the amount of media presented and struggling with organization (Habib et al., 2012; Meyers & Bagnall, 2015). None of them have explained the phenomenon of autistic students participating in online learning courses, considering the accessibility of learning within the courses. Online learning provides an alternate platform for learning for nontraditional students who may have been excluded historically from higher education, such as autistic students (Coleman & Berge, 2018). Additionally, a gap exists between disabled and typically-abled students in their learning within the classroom as well as their achievement after leaving higher education programs (job opportunities and further education) (ECU, 2017; Eurostat, 2014; Eurostat, 2019; Pearson et al., 2019). As more autistic students attend higher education, it is important to provide several opportunities for learning and increase accessibility wherever possible.

To address these issues, we propose a one-on-one interview with autistic students with experience in online learning courses at the college/university level. These interviews will consist of questions aimed at understanding the participants experiences and perspectives surrounding online learning and accessibility. In this study, we will aim to discover how online learning contributes to the accessibility of learning within the experiences of autistic higher education students and explore their experiences through the lens of accessibility within the context of an online learning environment.

If you decide to participate, then you will be asked to participate in an eligibility questionnaire, estimated to take about 15 minutes, as well as a one-on-one interview, estimated to take about 45 minutes to one hour. Approximately 12 participants will be participating in this study. If you decided not to participate, we will not include your data for research and analysis.

EXCLUSIONARY CRITERIA

To the best of your knowledge, you must meet the following criteria to participate in this study: between the ages of 18 to 35 years old, identify as autistic, completed at least one course online from a college or university located in the United States, and have completed at least one in-person course at any level (K-12, higher education, etc.).

Please note that if you are under 18 years old or older than 35 years old, if you have only taken online courses outside of a college or university in the United States, or if you have never taken an in-person course at any level, you are not able to take part in this study.

RISKS AND BENEFITS

RISKS: There are no known risks at this time to participate in this study. As with any research, there is some possibility that you may be subject to risks that have not yet been identified.

BENEFITS: You will be able to reflect on and share your experience as an autistic student who has taken courses online. Your contributions may help shape future research on online learning and learning for autistic individuals.

COSTS AND PAYMENTS

The researchers want your decision about participating in this study to be absolutely voluntary. To offset any inconvenience, you will receive a \$10 gift card as compensation for participating in this study.

NEW INFORMATION

If the researchers find new information during this study that would reasonably change your decision about participating, then they will give it to you.

CONFIDENTIALITY

The researchers will take reasonable steps to keep private information, such as interview responses and analysis, confidential. Real names will not be collected as part of this research and the researcher will remove any key identifiers from questionnaire and interview responses. The results of this study may be used in reports, presentations, and publications; but the researcher

will not identify you. Of course, your records may be subpoenaed by court order or inspected by government bodies with oversight authority.

WITHDRAWAL PRIVILEGE

It is OK for you to say NO. Even if you say YES now, you are free to say NO later, and walk away or withdraw from the study at any time. Your decision will not affect your relationship with Old Dominion University. If the researchers find new information during this study that would reasonably change your decision about participating, then they will give it to you.

COMPENSATION FOR ILLNESS AND INJURY

If you say YES, then your consent in this document does not waive any of your legal rights. However, in the event of harm, injury, or illness arising from this study, neither Old Dominion University nor the researchers are able to give you any money, insurance coverage, free medical care, or any other compensation for such injury. In the event that you suffer injury as a result of participation in any research project, you may contact Dr. Tian Luo, Responsible Principal Investigator, at tluo@odu.edu or 757-683-5369, Dr. John Baaki, the DCEPS Human Subjects Review Committee chair, at 757-683-5491 at Old Dominion University, or the Old Dominion University Office of Research at 757-683-3460 who will be glad to review the matter with you.

VOLUNTARY CONSENT

By selecting "yes" below, you are saying several things. You are saying that you have read this form or have had it read to you, that you are satisfied that you understand this form, the research

study, and its risks and benefits. The researchers should have answered any questions you may have had about the research. If you have any questions later on, then the researchers should be able to answer them:

Dr. Tian Luo at tluo@odu.edu or 757-683-5369

Keirnan Brown at kbrow082@odu.edu

If at any time you feel pressured to participate, or if you have any questions about your rights or this form, then you should call or email Dr. John Baaki, DCEPS Human Subjects Review Committee chair, at 757-683-5491 or jbaaki@odu.edu, or the Old Dominion University Office of Research, at 757-683-3460.

If you would like to participate in this study, please indicate your consent below. By selecting “Yes” below you are telling the researchers YES, that you agree to participate in this study. Survey submission will be received by Keirnan Brown from Old Dominion University.

Do you agree to participate in this study? If you select "Yes," you indicate that you grant consent and you will be able to move forward. If you click "No," you will not be able to move forward and you will not be contacted to participate in the study.

You may withdraw consent at any point.

A. Yes

B. No

Section 2

Before continuing with the study, please verify that you meet the inclusion criteria. **All participants must have completed at least one online learning course through a college or university in the United States, participated in an in-person learning course at any level, be between the ages of 18 and 35 years old, and identify as autistic.** Any questionnaire submissions from potential participants that do not meet the inclusion criteria will be disregarded.

A. Yes

B. No

Section 3

1. What is your gender?

a. Nonbinary

b. Woman

c. Man

d. Prefer not to answer

e. Other: _____

2. What is your age?

3. Do you identify as autistic?

a. Yes

b. No

4. How many online learning courses have you completed? Please only count ones completed at the higher education level (undergraduate, graduate, or certificate/professional) from an institution in the United States.
 - a. 1
 - b. 2-5
 - c. 6-9
 - d. 10+
5. At what level was the most recent course completed?
 - a. Undergraduate
 - b. Graduate
 - c. Certificate/Professional
 - d. Other
6. What is your field of study?

7. Select all that apply for the courses that you have completed:
 - a. Synchronous (virtually attended scheduled class sessions)
 - b. Asynchronous (independent learning with no class meeting times)
8. Have you previously participated in an in-person course at any level (K-12, higher education, etc.,)?
 - a. Yes
 - b. No
9. How many in-person courses have you completed past the high school level?
 - a. 0

- b. 1-5
- c. 6-9
- d. 10+

10. Please provide your email address. You will receive an email invite to schedule a virtual interview via Zoom. Your email address will remain confidential.

Appendix C

Interview Guide

Participant Number: _____

Interview Date and Start Time: _____

1. Purpose and Consent:

- a. Thank you for agreeing to participate in this study. My goal for this study is to explore autistic students' experiences with online learning with a focus on the accessibility of learning within that system. The purpose of this interview is to gather information about your personal experiences within and perceptions of online learning, the accessibility of that learning, and any specific supports or hindrances towards learning that you've experienced with online learning. Your participation in the study and this interview is voluntary and you may withdraw your consent at any time. Would you please confirm that you are providing your informed consent to participate and audio-record this interview.

2. Introduction:

- a. Please tell me a little bit about the online courses you've completed and your experience within them.

3. Sub-Question A

- a. When learning, in any kind of environment, what would make an environment or course accessible to you?
- b. Tell me about your experience with learning accessibility in the online courses you completed?
- c. Would you recommend online learning to other autistic students? Why or why not?

4. Sub-Question B

- a. What were some aspects within online learning that helped you reach your goals?
- b. Was there anything the instructor did or included in the course that was beneficial to your learning?

5. Sub-Question C

- a. What were some aspects within online learning that held you back from reaching your goals?
- b. Was there anything the instructor did or included in the course that you feel made learning more difficult?
- c. Of these difficulties, would you classify them as being due to the online environment or specific to the instructor?

6. Sub-Question D

- a. How would you compare online learning to an in-person course?
- b. Do you perceive one to be more accessible to you than the other? Why or why not?

7. Conclusion

- a. Would you like to add anything else?

Interview End Time: _____

Length of Interview: _____

APPENDIX D

INSTRUCTIONS TO THE PARTICIPANTS FOR MEMBER-CHECKING INTERVIEW TRANSCRIPT AND SUMMARY

Thank you again for participating in the study **Online Learning as a Tool for Accessibility for Autistic Higher Education Students**. I'm attaching here a document with the transcript of our interview and a document with key points I gathered while reviewing the transcript as well as a summary of our interview. Please review it to make sure that I have correctly understood your perspective. If you would like to add anything or make any corrections, please feel free to let me know!

VITA

Keirnan Brown

Department of STEM Education and Professional Studies
Darden College of Education and Professional Studies
Old Dominion University

Education

PhD	Old Dominion University Program: Instructional Design and Technology	05/2024
MS	Western Governors University Program: Curriculum and Instruction	11/2018
BA	Western Governors University Program: Interdisciplinary Studies (K-8)	04/2018

Selected Professional and Teaching Experience

Instructional Systems Designer DTS, LLC	12/2023 – Present
Educator	08/2022 – 06/2023
Math Curriculum Lead Prince William County Public Schools	08/2018 – 06/2019
Educator	08/2019 – 06/2022
Math Curriculum Lead	
Faculty Learning Technology Trainer Fairfax County Public Schools	