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Is online course-taking helping or hindering students with disabilities in U.S. community colleges?

Francisco Expression Narciso Jr.

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Pepperdine University
Graduate School of Education and Psychology

IS ONLINE COURSE-TAKING HELPING OR HINDERING STUDENTS WITH
DISABILITIES IN U.S. COMMUNITY COLLEGES?

A dissertation submitted in partial satisfaction
of the requirements for the degree of
Doctor of Philosophy in Global Leadership and Change

by

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May, 2023

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DOCTOR OF PHILOSOPHY

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DEDICATION

This work is dedicated to all students with disabilities around the world who are seen and unseen, who are heard and unheard. I am aware that institutional barriers might exist that impact access to education for students with disabilities, and I want to express my commitment to shine a brighter light on these inequities. I hope that my research efforts can contribute to increased awareness and action towards making education more inclusive for everyone. I believe that with continued advocacy and collaboration, students with disabilities will have access to all the resources they need to thrive and achieve their full potential. To all the students with disabilities out there: I see you, I hear you, and I stand with you. This research is dedicated to you, and I hope that it will have a positive impact on your educational journey.

ACKNOWLEDGMENT

I am filled with gratitude as I acknowledge the people in my life who have supported me leading up to my dissertation. This journey would not have been possible without the love and encouragement of the people in my life.

First and foremost, I would like to thank my family for their unwavering support throughout my academic journey. Their love and encouragement have been my constant motivation, and I thank them for keeping me balanced. Thank you for putting up with my 3:50 alarm.

I am grateful to my dissertation committee for their guidance, constructive feedback, and insights. Their expertise in the field has been invaluable in shaping my academic journey. Dr. Schockman, thank you for always challenging me to creatively look at policy, global implications, unintended consequences. I especially appreciate you keeping me sane throughout multiple iterations of writing. Dr. Sublett, thank you for your quantitative skills and your equity advocacy and starting this journey with what seems like years ago. Dr. Jago, thank you for reminding me that every student is unique and educators should meet students where they are.

I am indebted to my friends and colleagues who have been a constant source of inspiration, support, and encouragement. Their belief in me has helped me through. I'd like to give a special thanks to my LAUSD family for always learning together.

I firmly believe in an inclusive education that provides every student with the resources they need to succeed. Every student is unique and capable of learning, and I am committed to this cause.

Once again, thank you to everyone who has supported me in this journey. You have played an essential role in shaping me into the person I am today.

VITA

Professional Summary

Francisco is an equity-driven leader who has devoted over 25 years of his career to improving the quality of adult education for students from various countries as a teacher and central office advisor for Los Angeles Unified School District's Division of Adult and Career Education. As an advocate for inclusive education, Francisco has trained California educators and administrators on equity in education.

Education

2023	Pepperdine University Doctor of Philosophy, Global Leadership and Change (Scheduled May 2023)
2016	Pepperdine University Master's in Education Administration
1997	University of California, Riverside Bachelor of Science in Business Administration

Credentials

California Preliminary Administrative Services Credential
California Designated Subjects Adult Education Teaching Credential

Professional Experience

2019-Present	Advisor, Division of Adult and Career Education, Los Angeles Unified School District
2020-2021	CALPRO Trainer, Success for all learners through equity
1998-2019	Tenured Faculty, Los Angeles Unified School District
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Scholarly Contributions

Bedon, J., Narciso, F. (2018). Integrated Education and Training. CALPRO Training Module, Sacramento, CA.

Adelson-Goldstein, J., Carter, C., Kim, S., Moreno, J., Narciso, F., Pasos, J., Schalit, M., Sucher, R., Tarne, S. (2004). Tools for ESL Lesson Planning. Los Angeles Unified School District. Los Angeles, CA.

ABSTRACT

Students with disabilities in U.S. community colleges continue to disproportionately experience lower degree attainment compared to students without disabilities. Furthermore, students with disabilities are twice as likely to choose community colleges for postsecondary education compared to four-year colleges. Students with disabilities in postsecondary education endure learning barriers including inflexible instruction, inaccessible content, and intimidating and unsafe learning environments. The purpose of this study is to address the increasing achievement gaps for students with disabilities in community colleges. Specifically, this study intended to answer the question to what extent, if at all, does online course-taking impact degree attainment for students with disabilities in U.S. community colleges? Even though the current study did not find statistically significant results, there was a directionality for the odds of positive degree attainment when students with disabilities participated in online course-taking, specifically for certificate and associate's degree. Since online course-taking can be a conceivable option to help students with disabilities, the researcher points to previous research for educational policy makers to consider: online learning can provide flexible instruction, accessible content, and a safe learning environment. Recommendations for postsecondary education policies are discussed. Implications of this study has global impact because the number of people with disabilities around the world are increasing. Because disabilities disproportionately impact poor and developing countries, it is proposed that globally responsible organizations consider online learning to be a part of existing inclusive education initiatives such as the United Nations Sustainable Development Goal 4. Recommendations for global education policies are discussed.

Chapter 1: Introduction

Chapter Overview

Chapter 1 provides an overview of the study as it relates to equity in education, online learning, and students with disabilities. It includes a background on students with disabilities in United States two-year community colleges, national and international policies that impact access to postsecondary education for students with disabilities, and the barriers that impact learning outcomes for students with disabilities – inaccessibility to course content, inflexible instruction, and unreliable safe learning environment. Online course-taking might be a plausible option for students with disabilities because online learning can provide increased access to course content, flexibility of learning, and safe learning environment. This chapter also includes a background on online learning, the characteristics of online learning, and effectiveness of online learning. The problem statement targets the postsecondary outcomes of students with disabilities in community colleges, the purpose statement and significance of study describe how investigating online course-taking addresses equity in postsecondary education for students with disabilities and informs the educational policies related to online course-taking, the definition of terms highlights key ideas, the conceptual framework provides the support that online course-taking is a plausible option for students with disabilities, and the theoretical framework that guides this study. The last part of this chapter addresses the research question of this study, the limitations of the dataset and methodology, the delimitations that provide the boundaries of this study, and assumptions that are accepted about the dataset and the experiences of students with disabilities, and the organization of the study that outlines the five chapters of this study.

Background of the Study

Although there has been considerable progress in equitable educational access for students in postsecondary institutions through community colleges, the educational outcomes are not equitable especially for students with disabilities. Community colleges have been a conceivable option for many students because of increasing access through online learning, lower costs, and fewer prerequisite enrollment requirements. Community colleges have fewer barriers of entry than four-year colleges. Students with disabilities are more likely to apply to a two-year community college. A longitudinal study supported by the National Center for Special Education Research found that the students with disabilities, within their first four years out of high school, who advanced to postsecondary education were twice as likely to enroll in two-year or community colleges (32%) compared to four-year colleges or universities (14%; Newman et al., 2009). Although students with disabilities are choosing community colleges as a place to learn and move ahead, it is apparent that there is an achievement gap. Eight out of ten of these students with disabilities in two-year or community colleges intended on completing a diploma, certificate, or license. Unfortunately, 18% actually completed. Of concern is the fact that students with disabilities are likely to enroll in community colleges, but less likely to achieve a postsecondary completion. In the same longitudinal study by the National Center for Special Education Research, information was collected from the same students expanding to their first eight years out of high school. Results from this report showed that the students with disabilities, within their first eight years out of high school, who advanced to postsecondary education were again more likely to enroll in two-year or community colleges (44%) compared to four-year colleges or universities (18%). Although many students with disabilities in the United States choose community college as a way to fulfill their postsecondary education and ultimately future

employment, these lower completion outcomes are evidence that there is still an equity gap for the learning outcomes of students with disabilities. This current study is grounded in the United States two-year community college institutions, but there are applicable implications to international postsecondary policies.

Although there is still a lot of work for institutions to have more inclusive student outcomes, there are policies that have supported increased access to education for students with disabilities. This policy focus on access has impacted many marginalized groups of students including students with disabilities. Example categories of disabilities that guide policies are, but not limited to: hearing impairment, blindness or visual impairment, speech or language impairment, specific learning disability or dyslexia, attention deficit disorder, health impairment, conditions related to mental, emotional, or psychiatric, depression, developmental disability, and brain injury (Bryan et al., 2019). Over the years, there have been policies intended to support educational access for students with disabilities in the United States and in other countries. In the United States, the Individuals with Disabilities Education Act (IDEA), Section 504 of the Rehabilitation Act of 1973, and Americans with Disabilities Act (ADA) of 1990 are examples of policies that support students with disabilities (Yell, 2019). Globally, the United Nations has supportive policies for people with disabilities – The Universal Declaration of Human Rights includes higher education rights for all and the Convention on the Rights of Persons with Disabilities recognizes the right to education for people with disabilities (United Nations, 2021a; United Nations, 2021b). There are national and international policies in place to support access to education for students with disabilities.

In the United States, students with disabilities are supported through IDEA, Section 504 of the Rehabilitation Act of 1973, and ADA of 1990 (Yell, 2019). IDEA is an educational benefit

law that provides tools for educators and parents to ensure that every elementary and secondary student who is disabled is provided free appropriate public education (The Individuals with Disabilities Education Improvement Act, 2004). IDEA also puts in place supports for statewide and local coordinated services for students and requires having an Individualized Education Program (IEP) that details the supports. Students with disabilities who pursue postsecondary education are ensured civil rights through ADA and Section 504 (American With Disabilities Act, 1990; The Rehabilitation Act, 1973). The purpose of these two civil rights laws is to protect people with disabilities by ensuring the same rights and opportunities that is given to all people. Section 504 prevents disability discrimination in agencies that receive federal funds like public postsecondary institutions, and ADA protection has a broader reach to protect those individuals with disabilities in agencies not limited to whether they receive federal funds like private postsecondary institutions except for religious organizations and private clubs.

The United Nations is a global advocate of educational rights for people with disabilities. The Universal Declaration of Human Rights was accepted on December 10, 1948 and since, proclaims standard rights for all people such as the right to education and equal accessibility to higher education (United Nations, 2021a). People with disabilities were not directly addressed in this Declaration, but were later addressed on March 30, 2007 with the signing of the Convention on the Rights of Persons with Disabilities. The intent of this human rights treaty is to advance and protect the rights of people with disabilities such as the right to nondiscriminatory and inclusive educational system at all levels. People with disabilities are ensured support and reasonable accommodations such as, but not limited to extra testing time and extended assignment deadlines that facilitates inclusion and equal participation in the mainstream of the general educational system. Finally, the Convention on the Rights of Persons with Disabilities

ensures “persons with disabilities are able to access general tertiary education, vocational training, adult education and lifelong learning without discrimination and on an equal basis with others” (United Nations, 2021b, para. 5).

Despite the policy progress for students with disabilities to access higher education, there are barriers that impact learning outcomes – unreliable safe learning environment, inflexible instruction, and inaccessibility of learning content (Flink & Leonard, 2019; Mullins & Preyde, 2013). For example, exclusion and inconsistencies in the learning environment create unsafe learning experiences that are harmful to the successful outcomes of students with disabilities. The learning environment continues to exclude students with disabilities because experiences with faculty and staff are mixed. Inconsistent understanding of how to support inclusiveness creates a situation where students with disabilities feel stigmatized and fearful to disclose disabilities because of ignorance and the perception of getting special treatment (Flink & Leonard, 2019). Another example of barriers is the inflexibility experienced by those students who have invisible learning disabilities. Mullins and Preyde (2013) investigated the lived experience of students with invisible learning disabilities such as dyslexia, attention-deficit hyperactivity disorder, and mental illness. Their study found that even if students with disabilities were required to have access to accommodations, there was an inflexible and one-sided institutional experience that support students without disabilities by excluding students with disabilities through social and organizational barriers. Socially, these students with disabilities reported that the lack of awareness of disabilities was amplified and sometimes raised questions of validity because their learning disabilities were invisible, thus unseen by professors and students. Inaccessibility of content can be caused by physical organizational barriers such as size of room, distracting noises, and number of students; thus, making it difficult for some

students with disabilities to access content. Organizational procedures can also create inflexible barriers for students to access content. These challenges occur when students with disabilities sometimes experience resistance from professors to facilitate accommodations or when instruction serves a single type of student and excludes other students such as students with disabilities. Students “were frustrated and even felt stigmatized by the education system” (Mullins & Preyde, 2013, p. 156). Based on the experience by these participants with disabilities, the authors suggest ideas to improve the learning for students with disabilities – increased awareness of disabilities to support safe learning environment, more education among staff and faculty to encourage more flexible instruction, and provide more support so all students can access content. Barriers that impact learning outcomes continue to exist, but might be addressed through online course-taking.

Online course-taking is a feasible option for students with disabilities to improve learning outcomes because of the potential of flexible instruction, increased access to content, and safe learning environment (Cavanaugh et al., 2013; Center on Online Learning and Students with Disabilities, 2016). Online learning has the “potential to offer flexible scheduling; individual mentoring; safe communities in which to learn; and varied methods of teaching, curriculum delivery, and assessment” (Center on Online Learning and Students with Disabilities, 2016, p. 85). In a study that investigated risk of dropout among students with disabilities, Cavanaugh et al. (2013) applied their findings to online learning and assert that giving students opportunities to control learning and have support through people who understand and care for them greatly impact dropout rates for students with disabilities. Online course-taking provides the differential supports that can accommodate the access and flexibility for students with disabilities. The Center for Applied Special Technology has also supported increased access and flexibility

through their work with Universal Design for Learning focusing on engagement through learner choice – what motivates each learner; representation – how each learner receives information; and action and expression – how each learner expresses what they learn (CAST, 2021). In a review of 17 empirical studies, the principals of Universal Design for Learning are associated with positive learning outcomes for students with disabilities such as “application of learning strategies... participation in discussion, interaction with technology, and reflection skills; and confidence in technology skills (Seok et al., 2018, p. 183).

For the past two decades, there has been an expansion of online courses in order to support and advance completion outcomes for students in postsecondary institutions, but equity accessibility gaps for marginalized students became more prevalent during the onset of the COVID pandemic. Many students have been utilizing online learning, including those students in community colleges. A report by the National Center for Education Statistics found that distance education enrollment increased from 8% to 20% between 2000 and 2008, and most of these students (22%) were in public two-year colleges (Radford, 2011). In 2019, over 5 million students in public colleges were enrolled in distance education courses, which is 36.2% of total student enrollment (National Center for Education Statistics, n.d.). In 2020, online learning became the primary mode of delivery of education during the onset of the COVID pandemic which caused barriers for institutions with fewer resources and marginalized students; thus, furthering the equity accessibility gap. In a study of comparing the community colleges in California during the first year of COVID, it was discovered that the colleges with more distance learning resources were positioned well to transition to online learning by providing a wider range of training on online skills for both students and faculty (Hart, 2021). Some of the accessibility barriers for online learning that individual students experienced were lack of

internet access, balancing coursework with family life, accessing a quiet place to study, and understanding where to access online support (Adnan & Anwar, 2020; Means & Neisler, 2021). Unfortunately, there were students who had more challenges than others: female, Hispanic, lower-income, students who were responsible for children, and students who work 21 or more hours (Means & Neisler, 2021). Students with disabilities were another group with accessibility challenges caused by the transition to online learning during COVID and experienced limited access to disability accommodations while transitioning to online learning. This showed the need to be intentional about the accessibility of accommodations for students with disabilities when studying online. The decisions made by educational institutions during this time of COVID were based on accommodating the dominant culture transitioning to online learning which excluded and discriminated students with disabilities and intensified inequities. Gin et al. (2021) highlighted these inequities of access to accommodations for students with disabilities caused by the focus on the dominant culture in a study of the transition to online learning for students with disabilities during the COVID pandemic. They discovered that students with disabilities had challenges accessing quiet environments for testing, extended time for testing, and instructors' lecture notes. Other disability accommodations emerged that could assist with online learning such as closed captioning for videos, breaks during testing time, and recordings of lectures. Although there have been inequities with accessibility of online learning for marginalized groups like students with disabilities, online learning can be a feasible option for students with disabilities related to degree attainment through flexibility in instruction, safe learning environment, and access to content.

The research on the effectiveness of online course-taking is mixed, and there are incongruities with findings regarding student outcomes. Jagers and Xu (2010) compared

patterns of online course-taking, retention and performance for community college students who took online courses and students who took face-to-face courses. They discovered the completion rates for face-to-face students were better compared to those of online students. Further investigation showed a more dismal situation for those online students who were trying to complete remedial courses. Higher proportion of online credits decreased community college transfer to a four-year college. In contrast, Shea and Bidjerano (2016) conducted a national study of community college students to explore whether or not the participation in online education impacts time to completion, transfer, and dropout. They found accelerated and increased degree completion for community college students who participated in online courses and found higher rates of transfer for those students who enrolled in at least one online course and lower dropout rates in year 5 and year 6. Finally, Sublett (2019) addresses the online paradox for online community college students where negative outcomes are observed in the short-term, but positive outcomes become apparent in the long-term. Using national data comparing students who took online courses with those that did not take online courses, it was discovered that there was no statistical difference associated with online courses and the increased or decreased time it took to transfer to a four-year college and time-to-completion. The literature on online course-taking debates its effectiveness, but few existing studies examine the impact of online course-taking on outcomes for students with disabilities.

Problem Statement

While there have been substantial policy improvements in equitable access to postsecondary education for students with disabilities in community college, inequities still persist – the degree completion rate is lower and the dropout rate is higher for students with disabilities in community colleges; and the exigency of these inequities have been exacerbated

due to COVID pandemic. A reason that community colleges are accessible for many students, including students with disabilities, is that there are few barriers of entry costs and prerequisite for enrollment. Therefore, students turn to community college as a pathway to education in order for future financial stability. Unfortunately, students with disabilities are not showing equitable outcomes in community colleges as seen with low completion rates (Newman et al., 2009; Newman et al., 2011). Although barriers of access to education have been addressed with national and international policies such as Individual with Disabilities Education Act (IDEA), Section 504 of the Rehabilitation Act of 1973, Americans with Disabilities Act (ADA) of 1990, and the United Nation's Convention on the Rights of Persons with Disabilities, the completion rates and dropout rates for students with disabilities in postsecondary education has not been proportional to those students with no disabilities. Barriers of entry into postsecondary education have been addressed, but the barriers for learning have been an ongoing issue. Studies have shown barriers for learning for students with disabilities are: unreliable safe learning environment, inflexible instruction, and inaccessibility of learning content (Flink & Leonard, 2019; Hoggatt, 2017; Morina & Morgado, 2018; Mullins & Preyde, 2013; Ryan, 2007; Shevlin et al., 2004). These barriers for learning have intensified for students with disabilities since the COVID pandemic advanced the pivot from face-to-face learning to online learning. Although this rapid transition to online learning caused challenges for students with disabilities in regards to access to accommodations and emergence of new challenges (Gin el al., 2021), students have higher satisfaction with online courses that used effective online instruction (Means & Neisler, 2021).

Although online learning is a feasible option for students with disabilities to address barriers of learning, with the potential of flexible instruction, increased access to content, and

safe learning environment, studies on the effectiveness of online learning is mixed. There are studies that show online learning supports positive learning outcomes and other studies that show negative learning outcomes. Understanding the impact on outcomes of online learning for students with disabilities is important. Understanding whether online learning helps or hinders students with disabilities can give insight to learning outcomes and advance future financial stability for students with disabilities. Although there are disability studies that investigate the impact of online learning on accessibility, flexibility, and inclusiveness of course design (Habib et al., 2012; McManus et al., 2017; Nieminen & Pesonen, 2020; Tandy & Meacham, 2009), on composition skills (Bruce et al., 2013), on control of learning and pace of learning, personalized learning, personalized touch, and social aspect (Allday & Allday, 2011; Basham et al., 2016; Cockerill et al., 2019), on implementation effectiveness of Universal Design for learning (Burgstahler & Russo-Gleicher, 2015; Griful-Freixenet et al., 2017; Seok et al., 2018), and on quality of life and self-esteem (Lambert & Dryer, 2018), no studies to date have looked at the impact of online learning on degree attainment for students with disabilities in two-year community colleges.

Purpose Statement

Considering the growing achievement gaps of students with disabilities in community colleges in the United States and the possibility of online courses being a plausible option to decrease these achievement gaps by supporting equitable outcomes, there is an apparent need to investigate to what extent, if at all, does online course-taking impact degree attainment among students with disabilities in community college? Online learning is a feasible option for students with disabilities because of the potential of flexible instruction, increased access to content, and safe learning environment (Badge et al., 2008; Center for Online Learning and Students with

Disabilities, 2016; Cockerill et al., 2019; Song & Hill, 2007). There is a significant amount of research that support online learning and those studies that show evidence opposing online learning, however, there is a gap in literature that investigates the impact of online learning on students with disabilities. On one hand, researchers such as Jagers and Xu (2010) find that the completion rate for online students are not as good as face-to-face students. On the other hand, there are researchers such as Shea and Bidjerano (2016) who have found positive impacts of online learning on degree completion. The studies on online course-taking continues to examine its effectiveness; but few studies include students with disabilities. The online course-taking studies that include students with disabilities focused on composition skills (Bruce et al., 2013) and quality of life and self-esteem (Lambert & Dryer, 2018). This study will contribute to the literature on students with disabilities by examining the impact of online course-taking on college degree level completion among students with disabilities in community colleges.

Significance of the Study

This research study has direct national and global relevance to both educational policies and educational resources because it investigates to what extent, if at all, does online course-taking impact degree attainment among students with disabilities in community college? This significance is timely because the COVID pandemic has precipitated the increased use of online learning and the negative impact on marginalized groups of students such as students with disabilities (Gin et al., 2021). If, indeed, online course-taking increases degree completion for students with disabilities, then more policies might endorse the resources to expand online courses to support students with disabilities. The return on investment of such policies and resources would impact the dropout rate and degree completion, and in the long run, create more future employment opportunities for students with disabilities. Conversely, if it is the case that

there is no relationship between online course-taking and degree completion, or worse, online course-taking decreases degree completion, then policymakers may deliberate on the adverse effects of online course-taking among students with disabilities. It's important that educational agencies such as community colleges consider the impacts of online learning especially as it relates to resources and policies that support online learning. In a study by Hart (2021), postsecondary institutions that had pre-COVID online resources such as technology and professional development were well positioned compared to institution that had limited resources when COVID impacted education and advanced the use of online learning. The online learning readiness of students in postsecondary institutions outside of the US revealed to be more important especially for institutions in underdeveloped countries. Adnan and Anwar (2020) investigated the attitudes of Pakistani students in higher education during the COVID pandemic when online learning was compulsory and found that the majority of students had internet accessibility problems due to technical and monetary issues and felt that face-to-face classes were more effective than online classes.

This study will represent a notable contribution to the growing literature on students with disabilities and online course-taking in community colleges. There have been numerous studies on the educational experience for students with disabilities in postsecondary (Moriña & Morgado, 2018; Ryan, 2007; Shevlin et al., 2004). There are fewer studies addressing students with disabilities outcomes in community college (Flink & Leonard, 2019; Hoggatt, 2017). Studies on online course-taking for students with disabilities in postsecondary education have focused on four-year institutions (Lambert & Dryer, 2018). This research aims to contribute to the field by using nationally representative data to identify the impact of online course-taking on dropout and degree completion among students with disabilities.

Definition of Terms

The following terms are relevant to this study and are defined to give the reader the context of each term in this study.

Accessibility is defined as product or service such as learning content or instruction optimized for the needs of as many people as possible (CAST, 2021).

Accommodations are supports or assistances provided for students with disabilities to advance equitable access to content and learning outcomes; examples are extra testing time, assistive technology, screen magnifiers, tutoring, excused absence, and deadline extensions (Terras et al., 2020).

Americans with Disabilities Act (ADA) protects people with disabilities by ensuring the same rights and opportunities that is given to all people; compared to Section 504, has a broader reach to protect those individuals with disabilities in agencies not limited to whether they receive federal funds like private postsecondary institutions except for religious organizations and private clubs (Yell, 2019).

Convention on the Rights of Persons with Disabilities is an international human rights treaty adopted by the United Nations that recognizes the equal rights and freedom by all persons with disabilities; for this study, the focus is on education without discrimination (United Nations, 2021b).

Face-to-face is defined as traditional instruction and learning in a physical classroom (Jaggers & Xu, 2010).

Flexibility is defined as the student's ability to choose when they study, how they receive information, and how they express the learned knowledge (CAST, 2021).

Individual with Disabilities Education Act (IDEA) provides tools for educators and parents to ensure that every elementary and secondary student who is disabled is provided free appropriate public education (Yell, 2019).

Learning theory is an idea intended to explain and give insight on process of learning; such theories are behavioral learning theory - learning is a progression of transformation due to stimuli or effect on behavior, social learning theory suggests that learning is done by observing, cognitive learning theory focuses on how learning information is received and managed by the mind (Slavin, 2012).

Medical model is a deficit model approach; normality and what is a normal student is defined by the institution and stresses disability is a differentiated problem that is individualized for each disabled student, thus finding individual segregated solutions (Mitra, 2006).

Online or distance education is defined as courses offered via Internet or other computer technologies, in which the students are separated from the instructor and supports regular and substantive interaction between the students and the instructor synchronously or asynchronously; main predictor variable in this study that indicates whether the student took all, some, or none of their classes completely online (Bryan et al., 2019).

Postsecondary education is defined as an academic, vocational, technical, home study, business, professional, or other school, college or university offering educational credentials or offering instruction or educational services; for this study refers to two-year community colleges (Bryan et al., 2019).

Postsecondary degree attainment pertains to educational degree attainment from a tertiary institution; for this study refers to two-year degree attainment such as certificate, associate, or bachelor (Bryan et al., 2019).

Section 504 of the Rehabilitation Act of 1973 protects people with disabilities by ensuring the same rights and opportunities that is given to all people by preventing disability discrimination in agencies that receive federal funds like public postsecondary institutions (Yell, 2019).

Social model is an inclusive approach to disabilities, maintains that society creates the oppression of the disable segment of the population (Olkin, 2002).

Students with disabilities is defined as a student:

(i) with mental retardation, hearing impairments (including deafness), speech or language impairments, visual impairments (including blindness), serious emotional disturbance (referred to in this title as ‘emotional disturbance’), orthopedic impairments, autism, traumatic brain injury, or health impairments, or specific learning disabilities; and (ii) who, by reason thereof, needs special education and related services (The Individuals with Disabilities Education Improvement Act, 2004). Disability is determined by: (a) a physical or mental impairment that substantially limits one or more major life activities of such individual; (b) a record of such an impairment; or (c) being regarded as having such an impairment (The Rehabilitation Act, 1973). The disability variable in this study is defined as: long-lasting disability or condition such as hearing impairment, blindness, deafness, severe vision, difficulty concentrating, remembering or making decisions, or long-lasting condition that substantially limits one or more basic physical activities such as walking, climbing stairs, reaching, lifting, or carrying (Bryan et al., 2019).

Universal Declaration of Human Rights is an international human rights document adopted by the United Nations that recognizes the rights and freedom of all humans (United Nations, 2021a); for this study, the focus is on higher education rights.

Universal Design for Learning is derived from an inclusive architecture design known as Universal Design where the goal is to create the most use for the most amount of people; the goal of Universal Design for Learning is to provide most learning opportunities for every student, including students with disabilities, by considering different backgrounds, different styles of learning, and different abilities (CAST, 2021).

Conceptual Framework

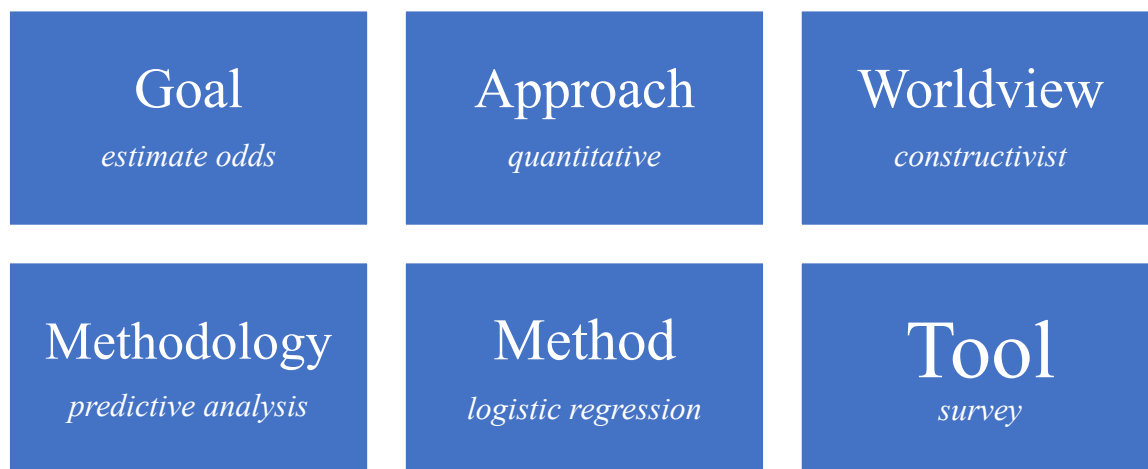
Learning online offers a conceivable solution to address the educational gap for the degree attainment outcomes of students with disabilities in community colleges because students can choose how they access course content, students can choose when they learn, and students can choose where they learn, thus supporting increased flexibility, accessibility of content, and a safe learning environment. Online course-taking can support learning flexibility through self-directed learning, where students can take advantage their own learning attributes; their own degree of independence in overseeing learning; and choices of various learning contexts (Song & Hill, 2007). Online coursework can be designed to personalize the way the content is accessed by using control options and various accessibility assistance such as visual control features, navigation tools and key word search (Badge et al., 2008). Online learning environments can provide a safe learning environment where students with disabilities feel less pressure in social situations and stigma because of disabilities (Center for Online Learning and Students with Disabilities, 2016; Cockerill et al., 2019).

Theoretical Framework

The researcher has selected to use Jago's (2019) framework (Figure 1) to organized the theoretical foundation that guides this study.

Figure 1

Theoretical Framework



The goal of this study is to estimate the impact of online course-taking on postsecondary degree attainment for students with disabilities in the United States. Specifically, the research question is to what extent, if at all, does online course-taking impact degree attainment among students with disabilities in community college? A quantitative approach will identify the association, if at all, of online course-taking on postsecondary degree attainment among students with disabilities in community colleges in the United States.

The researcher is influenced by critical theory with respect to Crenshaw's theory of intersectionality (1989) and Mezirow's perspective transformation theory (1981), but utilizes a constructivist worldview that frames the methodology. Student identity and the intersectionality of identities are important. For students with disabilities part of their identity is related to one or more disabilities. Systematic discrimination in education can create barriers for one or more of

these identities (Crenshaw, 1989). For instance, heavy classroom doors can cause physical barriers, fast pace lectures or discussion can be barriers for those who have emotional disturbance issues. There is a differentiated experience for students identifying with one compared to more than one disability. A one-way fits all approach to learning creates inequities for students with disabilities. With Perspective Transformation, a critical approach is taken to disrupt past assumptions or stereotypes of traditional education (Mezirow, 1981). For students with disabilities the disruption of traditional education can introduce new experiences that can be more inclusive. Online course-taking is a feasible option that can disrupt traditional face-to-face classes and give more option of learning. Online course-taking can address the inequities of a one-way fits all approach that is sometimes associated with traditional face-to-face classes. Although the researcher is influenced by critical theory based on the content and topic that describes experiences of students with disabilities in education and the inclusiveness comparing and contrasting the social model of disability versus the medical model of disability (Mitra, 2006), the worldview that influences the researcher's methodology is constructivist where students with disability, especially adults students with disabilities, have agency in their own learning and define this learning through their intersectional experiences and prior knowledge related to their layered identities (Crenshaw, 1989).

This study will use a predictive analysis to estimate the association, if at all, between online course-taking among students with disabilities in community colleges and degree attainment using a logistic regression. Since this study uses extant data from the Beginning Postsecondary Student Longitudinal Study (BPS: 12/17), the tool used is the BPS: 12/17 survey instrument.

This study will explore how degree attainment for students with disabilities in community colleges may or may not be impacted by online course-taking. Online course-taking can conceivably advance a learning environment for students with disabilities that is flexible, accessible, and safe (Badge et al., 2008; Center for Online Learning and Students with Disabilities, 2016; Cockerill et al., 2019; Song & Hill, 2007). A logistic regression analysis will be used to estimate the odds of degree attainment (certificate, associate's degree, bachelor's degree, and a combination of all degree attainment) as a function of the predictor variable – the interaction between disability and online course-taking and controlling for student demographics, academic characteristics, and institution factor.

Research Question

In order to better understand the impact of online course-taking on students with disabilities in community colleges, this study seeks to answer the following question:

- RQ: To what extent, if at all, does online course-taking impact degree attainment among students with disabilities in community college?

Limitations

The limitations of this study are related to the dataset and methodology. The dataset in this study is Beginning Postsecondary Student Longitudinal Study (BPS: 12/17) which limits the student sample to first-time students who started their postsecondary education during the 2011-2012 academic year. Another limitation is recency of the dataset. BPS: 12/17 is a multi-year, longitudinal collection of data and is the most current BPS dataset to date. Although BPS: 12/17 is a collection of data that is associated with postsecondary outcomes, the details of the online course, course instruction, and course participation are not specific (Bryan et al., 2019). A more complete understanding can be achieved through details such as whether the course is hybrid or

fully online, whether the course design uses differentiated instruction to support all students, and online course participation patterns of students. The dataset on students with disabilities is small and require to group various disabilities into a single disability group. This study groups various disabilities and uses a binary indicator of whether a student has a disability or not, similar to a study conducted by Sublett and Chang (2018). Further research might consider disaggregating the disability data to get a better insight on the differentiated needs of various groups of disabilities. This quantitative study utilizes a logistic regression analysis. Although a regression analysis gives insights on the variables and the relationships between the variables, a causal association between variables is limited (Urdan, 2021). Overall, the use of regression analysis with the confines of BPS: 12/17 limits the generalization of findings for the greater population.

Delimitations

The BPS: 12/17 dataset is a collection of postsecondary topics for students. Such topics are, but not limited to “persistence and attainment, employment during enrollment, financial aid and borrowing, education and career expectations, and employment outcomes after leaving postsecondary education” (Bryan et al., 2019, p. 2). The researcher delimits the inclusion of the postsecondary topics to persistence and attainment, specifically degree completion, in order to address the research question: To what extent, if at all, does online course-taking impact degree attainment among students with disabilities in community college? The researcher also delimits the BPS: 12/17 sample to public two-year institutions to support the focus of this study on community college students.

Assumptions

The assumptions of this study are related to the dataset and the experience of students with disabilities. The BPS: 12/17 dataset is a collection of information from student surveys and

administrative data sources (Bryan et al., 2019). This study assumes that the survey participants answered the questions truthfully, and the administrative data was obtained correctly. There is also an assumption that the data was collected accurately and supported by quality control and appropriate training for the BPS staff. It is assumed that the students' disabilities were reviewed and identified using a standardized process to recognize disabilities accurately. Associated with students with disabilities is the experience of inequity barriers in postsecondary education, and it is the assumption that community colleges are the preferred choice of postsecondary studies because of the fewer barriers of entry.

Organization of Study

This study is organized in five chapters. Chapter 1 is an overview of this study on student with disabilities taking online community college courses by providing the background, problem statement, purpose, significance of the study, terms, conceptual framework, theoretical framework, research question, limitations, delimitations, and assumptions. Chapter 2 is the literature review that presents the conceptual framework that guides this study and the theoretical frameworks that support the research question and approach. This chapter gives national and international insight using studies from various countries. Information about learning theory and its application to online learning is provided. Chapter 3 provides the methodology utilized in this study, detailing the Beginning Postsecondary Students (BPS) 12/17 dataset, the research design, the quantitative approach with statistical models, and variables. Chapter 4 consists of the results and a summary of the findings. Chapter 5 concludes with the local and global policy implications and recommendations for future research.

Chapter Summary

This current study seeks to investigate the impact of online course-taking on dropout and degree attainment for students with disabilities in community colleges. This research hypothesizes that online course-taking can benefit students with disabilities by providing increased access to content, flexibility in learning, and safe learning environment. Using national data, the findings from a quantitative analysis may have national and global impact on policy makers advancing equity in postsecondary education. This study is situated in the growing literature for students with disabilities and fills the gap regarding the shortage of empirical research focusing on online learning for student with disabilities in community colleges.

Chapter 2: Literature Review

Chapter Overview

This chapter describes the purpose of the study and the research question: To what extent, if at all, does online course-taking impact degree attainment among students with disabilities in community college? The review of literature and connections to relevant research is guided by researcher's conceptual framework that online learning provides flexibility, safe learning environment, and access; followed by support for students with disabilities and learning theories that impact learning online. The majority of the literature review is framed around previous studies that focus on students with disabilities in postsecondary education in the United States and other countries, online learning in American community colleges, and the outcomes of online learning and online learning with students with disabilities. Finally, the global condition of disabilities and equity for students with disabilities will be reviewed with focus on educational access and inclusion.

Purpose Statement

The growing exigency of degree attainment gap for students with disabilities compared to students without disabilities in US community colleges and the conceivable option that online learning might decrease these inequities in learning outcomes, guides the purpose of this study to investigate to what extent, if at all, does online course-taking impact degree attainment among students with disabilities in community college? There are studies that support online learning for postsecondary students (Edmunds et al., 2021; Johnson & Cuellar Mejia, 2014; Shea & Bidjerano, 2014, 2016, 2018, 2019). There are opposing studies that do not support online learning for postsecondary students (Hart et al., 2018; Huntington-Klein et al., 2017; Jaggars & Xu, 2010; Xu & Jaggars, 2011). Studies that have included students with disabilities describe

learning experiences related to the accessibility and flexibility of online learning (Allday & Allday, 2011; Basham et al., 2016; Bruce et al., 2013; Cockerill et al., 2019; Seok et al., 2018; Griful-Freixenet et al., 2017; Nieminen & Pesonen, 2020; Tandy & Meacham, 2009).

Conversely, studies have explored the negative learning experience for students with disabilities where online learning content lacks accessibility and flexibility (Habib et al., 2012; Lambert & Dryer, 2018; McManus et al., 2017).

In 2020 the COVID pandemic pressured the sudden pivot to online learning which challenged students with disabilities who studied online. Gin et al. (2021) assert the COVID pandemic caused the abrupt decision to transition to online learning that addressed the needs of the majority of students, but caused challenges to students with disabilities related to accessibility of accommodations and the emergence of new online problems. Students with disabilities were not able to access some of the pre-COVID accommodations such as testing environments with reduced distraction, extended testing time, and course lecture notes. The pivot to online learning caused new issues for students with disabilities such as the unreliable use of closed captioning for videos, inconsistent breaks during testing, and inaccessible recordings of lectures. The reduced availability of accommodation and emergence of new online challenges triggered anxiety that caused disability symptoms to be exacerbated. The researchers proposes that institutions discuss “ways to deliver accommodations and resources to students with disabilities during crises” (Gin et al., 2021, p. 12).

Online learning is a feasible option for students with disabilities because of the potential of flexible instruction, increased access to content, and safe learning environment (Badge et al., 2008; Center for Online Learning and Students with Disabilities, 2016; Cockerill et al., 2019; Song & Hill, 2007). Although this study will contribute to the literature on students with

disabilities by investigating to what extent, if at all, does online course-taking impact degree attainment among students with disabilities in community college, this study will also contribute to a greater issue of equity in education, specifically looking at the achievement gaps of students with disabilities. The applications of this study will contribute to the work of global organizations such as the United Nations Educational, Scientific and Cultural Organization (UNESCO) that address the inequities for more than one billion people in the world that have some form of disabilities (UNESCO, 2010).

Research Question

In order to better understand the impact of online course-taking on students with disabilities in community colleges, this study seeks to answer the following question:

- RQ: To what extent, if at all, does online course-taking impact degree attainment among students with disabilities in community college?

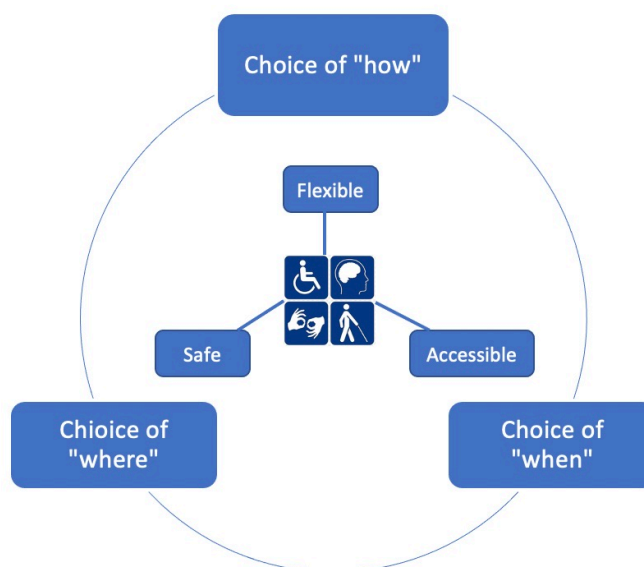
Conceptual Framework

Learning online offers a plausible solution to improve the educational outcomes for students with disabilities because it provides flexibility in learning, increased accessibility to course content, and a safe learning environment (Figure 2). First, online coursework can be flexible using various platforms and a multimodal approach so students have choices in ways to interact with information. Students with disabilities can choose how they access course content. Second, course instruction can support options for when and how long students with disabilities study by accessing online learning synchronously and/or asynchronously. Students can learn at the same time or at different times. Third, online learning environments are safe and supportive, reducing the stigma and interpersonal intimidation that students with disabilities may feel in a face-to-face class. Students with disabilities can choose where they learn. In short, online learning offers a

conceivable option for students with disabilities because online learning provides “flexible scheduling... safe communities in which to learn; and varied methods of teaching, curriculum delivery, and assessment” (Center for Online Learning and Students with Disabilities, 2016, p. 85).

Figure 2

Conceptual Framework



Flexible: Choice of “How”

The conceptual framework of this study is grounded in existing literature suggesting that online learning is flexible because of the opportunity to support self-directed learning, options for accessibility tools, and flexibility with learning content – how a student receives content, engages in content, and articulate knowledge. Song and Hill (2007) suggest a conceptual model that online learning is flexible by establishing control of learning for the student, or self-directed learning through the following: personal attributes, process, and context. Personal attributes refer to characteristics that the learner utilizes while learning such that an individual’s motivation and

capacity for learning, as well as prior knowledge of content is useful in gaining knowledge of content. The process of learning is influenced by the autonomy in planning, monitoring, and evaluating learning on a learning autonomy continuum. For instance, the control of learning can be mostly assigned to the learner such as studying independently of the instructor instead of relying mostly on instructor directed lectures which reduces learner control. The elements that guide the context of the learning are design and support. Resources, structure, and the nature of task are incorporated into the design; and instructor interactions and peer interactions are part of the support. Online learning has various options for learning context. Therefore, it is important for the learner to be aware and agree on the roles and responsibilities as it relates to taking control of the online learning context. Badge et al. (2008) assessed the use of online learning accessibility tools between students with disabilities and students without disabilities. They discovered when both students with disabilities and students without disabilities were asked to answer questions using Web-based resources, students with disabilities accessed 'user control' features more than students without disabilities. These students with disabilities were not indiscriminately clicking on control options, instead they were intentionally personalizing their learning. The flexibility of online learning accessibility tools allowed students to customize how they received the learning content which made online learning more accessible. Students with disabilities found and utilized these control features faster than students without disabilities suggesting that being able to control the learning environment was expected. Rodrigo and Tabuenca (2020) looked at evaluations of the course accessibility by students with disabilities and found that certain online accessibility tools were necessary: audio-visual recordings, textual transcripts, audio-visual subtitles, and customizable downloadable materials. Online learning provides flexibility in learning content; thus, accommodating for more learners and increasing

equity for learning outcomes (Pittman & Heiselt, 2014). Learners can utilize various platforms and benefit from a multimodal approach to give flexibility and choices on how they learn – various platforms such as discussion boards, chats, and video conferencing and various learning approaches such as visual, auditory, and kinesthetic. Center for Applied Special Technology (2021) advances inclusive education through Universal Design for Learning which creates more equitable flexibility to learning content for the greatest number of students, including marginalized students like students with disabilities. Universal Design for Learning is rooted from an architect movement known as Universal Design, named by Ron Mace, where architectural plans are designed to include the most use for the most amount of people. For instance, sidewalk curb ramps are useful for both someone using a wheelchair and for people who want to get on a sidewalk curb. Similarly, the goal of Universal Design for Learning is to provide maximum learning opportunities for all by making learning “accessible and applicable to students with different backgrounds, learning styles, abilities, and disabilities” (Rose & Meyer, 2000, pp. 68-69). This increased flexibility of content through the principles of Universal Design for Learning is achieved by providing multiple ways in which students can receive content, multiple ways in which students engage with content, and multiple ways in which students can articulate knowledge (CAST, 2021). Students can be supported to receive content by customizing the way information is received, using multiple media, and supporting information processing. Students can be supported to engage with content by minimizing barriers to access learning, providing options for persistence, and developing opportunities for reflection. Students can be supported to articulate knowledge by giving options of ways to respond, allowing communication through multiple media, and providing options for goal-setting. Illustrations of Universal Design for Learning include using multiple delivery of instructions, providing

multimodal representation of information such as auditory, visual, and kinesthetic, a various use of mediums and engagement such as text, videos, paired or group discussion, individual work and cooperative learning group work. In practice, Universal Design for Learning decreases the number of barriers for a student to learn and increases learning opportunities for all learners with various abilities and disabilities.

Accessible: Choice of “When”

Online course-taking provides an option for students to choose when course content is accessed and can accommodate for greater accessibility by allowing for the various study time needs for a wide range of students supporting how much time students learn. K. Smart and Cappel (2006) investigated postsecondary students’ perceptions of web-based, asynchronous, independent study online units. When asked about the perceived benefits of the online units, participants identified, “the flexibility and convenience of online learning, such as the ability to access the lessons anywhere at anytime, and to complete the units at one’s own pace” (K. Smart & Cappel, 2006, p. 211). It was also discovered that students’ perceptions of online learning were impacted by taking elective units compared to taking required units and fourth-year classification versus non-fourth-year classification – elective course-taking students and fourth-year students rated online learning higher. T. Zimmerman (2012) explored the interactions that students had with online course content and the impact on grades. Illustrations of learner interactions with content are utilizing online books, presentation slides, and videos. The time spent with these interactions with course content impacted quiz grades. Specifically, there was a strong relationship between the time a student spent interacting with course content and higher grades. The asynchronous aspect of online learning can benefit students with disabilities by allowing more time for learning. Yen et al. (2012) found that interactions in an online

environment were associated with lower anxiety compared to interacting in real-life situations. Using questionnaires for over 2,000 college students, they found that this reduced anxiety for online versus face-to-face interactions was especially true for participants with high social anxiety such as depression. The researchers attribute this reduced anxiety for online interaction to a student's choice to take time to reflect and deliberate on their responses to asynchronous discussions, and the student's choice of anonymity.

Safe: Choice of “Where”

Finally, online learning can provide students choices of where they learn which offers a safe, adaptable, and supportive learning environment and reduced intimidation. The Center for Online Learning and Students with Disabilities (2016) advocates for online learning opportunities because of the benefits for students with disabilities. Online learning can help many different learners, including students with disabilities by addressing learner variability through assortment of learning options, flexibility of scheduling, and special accommodations. The Center's researchers assert teachers should acknowledge the student's personal attributes and situations such as cultural background, technology access and competency, and strengths and areas of improvement. Acknowledging these personal attributes and situations support a learning environment that is safe for a greater amount of students including students with disabilities. Students with disabilities often seek assistance with accommodations and McAndrew et al. (2012) assert that designing a supportive environment that advances communication and explains accessibility accommodation will help both educators and learners because online learning environments are different than face-to-face learning environments. Students in an information literacy course acknowledged the benefit of receiving support tutorials for online tools such as discussion boards and providing instructional support through clear expectations – using

assignment rubrics, syllabus, instructions and feedback (Catalano, 2014). Making mistakes in online spaces is concerning for students and being anonymous provides a safe environment for students with disabilities who might be anxious about not understanding content the same way as other students (Podsiadlik, 2023). This current study is also grounded in the work of Cavanaugh et al. (2013) who assert that online learning can contribute to student engagement and, subsequently, learning outcomes among students with disabilities. They identify students must be supported by a safe learning environment and caring community so the students can make connections to their academic and post academic needs. Illustrations of safe learning environments is through support for students' control through uniform and equitable rules, whole-school commitment to ensure the needs of all students are met, and a feeling of community. Examples of caring community foci are fostering a feeling of belongingness, ensuring all students feel cared about through support of teachers and peers, and providing services that strengthens access to academic and technical support.

Support for Students: Medical Model and Social Model

Students with disabilities can be supported through equitable academic and social inclusiveness reinforced by equitable rules and a whole-school commitment from staff, teachers, and peers where students with disabilities are not stigmatized and part of the mainstream educational community. The extent to which inclusiveness is advanced in higher education can be viewed through two ideological models – medical model or social model. These two models can frame how institutions such as community colleges' approach equity for students with disabilities. The medical model lens is a deficit model approach, where institutions define normality and what is a normal student and see the ineptness of each disability as a differentiated problem that is individualized for each disabled student, thus finding individual segregated

solutions. This model excludes students with disabilities from the mainstream class because it considers a disability as an individual problem “caused by a disease, and injury, or some health condition that requires medical care in the form of treatment and rehabilitation” (Mitra, 2006, p. 237). The student must be cured or the disability must be addressed in order for the students to be a part of “normal” society.

On the other hand, the social model takes an inclusive approach to marginalized people, such as students with disabilities, and asserts that society’s failure is the oppression of the disable segment of the population (Olkin, 2002). Therefore, the social model becomes a tool that compels society to give attention to the social barriers and institutional barrier that excludes students with disabilities (Dirth & Branscombe, 2017). Through a social model lens, institutions can commit to a whole-school initiative to identify these institutional barriers that academically and socially exclude a group or groups of students and find equitable alternatives to be more inclusive so students such as students with disabilities are part of the mainstream educational community. Such cases of inclusiveness are policies that require teachers to use instructional strategies that incorporate multiple modalities of learning instead of a single modality, accepting alternative ways to show mastery of knowledge, allowing communication with multiple media, and giving opportunities of asynchronous instruction instead of solely using real-time of synchronous instruction. These instructional policies give more choices to students so that the most number of students can be included. In order to create a safe learning environment, the goal is to increase inclusion by accommodating the greatest number of students. “Disability is a social construct. Problems reside in the environment that fails to accommodate people with disabilities” (Olkin, 2002, p. 133).

The level of an institution's inclusiveness towards students with disabilities is influenced by the type of ideological model for which it prescribes, such as medical model or social model. Dirth and Branscombe (2017) examined the effects of representing disability through medical model versus social model on policy supporting or discriminating people with disabilities. Through a survey, they discovered that individual participants who prescribed to the social model as opposed to medical model had an increased awareness of "disablism," or the structural discrimination of disable people, thus advancing policies that support the social model to improve equity and inclusion. In another part of the study, participants were conditioned using online articles to read. Some participants were conditioned by reading an article framed with the medical model, where physiological symptoms cause depression; and other participants were conditioned by reading an article framed with the social model, where inaccessible environments and social attitudes unsupportive of disabilities cause depression. The participants conditioned with the medical model identified the source of difficulties due to the diagnosed disability. The participants conditioned with the social model identified the source of difficulties due to social factors. The researchers also wanted to find out if the medical model would reduce awareness of structural disablism by legitimizing inequality towards disabilities. It was discovered that "the medical model does indeed increase participant legitimization of disability inequality" (Dirth & Branscombe, p. 432). Bogart et al. (2019) surveyed university students in the Northwest United States regarding their connection with social model or medical model and their attitudes towards people with disabilities. They discovered that a stronger identification towards social model and weaker identification towards medical model predicted favorable attitudes towards people with disabilities. Participants in this survey who had disabilities had favorable attitudes towards people with disabilities and had a stronger belief in the social model which appeared to be a

cultural mismatch because these attitudes and beliefs conflicted with the majority of peers in the university. Conflict also occurs when institutions seemingly espouse the social model, but in practice demonstrate the medical model. For instance, California's Community Colleges' open access and inclusion mission is inconsistent with their medical model approach to policies such as rigid funding models and biased reliance on a small group of experts to identify and assign students with disabilities which constrains the inclusion of students with disabilities (Hoggatt, 2017). The researcher asserts that the California Community College inclusion policies lacked follow through in practice. Juxtaposed to California's Community College is the University of Iceland that has an inclusive educational setting for students with disabilities. Björnsdóttir (2017) investigated the well-known inclusive setting of the university's Vocational Diploma Programme for Icelandic students with disabilities. The diploma programme had a universal approach that was inclusive to the needs of students with disabilities by modifying the current curriculum and promoting flexible teaching methodology. There was unified support from faculty, programme coordinators, and student mentors. This social model approach improved the educational setting so "diploma students are not only tolerated but welcomed... and belong to the college community" (Björnsdóttir, 2017, p. 134). Another study by Collins et al. (2019) looked into the inclusive educational setting in a highly ranked (top 2% worldwide) university in Victoria, Australia and revealed that the change process to a more social model ideology requires more than inclusive systemic accommodations such as recording lectures, uploaded material online, wheelchair access, and utilizing a wide range of formats for information. Through semi-structured interviews of students and staff, it was revealed that there needs to be more universal awareness of the social model throughout the university to support the change of more inclusiveness – it is proposed that more resources be moved from individualized supports to

becoming increasingly universal, less divided and more unified view of continued training from staff, and more representation of students with disabilities through less stigma and greater inclusion.

Support for Students: Inclusive Policies

Increased access to higher education has been supported by inclusive policies. This focus on access has supported many marginalized groups of students such as students with disabilities, but evidence shows that more needs to be done. There are policies that support students with disabilities to access education in the United States and countries around the world. The Individual with Disabilities Act (IDEA) guarantees that every elementary and high school student with a disability has access to free public education, and Section 504 of the Rehabilitation Act of 1973 and Americans with Disabilities Act ensures civil rights to those students with disabilities participating in postsecondary education (Yell, 2019). Globally, there are similar supportive policies for people with disabilities, The United Nations' Universal Declaration of Human Rights includes higher education rights and Convention on the Rights of Persons with Disabilities (United Nations, 2021c). Although there have been increased focus on educational access for students with disabilities in higher education, there has not been a reciprocal focus on the specific practices that support everyday inclusion. Inequities still exists for students with disabilities in community college. These students fare much worse than students with no disabilities – with lower completion rates (Newman et al., 2009). The success metrics of equity might not only measure access to education, but also the quality of the educational practices and outcomes. For example, in an analysis of the United Nations' Sustainable Development Goal 4, which addresses educational access for students with disabilities, Unterhalter (2019) discovered that the metrics used to indicate inclusion, quality and

equality in education, do not capture the discrimination that exists that hinders access and quality and misses the target. The quality indicators were too broad and developed by large organizations. Development of these indicators need input from the people who intimately understand. “We need to ask how people who experience the injustice of education exclusion... In what ways can they participate in reviewing metrics and indicators?” (Unterhalter, 2019, p. 49).

Community Colleges

The Biden Administration has identified investments in community colleges a priority in order to be more inclusive and equitable so a greater number of students can access postsecondary education (Geiman, 2021). For many American students, community college is the only choice for postsecondary education because of the open access of entry – lower cost, fewer entry requisites, and less demand to compete for admission compared to four-year institutions. The average cost of a community college is a fraction of the cost of a four-year institution (American Association of Community Colleges, 2020; Provasnik & Planty, 2008). Grade point average requirement or standardized entry tests are not a necessary barrier for community college enrollment. A high school diploma or equivalent is required to enroll in community colleges (Cohen et al., 2014). Therefore, students who are at risk based on cognitive ability or financial capability can access to postsecondary education through community colleges compared to four-year institutions because there are fewer barriers of entry (Adelman, 2005). 11.3 percent of students beginning postsecondary education in two-year public institutions such as community colleges report having a disability (Berkner & Choy, 2008). Those students who are at risk based on cognitive ability may access developmental education, that once complete, they are prepared for college-level classes (Bailey et al., 2010). Students who take a

developmental course such as math were “one and a half times more likely to persist” (Davidson & Petrosko, 2015, p. 170) if taken with an online component. Community colleges have focused on increasing access through online learning. There has been an increasing rate of proportion for online class enrollment compared to traditional face-to-face classes in community colleges (Allen et al., 2016; Seaman et al., 2018). Although the focus on access for marginalized students to community colleges continues through online learning, there is an increasing need to study the outcomes of online learning for marginalized students in community colleges, especially students with disabilities because of the dearth of research that investigates this population.

Online Learning in Community Colleges

The term online learning and distance education has been used synonymously in the education field. Early on, distance education referred to correspondence study at a distance from the physical class location using print material and postal service. Distance Learning progressed to the use of multimedia educational materials and technology such as broadcast radio and television and video and audio. With the evolution of technology, distance education utilizes communication that supports a collaborative community of learners and is primarily referred to online learning or online education (Sumner, 2000).

For community college students, online course-taking is an increasing learning option. Although the overall enrollment in postsecondary education has decreased (National Student Clearinghouse Research Center, 2015), there is an upward trend for distance education in postsecondary (Allen et al., 2016; Lokken, 2014). From 2012 to 2016, the overall enrollment in postsecondary education has decreased 3.8%, but percent of overall enrollment comprising of distance education has increased – in 2012 distance education was 25.9% of overall enrollment and in 2016 distance education was 31.6% of overall enrollment (Seaman et al., 2018). Online

education has shown growth and has supported the push to increase access and flexibility for students in community colleges. Students are accessing online courses as a way to learn.

In various studies, in various states, the characteristics of community college students who study online are: women, white students, students who are 25 years or older, those who are eligible for federal financial assistance, English fluent, and academically prepared (Huntington Klein et al., 2017; Jaggars & Xu, 2010; Shea & Bidjerano, 2014; Xu & Jaggars, 2011). In a study of community college students in Washington State comparing persistence between online course and face to face courses, Huntington-Klein et al. (2017) discovered that females, older students, and full-time employed are more likely to take online courses. The group that was least likely to take online courses was limited English students. In a study by Jaggars (2014), college students at two Virginia community colleges were interviewed for the purpose of understanding their experiences with and their reasons for participating in online course-taking compared to face-to-face learning. These students identified one of the major reasons to take online courses is the flexibility. Students had multiple responsibilities such as work and family and explained that “the flexibility of online learning helped them better balance their schedule” (Jaggars, 2014, p. 29). This flexibility of online learning also gave students the feeling that they were more efficient with their time by not interacting with instructors or students who talk too much in a face-to-face setting. It was also discovered that older students often feel out of place with the young campus environment and appreciated the online choice not to interact with students much younger than them (Jaggars, 2014).

Learning Theory: Impacts on Online Learning

Behavioral learning theory, social learning theory, and cognitive learning theory are theories that give insight on process of learning and can be applied to online learning. Behavioral

learning theory asserts learning is a process of change due to stimuli or consequences on behavior (Ally, 2004). Positive or negative stimulus impacts whether or not an action is repeated. Social learning theory posits people learn through observational learning, and people learn by collaborating with each other (Taylor & Marienau, 2016). Behavior is acquired by observing or interacting with others. Cognitive learning theory focuses on how learning content is received and processed and how the mind works (Slavin, 2012). There are various ways in which students learn, thus each student's differentiated learning process can be explained through cognitive learning theory.

Behavior Learning Theory

Research on behavioral learning theory investigates the effects of consequences on behavior and learning. Two contributions are classical conditioning where a condition is associated with stimuli that evokes a response and operant conditioning where consequences such as reinforcers and punishers impact behavior (Ally, 2004; Schunk, 2012). Pavlov (1906) studied the salivation response of hungry dogs in which meat was the unconditioned stimulus that provoked the unconditioned response of salivation. The ringing of a bell became a conditioned stimulus when it was linked to the presentation of meat. Once the classical conditioning was complete, the ringing of a bell caused the dog to salivate. Skinner (1953) studied operant conditioning which focused on the impact of consequences on behavior – a behavior is either repeated or avoided through the use of reinforcer or punishers. Using “choice boxes,” rats “learn to discriminate between properties or patterns of stimuli” (Skinner, 1953, p. 59). This reinforced the rat's behavior, and the rat learned to press a bar to receive food.

Classical conditioning and operant conditioning expound on learning that occurs in online learning. Classical conditioning is applied to online learning by creating a safe learning

environment, especially for students with anxieties or disabilities. For instance, if online discussions are associated with less stressfulness, adequate time to deliberate on asynchronous posts instead of stressful real-time face to face responses, then students will eventually learn to be calm during online discussions. McCarthy et al. (2010) found that online discussion boards are an effective tool for knowledge acquisition and identify the benefits of small group and large group discussions. Small group online discussion boards were associated with ease of contributing knowledge and adequate time to read all posts. Large group online discussion boards were associated with appreciation of viewpoints (68% of students) and increased instructor involvement. Students were able to deliberate and receive feedback. Operant conditioning is also applied to online learning through feedback that influences behavior. To illustrate, teachers can give or deny digital badges that are associated for learning criteria for feedback on learning. Newby (2019) explored how students use feedback when digital badges were associated with mastery learning. Students took ownership of their learning by evaluating their own work by using the criteria for achieving digital badges. Overall, students found digital badges were an important part of learning, confirming understanding, and extending ideas regarding content. With behavioral learning theory, learners are supported by being presented the intended learning goals and outcomes so they know the direction of their learning, such as the use of online syllabus to give the learner insight by listing successful learning or the use of video to model successful learning. Online learning provides students instant feedback from the computer or asynchronous feedback from instructor. Through regular feedback, students associate positive and negative stimulus that helps identify when students learn content, when students need content remediation, or when students need content enrichment.

Social Learning Theory

Applications of social learning theory are exemplified in observational learning and self-regulated learning. Vicarious learning, or observational learning, is achieved through modeling or learning from observing others and self-regulated learning is where students set expectations for their own performances and reinforce learning themselves (Slavin, 2012; Taylor & Marienau, 2016). Bandura (1965) asserts that people can also learn from vicarious learning or modeling where students learn by watching other people with the awareness that learning is either rewarded or punished. Once this association with rewards and punishment is established, people can begin to regulate themselves. Bandura (1986) posits vicarious learning has four parts: attention, retention, initiation, and motivation. Attention is when the students are motivated to observe a model because they want to learn what they acknowledge or perceive is important. Retention is when the students observe and practice the model – students intake content and begin to process. Initiation is when the students try to reproduce the model accurately. Learning continues as the students demonstrate their learning. Finally, motivation is when the students associate the model with positive reinforcement. By receiving feedback or awards for successful demonstration of learning, students have a positive association with the successful learning.

An online representation of vicarious learning can be modeled through student-to-student interactions in online discussion boards. Students can look at the discussion posts and feedback received from classmates and the teacher. The positive or negative feedback can impact students' contribution of ideas and comments on discussion postings (McCarthy et al., 2010). To illustrate, if a teacher points out and gives positive feedback on a rigorous student posting, this encourages other students to contribute to online discussion using rigorous postings. Swan et al. (2009) assert that discussion boards are important and support online learning communities through

social presence, cognitive presence and teaching presence. The democratic characteristic of contributing ideas to an online discussion supports social presence. The cognitive presence is apparent in discussion boards through exploring and brainstorming shared ideas. Finally, the teaching presence advances student engagement in online discussions by providing support information, summarizing ideas, and guiding discourse.

An example of self-regulated learning that illustrates social learning theory is self-instruction. Meichenbaum (1977) describes the steps for self-instruction where students observe and regulate their own behavior: (a) the teacher models the task while thinking aloud; (b) the student imitates the task using instructions from the teacher; (c) the student performs the task while thinking aloud; (d) the student reduces the need for overt instructions by doing the task again while whispering the instructions; (e) the student presents the task using silent thoughts as a guide. The intended outcome is that the student would be able to successfully self-regulate through internal instructions while displaying learning. Online teachers have used instructional video clips with both audio and text instructions for students to follow and replicate. Teachers model learning in videos while providing accompanying video and text so students can practice learning task while listening to instructions then ultimately perform and demonstrate learning guided by silent thoughts. In a study that investigated the use of video instruction to enhance learning, Choi and Johnson (2005) explored the effect of video-based instruction compared to traditional text-based instruction. By using questionnaires, it was discovered that eight out of nine participants stated that video instruction was more memorable than text-based instruction. There was also a significant difference in attention of learners. The video-based instruction yielded higher attention of learners compared to text-based instruction. The researchers suggest that video-based instruction can be an effective way to enhance retention and attention.

Cognitive Learning Theory

Cognitive learning theory centers on the process of making meaning of content by emphasizing how the learner receives and retains information such that the brain continually organizes information with the purpose of efficiency and accessibility (Slavin, 2012). The process in which information is retained in the memory is an integral part of cognitive learning. Atkinson and Shiffrin's (1968) memory system asserts that memory is a series of transfers to the sensory register, to the short-term memory, and to the long-term memory. As the learner focuses attention to receive and interpret information, the sensory register receives information from the sight, sound, touch, smell, and taste and transfers to the short-term memory. As the working memory, the short-term memory holds information for a short period of time and begins to organize information such as determining what to remember and what can be discarded. The long-term memory is where information is kept for long periods of time through episodic memory, semantic memory, and procedural memory. Episodic memory involves events and situations that come from life experiences. Semantic memory includes common knowledge such as facts, concepts, and strategies. Procedural memory involves knowing how to do things such as walking and driving a car. Slavin (2012) states the brain continually remodels with every new information learned and remodels in a way that's unique for every person. Every person has different processing capabilities and there are many factors that impact these differences such as using various strategies to organize information more efficiently (Wyra et al., 2007). Making meaning of content that accounts for individual learning capabilities requires strategies such as self-directed and self-regulating learning, students setting their goals, selecting the appropriate study strategy, monitoring outcome, and self-evaluating learning (Jossberger et al., 2010; Saks & Leijen, 2014; B. Zimmerman, 1998).

Learning online through the internet gives students the flexibility to customize learning based on individual learning capabilities. Studying the continual use of internet, Eastin and LaRose (2000) discovered that Internet experience positively impacts Internet self-efficacy. Internet use and self-efficacy leads to positive outcome expectations which support how well one believes one can perform a behavior or learning. Cognitive learning theory is applied to online learning design that can support learning of content. Szpunar et al. (2013) found that embedding periodic testing into online video lectures supports the learning process by reducing mind wandering. Specifically, enhanced learning was reinforced when college students were given opportunities to retrieve and review lecture content by taking frequent tests that were appropriately and strategically placed during the video lectures. Compared to non-tested group, these college students who frequently tested during lectures exhibited lower mind wandering, increased note-taking, and higher cumulative test scores. Cognitive learning theory explains learning that occurs in the online environment by supporting students in processing and remembering information. Accessibility of online content makes it easier for teachers to chunk and sequence content in differentiated ways that addresses many learners. With online learning, there are possibilities of various activities that allow learners to select a pathway that matches their own learning styles and motivation.

Previous Studies

There are numerous studies that guide the researcher to address the research question: To what extent, if at all, does online course-taking impact degree attainment among students with disabilities in community college? Studies on postsecondary students with disabilities show the marginalized student experience, physical barriers encountered, and lack of disability awareness or support. Studies on online learning and student outcomes show the research on online learning

is mixed with both negative and positive outcomes. Studies on online learning and the outcomes for students with disabilities show online course-taking is a plausible option because of the flexibility and accessibility that support the personalized learning that is needed for the various needs of students with disabilities. Studies on people with disabilities worldwide show disabilities impact education, poverty, and equity and inclusion.

Postsecondary Students with Disabilities

In the United States and in other countries around the world, there is a dearth of empirical research on equitable educational experience for students with disabilities in postsecondary education. The limited studies that are available are smaller scaled and not generalizable for the greater population, but give insight on outcomes for students with disabilities in postsecondary education. The following themes emerged from these studies that show continual exclusion problems for students with disabilities in college: inconsistencies in awareness, physical access and culture; advancing supports and services; and self-advocacy for accommodations. Research also points to the importance of intersectional identities for students with disabilities.

Many students with disabilities experience challenges of awareness from others of disabilities. Ryan (2007) conducted semi-structured interviews with university students with learning disabilities in Australia and discovered that lecturers lack of awareness impacted these students' every day experience of being excluded. Participants reported that the academic staff were not aware of the pressures that students experienced associated with their disabilities, thus exacerbating the difficulties of learning abundant amount of material and keeping up with the pace of lectures. Repeated requests for accommodation caused embarrassment and guilt, and the limited contact with instructors impacted the participants' opportunities to ask questions or get support. For some of these students, a combination of having learning disabilities and lack of

support from instructors caused anxiety and depression. A student who often felt her learning disability was invisible as opposed to a physical disability, “Every lecturer I had, I had to keep restating what was wrong with me... that was really difficult to have to explain to everyone” (Ryan, 2007, p. 439).

Physical access and cultures inequities for students with disabilities continue to persist in postsecondary education. Marginalized college experience and physical barriers have been an ongoing problem for students with disabilities as evident in an earlier study of students with disabilities in Ireland. Shevlin et al. (2004) found that students with disabilities considered access issues and physical access issues when choosing a course to enroll. Once admitted into the university in Ireland, every day access issues due to disabilities impacted social and academic experiences. Assistive provisions like ramps and elevators increased access, but stairs and heavy double doors made it nearly impossible for students with disabilities. “Access and mobility difficulties were seen as obstacles to overcome in the pursuit of normal involvement in college life” (Shevlin et al., 2004, p. 21). Students with invisible mental disabilities such as dyslexia also experienced being unsupported and frustrated because the lack of awareness by lecturers and inconsistency of accommodation by lecturers such as forgetting to accommodate and slow down the pace of lectures. This caused difficulty and to some extent guilt and embarrassment when students with disabilities had to remind lecturers to slow down. Because these marginalized experiences and physical barriers were long-standing issues, some of these students with disabilities silently accepted these conditions. Another instance of physical barriers marginalizing students with disabilities is seen in a study in Spain. Moraña and Morgado (2018) investigated physical barriers that exist inside and outside the university campus in a study in Spain. Using the principals of Universal Design where broad design of products, buildings, and

environment are usable for the greatest amount of people regardless of ability or disability (Story et al., 1998), the researchers conducted a biographical-narrative study with university students and barrier classifications emerged for students with disabilities: urban barriers, transportation barriers, building barriers, environmental barriers, and communication barriers. Neighborhood and transportation barriers such as poor streets and sidewalks and public transportation presented challenges to a student's ability to get to school. There were also barriers within the university buildings, environmental conditions and communication that made it difficult for students with disabilities, such as small corridors, classrooms with no ramps, inadequate lighting, too much noise, and inaccessible instructional materials. All of these barriers hindered access to learning and content, thus marginalizing the students with disabilities in this study.

The marginalization that students with disabilities experience is also a result of institutional culture. In another study of students with disabilities in California Community Colleges, students had negative experiences due to the institutions' ideological deficit model that individualized and segregated students, inflexible funding model that overemphasizes the authorization of experts to label and place students, and lack of integration by addressing student deficits and not emphasizing inclusion (Hoggatt, 2017). The researcher used Titchkosky's (2011) framework which looks at an institution's accommodation and support for students with disabilities as a way to identify and explain the access that students with disabilities experience. The students in this study experienced exclusion that stemmed from institutional culture and a lack of institutional follow through to be more accommodating. The researchers discovered that California Community College policies claim to work towards access, but lack a practical approach to access and equity that includes all segments of the population and failed to account for disabled students. A phenomenological study in the United States of two-year college

students with disabilities by Flink and Leonard (2019) found the exclusion that college students with disabilities experienced fell into three categories: experience with faculty and staff, college services, and self. These college students with disabilities had mixed and inconsistent encounters with faculty and staff such as very positive and helpful experiences to difficult and negative experiences which led to feeling of frustration and sometimes embarrassment. As a case in point, disability services were not presented or publicized effectively, therefore, participants in this study were not aware of the Office of Disability Services or they discovered this office resource too late. These student were “negatively affected by the existing policies and procedures related to disability services” (Flink & Leonard, 2019, p. 900).

Accommodations and supports services are becoming more available for students with disabilities to make learning more accessible, but more can be done to assist. Burgstahler (2006) explored service and supports related to accessibility for students with disabilities in 17 postsecondary institutions nation-wide to develop distance learning program accessibility indicators to improve distance learning course accessibility. Only 33% of these indicators were implemented at institutions that participated. Thus, the researcher asserts that much still needs to be done to support students with disabilities in distance learning courses. Pena et al. (2016) explored student satisfaction with accessibility accommodations for students with disabilities such as: alternative testing locations, support from test examiners, extension of testing time, adaptation of educational material, support for learning activities, adapting essay tests to multiple choice format or short question format. The questionnaire results showed the most requested accommodation by students with disabilities was alternative testing location, which was the accommodation most accorded. The accommodation that gave students the most satisfaction was adapting essay tests to short question format. Unfortunately, this was the least conceded

accommodation. In regards to service and supports online, Terras et al. (2020) found that students with disabilities had fewer service available online, and these students had to advocate for necessary online accommodations.

Students with disabilities have become self-advocates for requesting necessary accommodations. Flink and Leonard (2019) found that participants' perception of self was impacted by the stigma associated with their disability and were acutely aware of their disabilities which motivated them to advocate for self and others. "Essentially, students each felt that what they had experienced throughout their lives as a student with disability made them uniquely qualified to help others" (Flink & Leonard, 2019, p. 900). This advocacy was apparent in two studies (Fleming et al., 2017; G. Richardson, 2021). In the first study of 30 community college students with a learning disability, students reported "an internal driver propelled them to pursue their post-secondary goals... and were very adept and creative in the strategies they used to overcome their challenges" (G. Richardson, 2021, p. 133). In the second study, 325 students with disabilities in three large state universities filled out an online survey that identified self-advocacy as a factor that predicts high academic performance related to high grade point average (Fleming et al., 2017).

The disability experience is more complex because of the intersectionality of layered identities of each student. There is a differentiated experience for students identifying with one compared to more than one disability. Based on a study of Open University, an institution that offers distance education across the UK, J. Richardson (2017) states that 12% of these online students identified with a disability. Of that group of students with disabilities, 42.7% identified with more than one disability. Having multiple disability had a greater impact for students. For instance, students with autism were as likely to complete online modules compared to non-

disabled students, but were less likely if the student had autism with an additional disability. There is also a differentiated experience base on student characteristics. Pingry O'Neill et al. (2012) determined that sex, age, and type of disability are predictors for graduation among students with disabilities such as female students who are 23 years and older, and students who have physical disabilities compared to cognitive or mental disabilities favor successful graduation. Postsecondary institutions have the challenge of being more flexible in the complex awareness of disabilities. Lombardi et al. (2012) found that there was an additional risk factor for students with disabilities who are also first-generation student status. Compared to continuing-generation students, first generation students with disabilities had lower GPAs, lower family and peer support, and high levels of financial stress. The researchers suggest that disability service providers strengthen their understanding of this population so services can be flexible and personalized. Waitoller and King Thorius (2016) assert that there are inequities in the inflexibility of the American education system which does not accommodate all people such as students with disabilities, and “cross-pollinating” will advance inclusion and equity in the learning experience of all students.

Online Learning and Student Outcomes

With the increase of online learning in postsecondary community colleges, online learning and the effectiveness of online learning on student outcomes have been the focus of discourse and debate because of the conflicting results from various studies. Armstrong et al. (2021) surveyed community colleges students in the southeastern United States to determine if student characteristics impacted retention in online courses for community college. The surveys focused on student characteristics such as locus of control, academic motivation, and learning style as well as demographic factors. Whites and older students (44 and above) had significantly

higher online course completion rates compared to minorities and younger students who had lower course completion rates, while male and female students had insignificant differences in course completion. Regarding locus of control, both internal locus of control and external locus of control had no significant difference in completion rates. In other words, students who attributed success to their individual course performance were not more likely or less likely to have higher course completion rates compared to students who attributed course performance to situations beyond their control. Regarding motivation, student satisfaction with the online course, specifically satisfaction early on the course, was a minor predictor of course completion. Finally, the researchers assert that linking learning styles with online student performance is difficult because of differences in course completion outcomes. The outcomes of this study indicate that students can succeed using various learning styles. Regarding online course design, the researchers suggest “to design courses to maximize the use of various learning styles to try to increase learning outcomes” (Armstrong et al., 2021, p. 42). Although there are continued discussions on online learning, the research on online learning is mixed that show both negative and positive outcomes.

There are other studies with samples in Virginia, California, Washington State, and Alabama that show negative outcomes for online learning such as students are less likely to complete online classes and more likely to fail and less likely to return to the institution (Hart et al., 2018; Huntington-Klein et al., 2017; Jaggars & Xu, 2010; M. Smart & Saxon, 2016; Xu & Jaggars, 2011). M. Smart and Saxon (2016) found that three out of four online/hybrid students were likely to withdraw or fail. The researchers focused on examining student outcomes in developmental English community college classes. They found that 71% of online/hybrid students did not pass their class compared to 23% of students who took the face-to-face version

of the class. In two studies across Virginia's community college system, nearly 24,000 student data were analyzed focusing on student retention and course performance for both college-ready students and developmental students (Jaggars & Xu, 2010) and those students who took either face-to-face or online introductory English and math courses (Xu & Jaggars, 2011). In the first community college study, retention rates for online students were slightly less than face-to-face students. It was also revealed that both college-ready students and developmental students had lower completion rates in online courses compared to face-to-face courses. Students who took online remedial courses were less likely to advance to the gatekeeper courses or the first college-level course. Among students who took at least one online course, the more online credits these students had proportionally, the "less likely to attain an award or transfer to a four-year college" (Jaggars & Xu, 2010, p. 17). In the second community college study in Virginia, comparing student retention and course performance in introductory English and math gatekeeper courses, more students dropped out of online English and math classes compared to face-to-face classes with a 9% gap for English and 13% gap for math. This suggests that these online gatekeeper courses provide less support than the face-to-face equivalent courses. Further, those students who stayed in these introductory courses had different grade outcomes comparing online course-taking to face-to-face course-taking. 74 percent of students who took online English classes earned a C grade or better compared to 77% who took face-to-face English classes. For online math classes the outcomes were much worse with a 6% difference compared to face-to-face classes for those students who earned a C grade or better (Xu & Jaggars, 2011). Xu and Jaggars (2013) showed similar negative outcomes related to student retention and course performance for students who took online courses in one of Washington State's technical or community colleges. Students who were male, Black, and had low academic preparedness had lower persistence and

grades in online courses. In California, a similar study also revealed negative outcomes for online students in community college. Students who take online classes are likely to repeat the course but less likely to take another course in the same subject (Hart et al., 2018). Students in online courses compared to face-to-face courses have “significantly lower completion rates, significantly lower rates of course passing (with an A/B/C or Pass grade) and significantly lower rates of A or B receipt” (Hart et al., 2018, p. 51). Johnson et al. (2015) found that online courses do not fare as well as face-to-face courses such that only 11% of California’s community college online classes were successful based on at least 70% of students getting passing grades and student performance is comparable with face-to-face versions of the same course. Further investigation shows that there is educational outcome gap that disproportionately impacts African American and Hispanic students more negatively. In a Washington State study, Huntington-Klein et al. (2017) discovered that full-time employed, women, older students, and students who are more academically able have better outcomes taking a face-to-face course compare to those peers in the same groups who take an online course.

There are studies that show positive outcomes for online learning. Milz’s (2020) study that assessed the student performance including grades, completion, and retention rates between face-to-face and online communication courses showed that students performed equally in both delivery formats, differing from previous studies that show online students perform worse than face-to-face students. The author proposes these outcomes might be explained by certain variables such as a student’s advancement in course of study may improve online completion (Xu & Jagers, 2011) and taking a mandatory course may yield better student performance compared to elective courses (Wladis et al., 2014). Fike and Fike (2008) found that student persistence was predicted by online course-taking. Although the researchers could not establish

why online course-taking was link to student persistence, they suggest the flexibility of online learning might have an influence on students and recommend further research to explore this association. Shea and Bidjerano (2019) found that the intensity of coursework online impacted student outcomes. Specifically, successful completion of online course was associated with the likelihood of increased degree completion and transfer. This association was stronger for full-time students who had higher grades. Edmunds et al. (2021) conducted an impact study on 1,908 students in North Carolina community college intervening by using instructional practices and technology tools in two introductory courses, namely Psychology and Business, for two terms that showed positive outcomes for online students. The use of high tech tools such as web conferencing, texting, customized videos, and discussion boards/forum and “high touch” strategies including communicate proactively, use preventative strategies to address problems, and remove barriers yielded a decreased probability by 10% of online students dropping the course. For minorities, there was an increased likelihood to pass the course (23% for introductory Psychology course and 7% for introductory Business course) and there was a significant impact on minority students’ year-to-year persistence (5.9%). In larger scale studies, analyzing national data sets from community college students revealed online learning impacts college degree attainment, transfer, and dropout. For instance, Shea and Bidjerano (2014) sought to discover the impact of taking online courses on degree completion. The study revealed that early online course-taking is associated with higher rates of degree attainment in the community college careers of students. Compared to the state-level research in Virginia that revealed the negative impact of online learner to student retention and course performance (Jaggars & Xu, 2010; Xu & Jaggars, 2011), this study of a national data set uncovered an opposite outcome, namely students who took online credit-bearing courses had higher rates of attaining associates degrees than those

students who did not, “14.1% compared to 8.9% of students who had not taken online courses” (Shea & Bidjerano, 2014, p. 108). In another study, Shea and Bidjerano (2016) describe the timing of first associate degree attainment, dropout from the institution, and transfers. The analysis showed that taking online courses increases the rate of degree completion as well as decreases the time for degree completion and shows no significant difference in transfer for community college students. This contradicts the conclusion that an increase in online course-taking decreases the likelihood of degree completion or transfer (Jaggars & Xu, 2010). The study found that online course-taking had no significant difference in dropout (Shea & Bidjerano, 2016). There are studies that show a positive relationship associated with long-term outcomes for online learning. Johnson and Cuellar Mejia (2014) examined the short-term and long-term outcomes of online learning compared to traditional face-to-face learning in California community colleges. Although this study showed negative short-term student outcomes which are similar to other studies such that students who study online have lower course completion and lower passing grades (Hart et al., 2018; Jaggars & Xu, 2010; Xu & Jaggars, 2011), the long-term outcomes contradict these negative outcomes by showing more transfers to four-year universities and more associate degrees which has led to the online paradox “short-term outcomes are poor, but long-term outcomes are not” (Johnson & Cuellar Mejia, 2014, p. 1). Sublett (2019) acknowledged the gap in empirical studies that could provide insight to the online paradox that the short-term outcomes for online course-taking is negative and long-term outcomes are positive. Specifically, the study investigated the distance education course-taking during the first year of community college, which is a critical time period for students. Using a national data set to assess the relationship between distance education, or online course-taking, and time-to-completion, it was revealed that students who took online classes in their first year

did not need more or less time to earn their degrees or transfer compared to students who did not take online courses. Students who completed their distance learning courses during their first year of community college and moved on to a four-year institution, completed their bachelor's degrees two to three months faster than students who did not take distance learning courses during their first year. Other studies have explored the blend of online learning with face-to-face learning such as taking some online courses and face-to-face courses or taking hybrid courses that combine online learning and face-to-face learning. Shea and Bidjerano (2018) investigated the tipping point proportion of online courses to face-to-face courses that would continue leading to positive outcomes for community college students without jeopardizing college degree completion. They discovered that if a student took up to 40% of online coursework the chances for degree completion improved compared to a classroom-only student. Conversely, more than 40% of online courses lowers the level of degree completion. A student's last institution's graduation rate matters too. If a student's last institution has a high graduation rate, this tipping point for online positive outcomes increases up to 60%. If a student's last institution has a low graduation rate, this tipping point is lowered to 10%. James et al. (2016) compared the retention for postsecondary students who took all their classes face-to-face, all their classes online, or hybrid classes that blended online and face-to-face. The results of the study revealed that taking hybrid courses or face-to-face courses yielded higher retention rates than taking all classes online. Older community college students (26+ years) who took all their classes online had higher rates of retention compared to younger students (< 26 years) which suggests that online courses might benefit certain groups of students such older students.

The studies in this section show that there is not an agreement on the impact of online-course-taking on student outcomes in community colleges, and differentiated solutions should be

considered with regards to course type and the needs of various students (Milz, 2020).

Educational institutions should be aware that online learning “brings its own set of challenges that might inadvertently restrict access to higher education rather than increase it” (Harrington, 2010, p. 12). Although there is an apparent disagreement, this study seeks whether online course-taking might or might not impact the outcomes of students with disabilities in community colleges.

Online Learning and Outcomes for Students with Disabilities

While there is not an agreement on the outcomes of online learning for the general population of students in community college, online learning is a conceivable option for students with disabilities, especially when the principals of Universal Design for Learning (Seok et al., 2018) are considered because of accessibility and flexibility; and for students with disabilities, providing learning that is accessible and flexible supports the personalize learning that is needed for the various needs of students with disabilities. Although little research is available, there are few studies that point out the importance of the accessible and flexible nature of online learning for students with disabilities. Online learning is a plausible option for students with disabilities because it offers “flexible scheduling; individual mentoring; safe communities in which to learn; and varied methods of teaching, curriculum delivery, and assessment” (Center on Online Learning and Students with Disabilities, 2016, p. 85).

Personalized learning, through flexibility and accessibility, is a focus for learning environments especially for students with disabilities. Nieminen and Pesonen (2020) conducted a qualitative content analysis of undergraduate students with disabilities taking an online math course in the University of Helsinki. The interview responses from the students were connected by ideas of personalized learning related to accessibility through self-regulation such as setting

goals and monitoring performance. These students with disabilities reported that while having individual access to math concepts, “the detailed rubric and self-assessment practices had a positive impact on their learning and studying... allowed the students to divide their understanding of their own skills into smaller units” (Nieminen & Pesonen, 2020, p. 9). Basham et al. (2016) conducted a descriptive study of online personalized learning and looked into the outcomes for students with disabilities compared to students without disabilities. They assert that the following flexible and accessible components are needed to operationalize online personalized learning such that students be supported to self-regulate their learning, students have continual data and feedback that is accessible and actionable, and students be able to choose how they learn and look at data and choose how learning is demonstrated. The flexibility and accessibility of online personalized learning decreased the effect size estimate of the differences in the learning growth for students with disabilities and students without disabilities. The percentage of meeting the two-year learning growth in math was higher for students with disabilities compared to students with no disabilities. Comparing the same two groups in English Language Arts, the students with disabilities had a lower percentage of meeting learning growth. Overall, these effect size estimates of higher and lower learning growth were small which indicates that personalize learning environments support both students with and without disabilities. J. Richardson (2016) compared the face-to-face versus online support and the outcomes in distance education among students with disabilities and students without disabilities. Similarly, both groups were equally likely to access online support. Students acknowledged the flexibility as a reason they chose online support. For students with disabilities, the mean obtained for overall grades were better and the pass rates were better for those who chose to access online support versus face-to-face support. The pass rates were higher for students with disabilities

compared to students without disabilities who accessed online support which suggests “online tutorial support may be an effective way to support students with disabilities” (J. Richardson, 2016, p. 87).

There are studies that illustrate the impact of supporting accessibility and flexibility by giving students choices. Tandy and Meacham (2009) acknowledge that students with disabilities might have challenges studying online such as navigating technology, barriers related to disabilities including concentration problems, auditory or visual difficulties, and problems processing information, and lack of accommodations. The authors assert that utilizing an online universal instructional design framework, where delivery of content is designed with choice for students to be accessible and useable by the greatest amount of people, supports the flexibility of learning regardless of the degree of ability for speech, vision, or mobility. Further, the use of technology should be intentional and inclusive. “Should we continue to work towards a technology with the greatest access we will avoid... needless class divisions” (Tandy & Meacham, 2009, p. 326). Utilizing the multi-modal option to increase choices within online learning, students can have the flexibility to receive and demonstrate understanding of content in multiple ways. An illustration of a multi-modal option is using both audio and video content to increase learning opportunities, especially for students who have a hard time reading a sizeable amount of text. Analyzing 11 empirical studies that focus on students expressing ideas using multi-modal tool, Bruce et al. (2013) found that a multi-modal approach improved quality of compositions for students with disabilities by impacting independence in learning and audience awareness. Scaffolds from multi-modal online tools intended for various types of learners supported students’ independence in their own learning which increased motivation and confidence, thus creating higher quality work and reduced the help needed from teachers. Multi-

modal learning interactions between students such as blogs supported audience awareness in composition writing where the focus of student writing moved from appeasing the teacher to purposeful writing interconnected with a larger authentic audience.

Studies have shown that control of learning is an aspect of online learning that has benefits for students with disabilities. In another study by Cockerill et al. (2019) that analyzed the semi-structured interviews of students with disabilities in an inclusive university in the United Kingdom that had a high number of students with disabilities, one of the themes that emerged from these interviews identified the advantage of students having control over learning with online courses. This control, as a result of accessibility and flexibility of course content, allowed students with disabilities to personalize how they study online so they were able to manage “their symptoms and other life commitments” (Cockerill et al., 2019, p. 176). It was also found that the personal touch of online learning helped these students manage the emotions that are usually associated with learning such as frustration and anxiety. Allday and Allday (2011) investigated the flexible pacing in online instruction and the pace of instruction choice among students with disabilities and students without disabilities. It was also discovered that for both groups of students, there was an increase in the final grade for those who did not ask for extended pace. It was also discovered that if given a choice on the pace of learning in regards to weeks, students with disabilities had similar pace of learning requests compared to students without disabilities which challenges the pace and time needs that is associated with students with disabilities in traditional school settings. It is likely that choice of learning pace and the flexibility of online courses “may negate the extended time needs created by the features and set-up of traditional schools” (Allday & Allday, 2011, p. 232).

The principles of Universal Design for Learning are effective in addressing the accessibility and personalized learning needs of online students including students with disabilities because it provides variety of supportive methods (Black et al., 2014). In a survey of instructionally-related personnel in an institution of higher education in California, the researchers found that some faculty were not aware that providing a variety of supportive methods helps students with disabilities. Those faculty who had three or more students with disabilities in the past year were familiar with accessibility accommodations, and faculty who did not teach students with disabilities in the last year had neutral to negative attitudes about students with disabilities. Seok et al. (2018) reviewed these 17 empirical studies regarding how outcomes for students with disabilities are affected by implementing the accessibility principles of Universal Design for Learning – increase access for a diverse spectrum of students through choice of how information is learned and choice of evidence of mastery learning. This review revealed effective student outcomes associated with Universal Design for Learning and emphasized the strengths of online learning are “its flexibility in terms of time and space to promote learning as well as its inherent ability to handle built-in accommodation and modification” (Seok et al., 2018, p. 185). Burgstahler and Russo-Gleicher (2015) compare strategies beneficial to students with disabilities and the strategies of Universal Design for Learning. They assert that strategies that can benefit students with disabilities can benefit all students which aligns with the principles of Universal Design for Learning that instructional design benefit the greatest number of students, as seen in the strategy of using online discussion boards as an alternate to face-to-face real-time discussions that allows deliberation time for all students including students with disabilities and students without disabilities. Using video presentations and asynchronous communication can reduce anxiety for students with disabilities

as well as students without disabilities, and the use of various multimedia assessments gives choice of learner mastery to all students. Advocating for a more inclusive learning environment can support the learning process for all students. Griful-Freixenet et al. (2017) interviewed students with disabilities in higher institutions in Belgium to investigate whether using Universal Design for Learning principles in online classes addresses their learning needs. Findings from student interviews showed that these learning environments addressed multiple means of engagement related to sustaining efforts and persistence such as creating an openness for communication, providing frequent feedback that encourages perseverance, and developing a community through collaboration. These students also identified the importance of structured material, clear expectation, and multi-modal approach to exams. The researchers assert that Universal Design for Learning is an approach to learning that includes that greatest number of learner and is a more efficient design than the traditional “retrofitting accommodations depending on the student’s disability type” (Griful-Freixenet et al., 2017, p. 1644) and warn that online learning should be flexible so that the principles of Universal Design for Learning could be differentiated based on the needs of all student because “meeting the learning needs of some can create barriers for others” (Griful-Freixenet et al., 2017, p. 1643).

Conversely, there are other studies that show the negative outcomes of online learning for students with disabilities due to the lack of accessible course content, lack of flexibility, and lack of inclusiveness for students with disabilities. In a study of a Norwegian postsecondary institution, students with disabilities were interviewed to investigate the use of online learning management system software that organizes content and supports instruction and learning (Habib et al., 2012). The researchers discovered that students with disabilities experienced challenges when accessibility and flexibility were not integrated into the design of the online learning

management system. Some of the online functions were described as “awkward and counter-intuitive” (Habib et al., 2012, p. 580) and the overload of information caused confusion for students with disabilities. Accessibility issues that created barriers for learning included difficulty to use assigned passwords, access to word processing tools such as spellcheck, confusing file folder organization such as deep subfolders and misleading file naming conventions, and the inflexible search function that does not accommodate for search spelling mistakes. The online learning management system in this study lacked flexibility with set deadlines; thus, getting assignment extensions required overcoming barriers such as submitting assignments outside of the learning management system through emails to the instructor or submitting physical hardcopies of assignments. McManus et al. (2017) investigated the barriers that students with disabilities faced in an Australian university that is known to be a leader in online education. Inflexible deadlines for assignments set off symptoms connected to disable conditions, and “participants indicated that they would delay starting or completing their assignments until their symptoms had subsided” (McManus et al., 2017, p. 341). Frustrations increased when time was spent unsuccessfully accessing course material or unsuccessfully accessing accommodations because of limited responses from faculty. Another barrier was due to the lack of inclusiveness. Many students with disabilities expressed feeling isolated and unsupported by faculty and students and that “they censored or limited their contributions to activities and group discussions as they felt intimidated by the other students” (McManus et al., 2017, p. 344). Nieminen and Pesonen (2020) discovered that students with disabilities also felt isolated and lonely in an online mathematics undergraduate course and that a contributing factor of this loneliness came from dominant discourse of disabilities drawn for the medical model approach which created a deficit-driven identity for students with disabilities. This identity

narrative put distance between students with disabilities and students without disabilities. The researchers suggest using an inclusive online learning design which challenges the medical modal approach narratives and provides “more opportunities for developing inclusive identifying narratives for everyone” (Nieminen & Pesonen, 2020, p. 19).

The quality of life for students with disabilities are also impacted by online learning environments. In a study of the quality of life of postsecondary students with disabilities, Lambert and Dryer (2018) discovered that the challenges of learning online impacted various aspects of students’ quality of life including stress, self-esteem, time for other activities, and personal life. The findings revealed that the additional time and additional effort to manage disability symptoms while studying online had a negative impact on the quality of life. Students with disabilities felt stress with the quality of their online discussion posting which also impacted their self-esteem. These students also spent a great deal of time on their studies compared with students with no disabilities, therefore, taking away time for leisure activities and personal relationships with family and friends. Lack of awareness by faculty may exacerbate the learning experience for students with disabilities. Therefore, the researchers suggest providing more study accommodations and increased understanding of disabilities. The studies in this section show evidence that the accessibility and flexibility of online-course-taking might impact outcomes for students with disabilities in community colleges in the United States. If, indeed, online course-taking impacts outcomes for students with disabilities in community colleges in the United States, then this might inform global policies that might impact students with disabilities around the world.

People with Disabilities Worldwide

The World Health Organization and World Bank identify 15% of the more than one billion people of world's population have some form of disability. Disability unequally impacts poor countries because there are higher levels of disabilities in low-income and middle-income countries compared to rich countries; and developing countries have a majority of children with disabilities which is four-fifths of the world's children with disabilities (UNESCO, 2010).

The global prevalence of disabilities is increasing. In 1970, people with disabilities accounted for about 10% of the world's population compared to 15% in the latest study. This increasing trend is unequally impacting developing countries. Because trends in health impact patterns of disability, developing countries where health is a major issue have greater number of disable people (World Health Organization and World Bank, 2011). As a case in point, increased chronic health conditions such as cardiovascular diseases and diabetes influence the prevalence of disability. One of the prominent causes of disability among children in Africa are poor health care for pregnant women and newborns and diseases and illnesses that impact the central nervous system such as poliomyelitis, meningitis, and cerebral malaria (World Health Organization and World Bank, 2011).

Disability Impacts Education. Disabilities impact educational access. Approximately one-third of children who do not attend primary level have a disability (Sæbønes et al., 2015). Children with disabilities are less likely to complete primary school. Aggregated data from 51 countries comparing people with disability and without disability showed a primary level completion gap of 10% points (World Health Organization and World Bank, 2011). Students with disabilities are educationally disadvantaged. This disproportionate educational issue is also apparent in adults with disabilities. In a World Health Survey, working age people with

disabilities in low-income and middle-income countries were one-third less likely to achieve primary school completion (UNESCO, 2014). The disabilities that impact education the most are the disabilities that affect interactions between people. Compared to physical disabilities, mental impairments affect communication with others and challenges student interactions the most. A study among children in Burkina Faso found that physical impairments have higher enrollment rates than students who might have challenges communicating because of being mute, deaf, blind, or mentally impaired (UNESCO, 2010). Another study identified disparities of six- to nine-year old students who have never been in school and found that 51% of students with high risk of mental disability had never been to school compared to 10% of students with no risk of disability (UNESCO, 2014).

Disability Impacts Poverty. Those people with disabilities are less likely to be employed because of variables associated with their disabilities. The barriers to employment for people with disabilities are lack of education, lack of disability accommodations at work, and reduced expectations among employers (UNESCO, 2012). This lack of employment increases the probability of poverty in households that are headed by people with disabilities. A study by Eide (2012) uncovers the complex relationship between education and participation in employment for people with disabilities in southern Africa. There is a cycle of discrimination where attending school is not associated with future employment for people with disabilities which impacts motivation to pursue education and, in turn, creates an outcome that disqualifies many uneducated people with disabilities from participating in society through meaningful employment. This lack of education worsens the poverty problem among people with disabilities. Even access to one more year of education is integral for people with disabilities. A study across 14 developing countries used two regression models to find the relationship

between disability and poverty and the significance of adding years of school. There was a significant relationship with having a disability and being poor. It was asserted that adding years of schooling was statistically significant such that one more year of completed schooling reduced the probability of an adult with disability being in the lowest poverty quintiles by between 2% and 5% (Filmer, 2008). A Bangladesh study in the Chuadanga district researched the economic impact of household with individuals with disabilities, especially looking at the earning and expenditures. The researchers found inequities in employment, 87% of employed participants left their full-time jobs within one year of identifying their disabilities. Participants explained that a major factor of changing employment status is the intolerance from employer of their disabilities. Households that had members with disabilities had necessary adjustments for accessibility of physical and social environment that cost an average of 4 months' worth of normal income (Chowdhury & Foley, 2006).

Equity and Inclusion. There have been advancements in equity and inclusion for people with disabilities in education, but more work still needs to be done. Policies that support people with disabilities through inclusion are more apparent, especially in institutions that address disabilities using a social model, defined as an inclusive approach to disabilities that asserts society oppresses the disable segment of the population through barriers that exclude people with disabilities (Dirth & Branscombe, 2017; Olkin, 2002). Successful inclusion policies are prevalent in certain countries as seen in Finland where students with disabilities are less likely to be in special education and instead more likely integrated in existing schools (Finland Government, 2019). Inclusion for people with disabilities is more equitable as society moves towards a social model as opposed to a medical model, described as normality defined by society and the ineptness of each individualized disability problem that requires individual segregated solutions

(Mitra, 2006). Other countries such as Portugal, Norway, Lithuania, Malta, and Cyprus are transitioning into a more inclusive education by moving away from the medical model approach to the social model approach to disabilities (World Health Organization and World Bank, 2011).

Equity and Inclusion in Data. Scarcity of common and reliable data is an ongoing obstacle for international agencies to collaborate on addressing disabilities through equitable and inclusive education (UNESCO, 2020). Contributing to this obstacle are the various definitions of disabilities and various approaches to address disabilities among agencies and countries. To address data collection and the standardization of data collection, there have been collaborations between international organizations such as Washington Group on Disability Statistics and the United Nation's Department of Economic and Social Affairs (UNDESA) and United Nation's Educational, Scientific and Cultural Organization (UNESCO). The Washington Group on Disability Statistics provide the Short Set of Questions for international cooperation of statistics focusing on disability measures. The six questions center on six functional domains including seeing, hearing, walking, cognition, self-care, and communication (World Health Organization and World Bank, 2011). This Short Set of Questions was advanced in the United Nations Expert Group Meeting on Disability Data and Statistics which was a collaboration with the Convention on the Rights of Persons with Disabilities, the United Nations Educational, Scientific, and Cultural Organization, and various other organizations focused on people with disabilities. This meeting emphasized the need for countries to better coordinate collection, analysis, and dissemination of disability data and an increase role of the United Nations system (Melha, 2014). Kett (2012) investigated support for youth with disabilities in developing countries that included China, Kenya, Sri Lanka, and Sierra Leone and discovered the available data on employment for youth with disabilities are seldom disaggregated so it posed a challenge to make comparisons

between countries and even within countries. Efforts that have been made to produce data by organizations such as International Labour Organisation have identified high unemployment for people with disabilities due to inequities caused by limited employment rights and lack of basic education and vocational training. There is a need to collaborate across ministries to recognize common data to give improved insight on the inequities for people with disabilities and support the relationships between education and employment sector.

Equity and Inclusion in Education. Increasing the awareness of inclusion in education for marginalized students like students with disabilities, requires addressing topics such as the learning environment, entitlements and opportunities, and accessibility and affordability. Fostering an awareness for all educational stakeholders, especially teachers, on how to support more inclusion of all students including students with disabilities will build capacity that advances equity in the learning environment. Examples of supporting the learning environment are training teachers on supporting students with disabilities, recruiting more people with disabilities to teach, assigning teachers to schools more equitably, and giving more support to disadvantaged schools (UNESCO, 2010; UNESCO, 2014). Entitlements and opportunities can advance inclusion in education if there is support by the government such as equitable allocation of public spending and legislation that enforces anti-discrimination increase inclusion awareness (UNESCO, 2010). There are cases of government support of inclusion in education through entitlements and opportunities such as in Brazil and the United States. In Brazil, funding gaps were addressed through the Brazilian program FUNDEB. This program reduced the funding gap in education to help increased enrollment for marginalized groups such as students with disabilities, though more work needs to be done to improve the quality conditions in the school system (França, 2015). The United States *Brown v. Board of Education* decision that reversed

laws that separated school children because it violated the equal protection for all people described in the American constitution. This landmark case advanced anti-discrimination that impacted awareness of segregation of marginalized groups like students with disabilities (UNESCO, 2010). Lastly, accessibility and affordability are critical components to increasing inclusion in education. In rural parts of developing countries, the limited number of available classrooms significantly reduces access to education especially those students, like those with disabilities, who might have difficulty traveling to school. Classroom construction programs address accessibility by bringing schools to students who might not have easy access to education (UNESCO, 2010). Kazianga et al. (2013) looked at a school construction program in Burkina Faso and found that its impact to enrollment was an increase by 20% points. In another study of village-based schools, enrollment was also positively impacted when placing a school in a village. Female enrollment increased by 52% points and male enrollment increased by 35% points (Burde & Linden, 2013). An analysis of 177 studies on educational interventions in low- or middle-income countries showed that school construction had the strongest effects on educational access as well as school sanitation and water and cash transfers (Evans & Yuan, 2022). Affordability is another barrier for many students in poor areas. Therefore, eliminating school fees, reducing indirect costs such as textbooks and uniforms, and stipends for marginalized groups make education more affordable. In 2003, the Kenyan proclaimed free primary education for all students. As a result, the enrollment increased from 5.9 million to 7.6 million, which translates to over 29% increase in three years (Birger & Craissati, 2009).

Chapter Summary

Chapter 2 describes the purpose of the study is to investigate to what extent, if at all, does online course-taking impact degree attainment among students with disabilities in community

college? This study can conceivably inform global inequities for more than one billion people with disabilities around the world. The researcher uses a conceptual framework that integrates access to course content, flexibility in learning, and a safe learning environment; and identifies the social model and policies that support students with disabilities; as well as the learning theories that can be applied to online learning. The literature reveals that students with disabilities face marginalization, encounter physical barriers, and experience lack of disability awareness and support from others. The literature also uncovers a disagreement on the impact of online learning for students with disabilities, with both negative and positive outcomes. Finally, the literature shows that online learning is a plausible option for students with disabilities because it can support increased access to content, learning that is flexible, and a learning environment that safely accommodates various disabilities. This study might have global implications, therefore, this chapter includes studies on people with disabilities worldwide specifically how disabilities impact education and poverty, as well as the current state of equity and inclusion for people with disabilities.

Chapter 3: Research Methodology

Chapter Overview

In this chapter, the researcher will detail the methodology of this study for addressing the achievement gaps of students with disabilities in community colleges in the United States. Specifically, this study investigates the impact of online learning on degree attainment among students with disabilities in community colleges using a logistic regression model. The components of this chapter detail the methodology and research design, the setting and sample using data from the Beginning Postsecondary Student Longitudinal Study 12/17, the strategies and procedures of data collection, the instrumentation, human subjects considerations, data collection, data management, data analysis, and chapter summary.

Purpose Statement

The purpose of this research study is to investigate to what extent, if at all, does online course-taking impact degree attainment among students with disabilities in community college? This research study is relevant and timely because the COVID pandemic precipitated the pivot to online learning and advanced the exigency of student outcomes related to online learning. The accelerated transition to compulsory online learning due to COVID has negatively impacted students with disabilities because of limited access to pre-COVID accommodations such as note-taking services and reduced distraction environments for testing and the emergence of new challenges such as anxiety of being recorded during tests and fewer opportunities for informal help (Gin et al., 2021). Although there were challenges to online learning due to COVID, there were higher student satisfaction with classes that utilized effective online instruction (Means & Neisler, 2021). Considering the inequities in achievement for students with disabilities in community colleges, online course-taking is a plausible option to decrease these achievement

gaps. Online learning is a feasible option for students with disabilities because of the potential of flexible instruction, increased access to content, and safe learning environment.

Research Question

In order to better understand the impact of online course-taking on students with disabilities in community colleges, this study seeks to answer the following question:

- RQ: To what extent, if at all, does online course-taking impact degree attainment among students with disabilities in community college?

Research Design

The purpose of this study is to investigate to what extent, if at all, does online course-taking impact degree attainment among students with disabilities in community college? This research will contribute to the literature regarding equity in education, specifically focused on the dearth of studies related to students with disabilities in community colleges. The literature reveals that students with disabilities are more likely to enroll in community colleges compared to four-year colleges or universities, but the outcomes are concerning because of low completion rate for a diploma, certificate, or license (Newman et al., 2009). The barriers that impact learning outcomes for students with disabilities are unreliable safe learning environment, inflexible instruction, and access challenges of content (Flink & Leonard, 2019; Hoggatt, 2017; Moriña & Morgado, 2018; Mullins & Preyde, 2013; Ryan, 2007; Shevlin et al., 2004). Online learning is a conceivable option to address degree attainment for students with disabilities. Online learning has the potential to provide flexible instruction, improved access to course content, and a learning environment where students feel safe (Cavanaugh et al., 2013; Center on Online Learning and Students with Disabilities, 2016). Unfortunately, there is not an agreement between the studies on effectiveness on online learning such that some studies show positive learning

outcomes (Edmunds et al., 2021; Johnson & Cuellar Mejia, 2014; Shea & Bidjerano, 2014, 2016, 2019), and other studies that show negative learning outcomes (Hart et al., 2018; Huntington-Klein et al., 2017; Jaggars & Xu, 2010; Xu & Jaggars, 2011). Although there have been studies that investigate learning outcomes for students with disabilities (Flink & Leonard, 2019; Hoggatt, 2017; Moriña & Morgado, 2018; Ryan, 2007; Shevlin et al., 2004), there is a gap in research that deal with the learning outcomes of students with disabilities in community college. This gap in the literature persists with the dearth of research addressing the impact of online course-taking on learning outcomes for students with disabilities in community college. This study will explore the extent to which online course-taking impacts degree attainment among students with disabilities in community college.

The researcher is using Jago's (2019) framework for the theoretical foundation that guides the research design of this study. The goal of this study is to estimate the impact of online course-taking on community college degree attainment for students with disabilities in the United States. A quantitative approach will identify the association, if at all, of online course-taking on postsecondary degree attainment among students with disabilities in community colleges. The worldview that influences the researcher's methodology is constructivist where students with disabilities, especially adult students with disabilities, have agency in their own learning and define this learning through their intersectional experiences and prior knowledge related to their layered identities (Crenshaw, 1989). This predictive analysis study, specifically a series of logistic regression models, will use extant data from the Beginning Postsecondary Student Longitudinal Study (BPS: 12/17). The goal of the logistic regression is to estimate the probability of degree attainment: certificate, associate's degree, bachelor's degree, and a combination of all degree attainment. The design of this logistic regression utilizes a predictor

variable associated with the interaction between online course-taking and disabilities and using control variables related to student demographics, academic characteristics, family attributes, and institutional factors.

Setting and Sample

The data analysis of study uses extant data from the Beginning Postsecondary Student Longitudinal Study (BPS: 12/17). BPS: 12/17 is a collection of postsecondary data over the span of multiple years acquiring nation-wide samples of first-time postsecondary students who began in 2011. The BPS: 12/17 cohort were derived from the NPSAS:12 and were used for the base-year data. The inclusion criteria for this cohort were those who were:

- enrolled in either: (1) an academic program; (2) at least one course for credit that could be applied toward fulfilling the requirements for an academic degree; (3) exclusively noncredit remedial coursework but determined by the institution to be eligible for Title IV aid; or (4) an occupational or vocational program that required at least 3 months or 300 clock hours of instruction to receive a degree, certificate, or other type of formal award;
- not currently enrolled in high school; and
- not solely enrolled in a high school completion program. (Bryan et al., 2019, p. 8)

The two follow-up data collections were BPS: 12/14 and BPS: 12/17. Data was collected for each follow-up using student surveys namely web and telephone surveys; and administrative data including institutional records and other data sources such as student financial aid records. The BPS: 12/17 sample of students who completed the survey is approximately 22,530. In this study, the researcher focuses on the participants who began postsecondary education at a public, two-year institution. Therefore, the sample included in this study is approximately 6,529 community

college students (~29% of the BPS: 12/17 complete sample). The purpose of BPS: 12/17 is to see how postsecondary outcomes including persistence, degree attainment, and employment are related to variables such as student demographics, academic characteristics, and institutional factors.

Human Subjects Considerations

Guidance and approval for this study will be obtained by the Pepperdine Institutional Review Board (See Appendix for IRB approval letter). This study uses dataset from Beginning Postsecondary Student Longitudinal Study (BPS: 12/17). Permission to access this dataset is from dissertation committee member Dr. Cameron Sublett. This extant data has no personal identifying data, the participants are anonymous and will not be exposed to any risk or harm. Findings will be reported anonymously. This study has the potential benefit to give insight on whether or not online course-taking helps or hinders students with disabilities in community colleges. The dataset will be locked in a secure cabinet within a secure project office and will only be accessible by the dissertation committee member who provided access to the dataset. After the five-year license period, the dataset will be mailed back (National Center for Education Statistics, 2011).

Instrumentation

The survey instrument used in collecting data for BPS: 12/17 aimed to gather information on persistence and degree attainment. This nation-wide survey comprised of six areas: enrollment, education experience, financial aid, employment, income and expenses, and background. Enrollment information includes high school completion, postsecondary enrollment, expected completion date of current enrollment and completion of highest degree ever expected. Also included are personal information such as birth date and marital status. Education

experience items capture remedial courses since high school, estimated GPA, and online course-taking at their current postsecondary institution. Financial aid information were content such as loans, scholarships, tuition reimbursement, and veteran benefits. Employment entries comprises of a comprehensive list of employment history between July 2012 and June 2017 including employer names, employment dates, type of occupation, and whether participant had looked for employment with not working. Income and expenses were related to financial information such as annual income, monthly automobile loan or lease, and monthly mortgage or rent; as well as financial traits. Additionally, number of dependents were included. Finally, background data included primary residence zip code, military status, disability status, and voting behavior. Also included were questions regarding financial literacy.

The survey instrument for the BPS: 12/17 study was used in the first check-in in 2014 and then during the second check-in in 2017. The 2017 survey content contained the core data components used in 2014 that focused on the variables associated with enrolling and persisting in postsecondary education. There were additional questions to the employment experiences and outcomes in the 2017 survey such as choices of major, nonmonetary advantages of education, and expected future earning and occupations. The survey elements were finalized after input was given by the expert Technical Review Panel, questions and quality of design were tested, and a pilot of the survey was utilized. Participants completed the finalized survey over the phone or on the Web.

BPS: 12/17 used proprietary software to customize, program, and test the survey instrument. The survey was accessible to participants through web browser interfaces in which the contents were protected by a stringent three-tier security approach in accordance with the policies of the National Center for Education Statistics.

Data Collection

The BPS: 12/17 data was collected in the span of six years using a nation-wide survey and administrative records on first-time postsecondary students who began in 2011. The content of the survey instrument was intended to provide information on persistence and degree attainment involving six areas: enrollment, education experience, financial aid, employment, income and expenses, and background. The BPS staff reached out to students regarding their inclusion in the survey using mail and email prior to initiating the data collection. The data collection occurred in an early-response phase that lasted four weeks followed by a production phase that continued for another four weeks. During the early-response phase and production phase students were contacted using telephone, text, email, and mail. Students were able to participate in the survey using a website or telephone. Measures such as monitoring interviews, staff quality circle meetings, debriefing meeting were implemented to ensure quality control. Administrative records were also used to ease the burden on participating students. Financial aid information was acquired from Central Processing System and National Student Loan Data System. Enrollment information was taken from National Student Clearinghouse and Veterans Benefits Administration. The administrative data that were obtained from these sources were checked several times to control for quality. For the web survey, the time participants completed each survey was considered. This timing burden informed exclusion of cases such as incomplete surveys and total time outliers. Using Box-Cox power transformation (Box & Cox, 1964), those participants who had survey completion time outside the established distribution of survey time range were excluded. Missing data was imputed using logical or mathematical relationships and values from statistically identified donor cases.

Data Management

The data used in this study is from Beginning Postsecondary Student Longitudinal Study (BPS: 12/17). This restricted National Center for Education Statistics (NCES) dataset is a nation-wide multi-year collection of first-time postsecondary student information. Access to this dataset is from dissertation committee member Dr. Cameron Sublett. The researcher will adhere to the general security requirement of NCES. A locked secured cabinet and secured project office will be used to store the data. A single-user desktop computer will be password protected, not connected to other computers and modems, and adhere to minimum security requirements (National Center for Education Statistics, 2011). The dataset will only be accessible by the dissertation committee member who provided access to the dataset. The dataset will be mailed back after the five-year license period.

Outcome Variables

This study investigates whether or not online course-taking helps or hinders students with disabilities. Specifically, the researcher will examine the impact of online course-taking on the highest degree attainment for students with disabilities in community college. This degree attainment variable in BPS: 12/17 is the highest degree attained anywhere through June 2017. The categorical outcomes listed in this degree attainment variable are: certificate, associate's degree, bachelor's degree, and a combination of all degree attainment. This study will predict the probability of these degree attainment outcomes for students with disabilities considering online course-taking.

Predictor Variables

As predictor for highest degree attainment, this study will use an interaction between students with disabilities in community college and online course-taking. The disability variable

identifies students who have a long-lasting condition. The various disability condition will be examined as a binary indicator identifying whether a student has a disability or not, similar to a study by Sublett and Chang (2018). The online course-taking variable in BPS: 12/17 is any courses taken completely online for 2011-12. The categorical outcomes listed in this online course-taking variable are: All, Some, and None. These outcomes show if a student has taken all courses completely online, some courses completely online, or no courses online. From these categories, the researcher will generate a binary outcome variable by collapsing *All* and *Some* into one outcome. Therefore, the generated binary outcome indicates whether or not a student took or did not take an online course. Using binary indicators to identify online course-taking is similar to past community college studies investigating online course-taking (Shea & Bidjerano, 2014; Sublett, 2019).

Control Variables

This study will control for variables related to student demographics, academic characteristics, family attributes, and institutional factors in order to determine the relationship between the predictor variables and outcome variables. These control variables categories were intended to replicate control variable categories utilized by Jaggars and Xu (2010) and Jaggars (2011) who researched the impact of online learning compared to face-to-face learning in Washington and Virginia community colleges, Sublett and Chang (2018) who also investigated the outcomes for students with disabilities taking online courses and the studies by Shea and Bidjerano (2014) and Sublett (2019) that explored the impact of distance education on community college students.

The following student demographics control variables will be held constant to limit the influence on the outcome variables: gender, race, English as primary language, and U.S. born.

The gender binary variable identifies the sex of the student, male or female. Race is identified as: White, Black or African American, Hispanic or Latino, Asian, and other. English as a primary language will be identified using the categories: English, Spanish, English and Spanish equally, another language, and an equal mix of English and another language. The U.S. born binary variable identifies whether or not the student was born in the United States.

Based on previous research (Shea & Bidjerano, 2014; Sublett, 2019), the following academic characteristics control variables will be held constant to limit the influence on the outcome variables: academic risk factors, remedial course-taking, type of high school attended, high school degree type, and degree goal. The academic index of risk is a variable that considers seven risk characteristics such as did not complete a high school diploma, part-time enrollment, and single parent. These risk characteristics may negatively impact persistence and attainment. The remedial course binary variable identifies whether or not the student took a remedial or developmental course in 2011-12. The type of high school categorical variable uses the following categories: public high school, private high school, foreign high school, and home schooled. The high school degree type variable indicates: traditional high school diploma, GED or completion certificate, or other. The degree goal variable distinguishes between the following highest expected attainment goals: certificate, associate's degree, bachelor's degree, postgraduate, and no degree.

The following variables related to family attributes will also be held constant: parents born in the U.S., parents' highest level of education, and sibling attending college. The U.S. born binary variable identifies whether or not the student's parents were born in the United States. The parents' highest level of education distinguishes between high school, vocational/certificate,

associate's degree, bachelor's degree and graduate degree. Finally, family attribute includes whether or not the student has a sibling who attended college first.

The following institutional factor control variables will be held constant to limit the influence on the outcome variables: historical Black college, Hispanic enrollment, in state institution, and degree of urbanization. Whether or not an institution is designated as historically Black college or university is indicated through a binary variable. As a representation for the Hispanic-serving institution indicator, this study will use Hispanic enrollment which identifies at least 25 percent of student body who are Hispanic. In state institution indicates whether the student's institution exists in the student's state of legal residence. The urban area in which the school is located can be describe using a range of 12 categories from "large city" to "rural" based on the physical address. These degree of urbanization categories were developed by the U.S. Census Bureau.

Data Analysis

The Beginning Postsecondary Student Longitudinal Study (BPS: 12/17) data is used in this study to determine if online course-taking helps or hinders students with disabilities in community colleges. In detail, this study investigates the research question: To what extent, if at all, does online course-taking impact degree attainment among students with disabilities in community college? The analysis of BPS: 12/17 looks at the categorical outcomes of degree attainment: certificate, associate's degree, bachelor's degree, and a combination of all degree attainment to predicts the odds of these categories considering the interaction between disability and online course-taking.

The researcher will utilize a regression analysis with Stata to estimate the odds of a degree attainment category. Specifically, a series of logistic regression models will be used to

estimate the odds of certificate, associate's degree, bachelor's degree, and a combination of all degree attainment as a function of the interaction between disability and online course-taking. The researcher intends to reproduce a study by Sublett and Chang (2018) regarding outcomes for students with disabilities in high school. Instead of a linear probability model to investigate the binary outcome of high school completion, this study will use a series of logistic regression models to investigate the highest degree attainment in community college. There are four outcome variables, therefore, a series of logistic regression models is appropriate to compare the levels with the baseline. The main predictor variable is the interaction between online course-taking and whether a student has a disability. The researcher will estimate the odds of the degree attainment outcomes considering the interaction between online course-taking and whether a student has a disability. Control variables will be used in this model related to student demographics, academic characteristics, family attributes, and institution factor. These control variables categories were intended to reflect Shea and Bidjerano (2014) and Sublett (2019) who looked at the impact of online learning on the outcomes of students in community colleges. Student demographics will recognize gender, race, English as primary language, and U.S. born. Academic characteristics will include academic risk factors, remedial course-taking, type of high school attended, high school degree type, degree goal, and student engagement. Family attributes will distinguish parents born in the U.S., parents' highest level of education, and sibling attending college. Institution factor will include historical Black college, Hispanic enrollment, in state institution, and degree of urbanization.

The researcher will first run descriptive statistics in order to look at the relationships between variables. Looking at the main predictor variable without the interaction with online course-taking will reveal the relationship between disability status and degree attainment. This

will be done by looking at the binary indicator of whether a student has a disability or no disability without the interaction with online course-taking in order to understand the distribution of variable values between: certificate, associate's degree, bachelor's degree, or no degree attainment. Then exploring the online course-taking variable without the interaction with the disability variable will show the relationship between online course-taking and degree attainment. A binary indicator will be used indicating whether a student took or did not take an online course without the interaction with the disability variable to identify the distribution of variable values between: certificate, associate's degree, bachelor's degree, or no degree attainment.

The researcher will begin with a baseline series of logistic regression models that does not include any control variables in order to establish the baseline estimation between the main predictor variable namely the interaction between online course-taking and whether a student has a disability and the outcome degree attainment variable. This model will be entered into Stata and the coefficient associated with this interaction is the primary parameter of interest. The baseline series of logistic regression models will be improved upon by a set of controls related to student demographics, academic characteristics, family attributes and institution factors. After running the series of logistic regression models, the researcher will be able to do the following:

- estimate the odds, employing a two-way interaction predictor, of completion for a certificate degree; displaying the main effect of the online course-taking variable, the main effect of the disability variable, and the function of the interaction effect between disability and online course-taking variable;
- estimate the odds of attaining an associate degree utilizing a two-way interaction, including the main effect of the online course-taking variable, the main effect of the

disability variable and the interaction effect between the disability and online course-taking variable;

- estimate the odds of achieving a bachelor degree associated with a two-way interaction between online course-taking and disability, detailing the main effect of the online course-taking variable, the main effect of the disability variable, and the interaction effect between the disability and online course-taking variable; and
- estimate the odds of earning any degree including certificate, associate, and bachelor by using a two-way interaction between the online course-taking variable and disability variable; showing the main effect of the online course-taking variable, the main effect of the disability variable, and the interaction effect between the disability and online course-taking variable.

Chapter Summary

This chapter, describes the methodology of this study using a quantitative research design for addressing the outcomes of students with disabilities in community colleges in the United States. Specifically, this study will explore the impact of online course-taking on degree attainment among students with disabilities in community colleges using a series of logistic regression models. This chapter also details the setting and sample using national representative data from the Beginning Postsecondary Student Longitudinal Study 12/17. Information is given on the strategies and procedures of data collection and the instrumentation of BPS: 12/17. Next, this chapter presents the human subjects considerations of using extant data, six-year data collection beginning with an initial survey with two follow-up surveys, and data management defined by the National Center for Education Statistics. Finally, the outcome variables, predictor variables, and control variables as well as data analysis are specified. The methodology of this

study supports the purpose of investigating to what extent, if at all, does online course-taking impact degree attainment among students with disabilities in community colleges.

Chapter 4: Results

Chapter Overview

Chapter 4 details the results of this study in which the purpose is to investigate the extent, if at all, of the impact of online course-taking on degree attainment among students with disabilities in community college. Using a sample from the Beginning Postsecondary Student Longitudinal Study (BPS: 12/17), this study explored the relationship between impact of online course-taking for students with disabilities on postsecondary degree attainment and presented the results of the logistic regression analysis of postsecondary degree attainment using the interaction between online course-taking and whether a student had a disability. This chapter details the descriptive analysis of outcome variables, the predictor variable as an interaction, and control variables. The findings were results from a series of logistic regression models to analyze the impact of the interaction between online variable and disability variable on degree completion for certificate, associate degree, bachelor degree, and any degree.

Purpose Statement

The purpose of this research was to explore the impact, if at all, of online course-taking on postsecondary degree completion among students with disabilities in community college. Enrolling in two-year community colleges is an advantageous option for many students because of the limited barriers of entries such as lower costs and fewer prerequisites. Students with disabilities are historically likely to apply to two-year community colleges, but unfortunately are less likely to complete (Newman et al., 2009). Many students with disabilities face barriers for learning related to unreliable safe learning environment, inflexible instruction, and inaccessibility of learning content (Flink & Leonard, 2019; Hoggatt, 2017; Moriña & Morgado, 2018; Mullins & Preyde, 2013; Ryan, 2007; Shevlin et al., 2004). Online learning can be a viable option for

students with disabilities because of the possibility for flexible instruction, increased access to content, and safe learning environment. The COVID pandemic advanced the use of online learning, but unfortunately caused challenges to students with disabilities, such as inaccessibility of accommodations. At the same time, there are reports of higher student satisfaction from students who took classes that experienced effective online instruction (Means & Neisler, 2021). Considering the recent precipitous use of online learning and the mixed results of online learning, this study sought to further investigate the impact, if at all, of online learning on degree completion for students with disabilities in community colleges. If online course-taking helps increase degree completion for students with disabilities in community colleges, it is proposed that educational policies advocate for resources to increase online course-taking. On the other hand, if online course-taking does not support degree completion for students with disabilities, or worse, has an adverse effect, then policymakers might reconsider the current plans for online learning. The impact of this study also has global impact, especially since the number of people with disabilities around the world is increasing (World Health Organization and World Bank, 2011).

Research Question

The research question of this study advanced the understanding regarding the impact of online course-taking on degree completion for students with disabilities in community colleges:

- RQ: To what extent, if at all, does online course-taking impact degree attainment among students with disabilities in community college?

Data Collection

This study used extant data from Beginning Postsecondary Student Longitudinal Study (BPS: 12/17). BPS: 12/17 dataset is from the National Center for Education Statistics intended to

see how postsecondary outcomes including persistence, degree attainment, and employment were connected to six areas: enrollment, education experience, financial aid, employment, income and expenses, and background for first-time postsecondary students. BPS: 12/17 is a collection of postsecondary data over the span of multiple years acquiring nation-wide samples of first-time postsecondary students who began in 2011 until 2017 using telephone, text, email, mail and website. The initial data was collected at the end of the participants' first year. The two follow-up data collections were BPS: 12/14 and BPS: 12/17. The BPS: 12/17 sample of students who completed the survey is approximately 22,530.

Sample

This study used a sample from BPS: 12/17 to investigate the impact of online course-taking on degree completion for students with disabilities in community college. The researcher focused on the participants who began postsecondary education at a public, two-year institution. Therefore, the sample included in this study was approximately 6,529 of the 22,530 total participant sample which reflects ~29% of the BPS: 12/17 complete sample.

Outcome Variables

The outcome variable of focus in this study was community college degree attainment: certificate, associate's degree, bachelor's degree, and a combination of all degree attainment. The National Center for Special Education Research recognized that students with disabilities are more likely to choose community colleges instead of four-year colleges or universities for postsecondary education, but are less likely to succeed in postsecondary completion (Newman et al., 2009). Table 1 shows that students with disabilities fared worse in degree attainment than students with no disabilities, and were less likely to achieve degree attainment.

Table 1*Proportion for Degree Attainment in Community College*

Degree Attainment	No Disability (<i>n</i> = 5,752)	Disabilities (<i>n</i> = 777)	Full sample (<i>N</i> = 6,529)
Certificate	11.51	10.17	11.35
Associate	20.64	15.7	20.05
Bachelor	13.20	6.69	12.42
No attainment	54.66	67.44	56.18

Existing research indicated the effectiveness of online course-taking is mixed, showing positive and negative learning outcomes. In some studies, online learning appeared to have positive learning outcomes such as earning a degree, transferring to a four-year college, and less likely to withdraw (Edmunds et al., 2021; Johnson & Cuellar Mejia, 2014; Shea & Bidjerano, 2014, 2016, 2019), and other studies revealed online learning had negative learning outcomes including failing or withdrawing from online courses, receiving fewer A or B grades, negative probability of choosing another class in the same field, and less likelihood of degree attainment or transfer to four-year college (Hart et al., 2018; Huntington-Klein et al., 2017; Jaggars & Xu, 2010; Xu & Jaggars, 2011). Table 2 illustrates the mixed outcomes of degree attainment for students in BPS: 12/17 who took online courses. A greater proportion of online students attained an associate degree or bachelor degree compare to the proportion of students who did not take online courses. Conversely, the proportion for students who achieved a certificate was lower for students who took online classes compared to students who did not take online courses.

Table 2*Proportion for Outcome Variables for Online Course-taking*

Degree Attainment	Not online (<i>n</i> = 5,066)	Online (<i>n</i> = 1,463)	Full sample (<i>N</i> = 6,529)
Certificate	11.57	10.59	11.35
Associate	19.76	21.05	20.05
Bachelor	12.22	13.12	12.42
No attainment	56.45	55.23	56.18

Control Variables

To improve the logistic regression models used in this study to examine the relationship between the degree attainment outcomes and the interaction with online course-taking and disability, the researcher took into account statistical controls related to student demographics, academic characteristics, family attributes, and institutional factors. Using these control variables was intended to reflect similar control variables used in previous studies of community college students and online course-taking (Shea & Bidjerano, 2014; Sublett, 2019). The control variables related to student demographics included: gender, race, English as primary language, and U.S. born. The next category of control variables associated with academic characteristics comprised of: academic risk factors, remedial course-taking, type of high school attended, high school degree type, and degree goal. Family attributes control variables consisted of: parents born in the U.S., parents' highest level of education, and sibling attending college. The final control variables related to institutional factors included: historical Black college, Hispanic enrollment, in state institution, and degree of urbanization. Table 3 displays the descriptive statistics for these variables regarding students who took online course and who did not take online courses.

Table 3

Proportion Difference Across Categories of Control Variables

	Not online (<i>n</i> = 5,066)	Online (<i>n</i> = 1,463)	Full sample (<i>N</i> = 6,529)
Student Demographics			
Female	53.55	60.56	55.12
Male	46.45	39.44	44.88
White	50.99	63.43	53.78
Black	17.25	11.62	15.99
Hispanic	22.76	16.68	21.40
Asian	4.36	3.49	4.17
Other race	4.64	4.78	4.67
English is primary	79.67	85.37	80.95
US born	89.79	92.07	90.30

	Not online (<i>n</i> = 5,066)	Online (<i>n</i> = 1,463)	Full sample (<i>N</i> = 6,529)
Academic characteristics			
Academic risk	65.67	68.49	66.30
Remedial course-taking	38.61	29.19	36.50
Public high school	80.42	79.70	80.26
Private high school	3.71	4.03	3.78
Other high school	15.87	16.27	15.96
Traditional high school diploma	85.51	85.65	85.54
GED/completion certificate	11.39	12.58	11.66
Other	2.27	1.09	2.01
No degree	0.83	0.68	0.80
Goal: certificate	4.68	4.03	4.53
Goal: associate	21.46	20.44	21.23
Goal: bachelor	41.81	42.45	41.95
Goal: post graduate	31.90	32.88	32.12
Goal: no degree	0.16	0.21	0.17
Family attributes			
Parents born in US	77.41	83.53	78.79
Parents' highest education			
Not known/no HS diploma	15.30	13.53	14.90
High school	28.64	30.49	29.05
Some college, no degree	17.41	19.07	17.78
Vocational/technical	4.68	5.26	4.81
Associate degree	9.32	7.66	8.94
Bachelor's degree	15.71	15.17	15.59
Post graduate	8.94	8.82	8.91
Sibling attending college first	46.25	44.63	45.89
Institutional Factors			
Historically black college	0.83	0.55	.77
Hispanic serving institution	15.56	12.52	14.87
In state of residence	95.10	94.53	94.98
Type of college			
Rural	17.86	23.51	19.13
Urban	44.39	37.32	42.81
Suburban	27.64	26.18	27.31
Other region	10.10	12.99	10.75

The student demographics control variables comprised of: gender, race, English as primary language, and U.S. born. The gender binary variable identifies the sex of the student, male or female. Race is identified as: White, Black or African American, Hispanic or Latino, Asian, and other. English as a primary language will be identified using the categories: English,

Spanish, English and Spanish equally, another language, and an equal mix of English and another language. The U.S. born binary variable identifies whether or not the student was born in the United States.

The academic characteristics control variables included: academic risk factors, remedial course-taking, type of high school attended, high school degree type, and degree goal. The academic index of risk is a variable that considers seven risk characteristics such as did not complete a high school diploma, part-time enrollment, and single parent. These risk characteristics may negatively impact persistence and attainment. The remedial course binary variable identifies whether or not the student took a remedial or developmental course in 2011-12. The type of high school categorical variable uses the following categories: public high school, private high school, foreign high school, and home schooled. The high school degree type variable indicates: traditional high school diploma, GED or completion certificate, or other. The degree goal variable distinguishes between the following highest expected attainment goals: certificate, associate's degree, bachelor's degree, postgraduate, and no degree.

The family attributes control variables consisted of: parents born in the U.S., parents' highest level of education, and sibling attending college. The U.S. born binary variable identifies whether or not the student's parents were born in the United States. The parents' highest level of education distinguishes between high school, vocational/certificate, associate's degree, bachelor's degree and graduate degree. Finally, family attribute includes whether or not the student has a sibling who attended college first.

The institutional factor control variables comprised of: historical Black college, Hispanic enrollment, in state institution, and degree of urbanization. Whether or not an institution is designated as historically Black college or university is indicated through a binary variable. As a

representation for the Hispanic-serving institution indicator, this study will use Hispanic enrollment which identifies at least 25 percent of student body who are Hispanic. In state institution indicates whether the student's institution exists in the student's state of legal residence. The urban area in which the school is located can be describe using a range of 12 categories from "large city" to "rural" based on the physical address. These degree of urbanization categories were developed by the U.S. Census Bureau.

Predictor Variables

The predictor variable in this study was an interaction between the online variable and disability variable. The researcher explored whether or not online course-taking helps or hinders students with disabilities in U.S. community colleges. Specifically, this study examined the impact, if at all, of online course-taking on the degree attainment for students with disabilities in community college. The degree outcomes are: certificate, associate's degree, bachelor's degree, and a combination of all degree attainment. This study investigated the odds of these degree attainment outcomes for students with disabilities as an interaction with online course-taking. On one side of the interaction was the disability variable. The disability variable was a binary indicator of whether a student had a disability or not have a disability. Of the 6,529 community college students in the BPS: 12/17 dataset, 777 students (11.90%) identified as having a disability. It is important to mention that the variable that identified disabilities had considerations. This binary indicator was not disaggregated based on specific disabilities. Students in postsecondary education were not required to have an Individualized Education Plan, therefore, disabilities were not identified the same way as in primary or secondary education. Therefore, some community college students might not have their disabilities identified. These were limitations with this study and may be addressed in future studies.

On the other side of the interaction was the online course-taking variable. Online was a binary variable showing whether a student took *All* and *Some* online courses or *None*. It is essential to state that the variable for online course-taking was based on any courses taken completely online for 2011-12. The categorical outcomes listed in this BPS: 12/17 online course-taking variable were: All, Some, and None defined as courses taken completely online, some taken completely online, or no courses taken online. For this study, *All* and *Some* were collapsed into one outcome. Therefore, this generated a binary outcome that indicated whether or not a student took (*All* and *Some*) or did not take an online course (*None*). Studies by Shea and Bidjerano (2014) and Sublett (2019) that investigated online course-taking used binary online indicators the same way. It is necessary to note that the online variable had some limitations regarding the nature of courses, the instruction practices, and student participation such as the extent of how many online and face to face meeting students were mandated, whether or not the online learning was synchronous or asynchronous, the online instructional experience of instructors, and the patterns of student participation.

Table 4 shows the proportion of students with no disabilities and with disabilities who took online courses. Roughly 22% of students in all groups took some degree of online courses and roughly 77% of students in all groups did not take online courses. Similarly, about 22% of students with disabilities took some degree of online courses. This is consistent with a study by the National Center for Education Statistics that identified 22% of students attending public two-year colleges took distance education (Radford, 2011).

Table 4*Proportion of Online Course-taking*

Online Course-taking	No Disability (<i>n</i> = 5,752)	Disabilities (<i>n</i> = 777)	Full sample (<i>N</i> = 6,529)
Online	22.41	22.39	22.41
Not online	77.59	77.60	77.59

Note. Online variables (All, Some, and None) have been collapsed into the binary categories “online” using All and Some and “not online” using None.

Analytic Approach

To investigate the impact of the predictor variable on the outcome variable, the researcher used a series of logistic regression models. Specifically, the logistic regression models were used to estimate the odds of the outcome variable defined as the highest postsecondary degree attainment as a function of the predictor variable which was the interaction between disability and online course-taking. Taken from BPS: 12/17, the highest degree attainment outcomes were: certificate, associate’s degree, bachelor’s degree, and a combination of any degree attainment. Four logistic regression models were used, one model for each of the attainment outcomes. Each logistic regression model started with a baseline model which then was controlled for a series of variables: student demographics, academic characteristics, family attributes and institutional factors. This reflected the control variables used in previous studies of community college students and online course-taking (Shea & Bidjerano, 2014; Sublett, 2019). Student demographics controls reflected: gender, race, English as primary language, and U.S. born. Academic characteristics controls considered: academic risk factors, remedial course-taking, type of high school attended, high school degree type, and degree goal. Family attributes focused on: parents born in the U.S., parents’ highest level of education, and sibling attending college. Institutional factors concentrated on: historical Black college, Hispanic enrollment, in state institution, and degree of urbanization.

Results

The researcher utilized a series of logistic regression models for each of the outcome variables related to community college degree attainment: certificate, associate's degree, bachelor's degree, and a combination of all degree attainment. The analysis began with a baseline logistic regression in order to establish the estimation of the association between the outcome highest degree attainment variable and the main predictor variable (the interaction between online course-taking and whether a student has a disability) without controlling for the influence of other variables – Model 1. Model 2 controlled for student demographics: gender, race, English as primary language, and U.S. born. Model 3 controlled for both student demographics and academic characteristics: academic risk factors, remedial course-taking, type of high school attended, high school degree type, and degree goal. Model 4 controlled for student demographics and academic characteristics, as well as family attributes: parents born in the U.S., parents' highest level of education, and sibling attending college institution. Model 5 controlled for student demographics, academic characteristics, family attributes, and institutional factors: historical Black college, Hispanic enrollment, in state institution, and degree of urbanization.

Certificate Degree Attainment

Table 5 shows the results of the odds attaining certificate degree, employing a two-way interaction associated with the online variable, disability variable, and the interaction between the online variable and disability variable. The first column shows this analysis using a baseline logistic regression model without control variables. The results indicated the odds of students who took an online class to attain a certificate were 0.865. The odds of students with disabilities to attain a certificate were 0.793. In other words, students who took online courses had reduced odds of earning a certificate, as well as students with disabilities had reduced odds of earning a

certificate. These results were not statistically different from zero. Conversely, there were increased odds 1.492 for attaining a certificate for students with disabilities who took online courses. This result was also not statistically different from zero.

The second column of Table 5 was controlled for student demographics. After controlling for student demographics, the main effect of online course-taking had reduced odds of earning a certificate which was 0.849. Controlling for student demographics, students with disabilities had reduced odds 0.777 of earning a certificate. These relationships, for the main effect of online course-taking and the main effect of disabilities, were not statistically different from zero. The interaction effect of students with disabilities who took online courses had increased odds for attaining a certificate. It is important to note that the increased odds of 1.498 was not statistically significant.

The third column, Model 3, of Table 5 controlled for academic characteristics as well as student demographics. The odds of earning a certificate for students who took an online class were 0.863. For students with disabilities the odds of earning a certificate were 0.758. These reduced odds were not statistically significant. The interaction between online course-taking and disabilities yielded increased odds of 1.349 for earning a certificate and was not statistically different from zero.

Additional controls were used for Model 4 and Model 5 of Table 5. For Model 4, family attributes were added to the control variables. For Model 5, institutional factors were added to the control variables. For each model, the main effect of online course-taking had reduced odds of earning a certificate which were 0.860 for Model 4 and 0.852 for Model 5. The main effect of disability had reduced odds of earning a certificate which were 0.760 for Model 4 and 0.766 for Model 5. There was increased odds of earning a certificate for the interaction between online

course-taking and disability. The results for these interactions were 1.334 for Model 4 and 1.282 for Model 5. It is important to note that the results of Model 4 and Model 5 were not statistically significant.

Table 5

Logistic Regression of Certificate Degree Attainment, Odds Ratio

Variables	Model 1	Model 2	Model 3	Model 4	Model 5
Online course	0.865	0.849	0.863	0.860	0.852
Disability	0.793	0.777	0.758	0.760	0.766
Online course X Disability	1.492	1.498	1.349	1.334	1.282
Controls					
Student demographics	No	Yes	Yes	Yes	Yes
Academic characteristics	No	No	Yes	Yes	Yes
Family attributes	No	No	No	Yes	Yes
Institutional factors	No	No	No	No	Yes

Associate Degree Attainment

Table 6 displays the odds for students attaining an associate degree also using a two-way interaction – resulting in the main effect of the online variable, the main effect of the disability variable, and the interaction effect between the online variable and disability variable. The first column illustrates this analysis using a baseline logistic regression model without control variables. The results showed the increased odds of the main effect of online course-taking was 1.056 and the reduced odds of the main effect of disability was 0.674. In other words, students who took online courses had increased odds of earning a certificate, but students with disabilities had reduced odds of earning a certificate. The result of online course-taking was not statistically significant. When the two variables were interacted, the interaction effect between the online variable and disability variable showed an increased odds 1.280 of earning an associate degree. This result was not statistically different from zero.

The analysis was improved upon by controlling for student demographics in second column of Table 6. The results displayed the odds of 1.025 for attaining an associate degree for

students who took online classes and the odds of 0.682 for attaining an associate degree for students with disabilities. Students who took online classes had increased odds of earning an associate degree, and students with disabilities had reduced odds of earning an associate degree. The main effect of online course-taking was not statistically significant. Conversely, there was an increased odds of 1.283 for earning an associate degree for the interaction between online course-taking and disability. Therefore, students with disabilities were more likely to attain an associate degree when participating in online courses. This result was not statistically different from zero.

In the third column of Table 6, the analysis was improved upon by adding controls for academic characteristics in addition to the student demographics. The results illustrated the odds of 1.040 for earning an associate degree for the online course-taking variable. For the disability variable, the odds of earning an associate degree were 0.699. As observed in the previous models, in the first and second columns of Table 6, there were increased odds of attaining an associate degree for students who took online courses, but reduced odds of attaining an associate degree for students with disabilities. The results from the effect of online course-taking were not statistically significant. For students with disabilities, the odds were increased when online courses were taken. The results of the interaction between disability and online course-taking illustrated the odds of 1.331 for earning an associate degree for students with disabilities who took online courses. This was not statistically significant.

In the fourth and fifth columns of Table 6, additional controls were used for Model 4 and Model 5, namely family attributes and institutional factors were added to the controls, respectively. For each model the main effect of online course-taking had increased odds of completing an associate degree which were 1.042 for Model 4 and 1.040 for Model 5. The

results were different for disability such that there were reduced odds for completing an associate degree for students with disabilities. The odds of main effect of disability were 0.696 for Model 4 and 0.696 for Model 5. The increased odds for associate degree completion for online courses and reduced odds for disability was a pattern observed in the Model 1, Model 2, and Model 3 of Table 6. The increased odds for associate degree completion for online course-taking was not statistically significant. For students with disabilities, the odds were increased when online courses were taken. The results for the interaction between disability and online course-taking were 1.342 and 1.338 for Model 4 and Model 5, respectively. These results were not statistically different from zero.

Table 6

Logistic Regression of Associate Degree Attainment, Odds Ratio

Variables	Model 1	Model 2	Model 3	Model 4	Model 5
Online course	1.056	1.025	1.040	1.042	1.040
Disability	0.674***	0.682**	0.699**	0.696**	0.696**
Online course X Disability	1.280	1.283	1.331	1.342	1.338
Controls					
Student demographics	No	Yes	Yes	Yes	Yes
Academic characteristics	No	No	Yes	Yes	Yes
Family attributes	No	No	No	Yes	Yes
Institutional factors	No	No	No	No	Yes

* $p < .05$. ** $p < .01$. *** $p < .001$

Bachelor Degree Attainment

Table 7 shows the results of the odds for students achieving a bachelor degree associated with a two-way interaction between online course-taking and disability. The results of each model illustrate the main effect of online, the main effect of disability, and the interaction effect of online and disability. The first column shows a baseline logistic regression analysis without control variables. The results indicated 1.089 odds for attaining a bachelor degree for the online course-taking variable and 0.477 odds for the disability variable. Students who took online courses had increased odds of attaining a bachelor degree, which was not statistically significant.

Students with disabilities had reduced odds of earning a bachelor degree. When students with disabilities took an online course, the odds of earning a bachelor degree were still reduced. The interaction effect of disability and online showed the odds 0.958. This result was not statistically different from zero.

The second column, Model 2 of Table 7 was controlled for student demographics. The odds for earning a bachelor degree was 1.022 for the main effect of the online variable and for the main effect of the disability variable was 0.488, the former was not statistically significant. Students who took online classes had increased odds of attaining a bachelor degree while students with disabilities had reduced odds of completing a bachelor degree. Even when taking an online course, students with disabilities had reduced odds of completing a bachelor degree when participating in online classes. The result of this interaction between disability and online course taking was 0.950, which was not statistically different from zero.

Model 3, in the third column of Table 7, was improved upon by adding other control variables related to academic characteristics in addition to the student demographics. The results showed the odds of 1.025 for attaining a bachelor degree for the online variable and the odds of 0.532 for attaining a bachelor degree for the disability variable. There were increased odds of earning a bachelor degree for students who took online courses, but reduced odds of earning a bachelor degree for students with disabilities. This pattern that showed increased odds for the online variable and reduced odds for the disability variable was similarly observed in Model 1 and Model 2 of Table 7. The result of the main effect of the online variable was not statistically different from zero. Conversely, the odds of earning a bachelor degree for students with disabilities was increased when online courses were taken. The results of this interaction between disability and online was 1.060. This was not statistically significant.

Additional controls were employed to improve Model 4 and Model 5 of Table 7. Control variables related to family attributes were added in Model 4 and control variables related to institutional factors were added in Model 5. These controls were in addition to student demographics and academic characteristics controls. For each of these models the main effect of online course-taking had increased odds of earning a bachelor degree which were 1.044 and 1.052 for Model 4 and Model 5, respectively. These results related to the online variable were not statistically significant. The odds were different for students with disabilities. Model 4 and Model 5 had reduced odds for the main effect of the disability variable. Interestingly for students with disabilities, the odds were increased when online courses were taken. Interacting the disability variable and the online course-taking variable yielded increased odds of 1.111 for Model 4 and 1.113 for Model 5. These results were not statistically significant.

Table 7

Logistic Regression of Bachelor Degree Attainment, Odds Ratio

Variables	Model 1	Model 2	Model 3	Model 4	Model 5
Online course	1.089	1.022	1.025	1.044	1.052
Disability	0.477***	0.488***	0.532***	0.517***	0.519***
Online course X Disability	0.958	0.950	1.060	1.111	1.113
Controls					
Student demographics	No	Yes	Yes	Yes	Yes
Academic characteristics	No	No	Yes	Yes	Yes
Family attributes	No	No	No	Yes	Yes
Institutional factors	No	No	No	No	Yes

* $p < .05$. ** $p < .01$. *** $p < .001$

Any Degree Attainment

Table 8 illustrates the odds for students earning any degree, including certificate, associate, and bachelor utilizing a two-way interaction. The results were associated with the main effect of the online variable, the main effect of the disability variable, and the effect of the interaction between the online variable and the disability variable. Model 1 in the first column shows a baseline logistic regression model with no control variables. The increased odds of

attaining any degree from the main effect of online course-taking was 1.019 which was not statistically different from zero. For the main effect of disability, the reduced odds was 0.544. In other words, there was increased odds of earning any degree for students who took online courses, but students with disabilities had reduced odds of earning any degree. When the disability variable was interacted with the online variable, the interaction effect showed increased odds of 1.335. This result was not statistically different from zero.

The baseline model was improved by controlling for student demographics in Model 2 of Table 8. The results show the odds of 0.963 for completing any degree for the main effect of online course-taking and the odds of 0.547 for completing any degree for the main effect of disability. Students who took online courses did not have increased odds as in the Model 1, but had reduced odds of completing any degree which was not statistically significant. Students who had a disability had reduced odds of earning any degree. Conversely, student who had disability had increased odds of 1.340 for earning any degree when participating in online courses. This result was not statistically different from zero.

Model 3 of Table 8 was improved by utilizing controls associated with academic characteristics in addition to the controls associated with student demographics. The results show the odds of 0.965 of attaining any degree for the online variable. For the disability variable, the odds of attaining any degree was 0.571. Similar to the observation in the Model 2 of Table 8, there were reduced odds of earning any degree for students who took online courses and reduced odds of earning any degree for students with disabilities. The results from the effect of online course-taking were not statistically significant. For students with disabilities, there were increased odds for attaining any degree when online courses were taken. Specifically, the results

show the odds of 1.413 for the interaction between the disability and online course-taking variable. This result was not statistically significant.

Table 8 was improved upon by adding controls related to family attributes and controls related to institutional factors to Model 4 and Model 5, respectively. The main effect of the online variable had reduced odds of completing any degree which were 0.974 for Model 4 and 0.973 for Model 5. The main effect of the disability variable had reduced odds of earning any degree. The odds of the main effect of disability were 0.565 for Model 4 and 0.567 for Model 5. The reduced odds for attaining any degree for both the main effect of the online variable and the main effect of the disability variable was a pattern observed in Table 5. The results of the main effect on the online variable were not statistically significant. The reduced odds for earning any degree for the disability variable were increased when online courses were taken. The interaction between the disability and online variable yielded increased odds 1.444 for Model 4 and 1.416 for Model 5. These results were not statistically different from zero.

Table 8

Logistic Regression of Any Degree Attainment, Odds Ratio

Variables	Model 1	Model 2	Model 3	Model 4	Model 5
Online course	1.019	0.963	0.965	0.974	0.973
Disability	0.544***	0.547***	0.571***	0.565***	0.567***
Online course X Disability	1.335	1.340	1.413	1.444	1.416
Controls					
Student demographics	No	Yes	Yes	Yes	Yes
Academic characteristics	No	No	Yes	Yes	Yes
Family attributes	No	No	No	Yes	Yes
Institutional factors	No	No	No	No	Yes

* $p < .05$. ** $p < .01$. *** $p < .001$

In summary, this study's logistic regression analysis used a two-way interaction to investigate the odds of degree completion associated with the main effect of the online variable, the main effect of the disability variable, and the interaction effect between the online variable and the disability variable. Online course-taking had mixed effects depending on the various

degree completion – certificate, associate degree, or bachelor degree. The main effect of the online variable showed reduced odds for certificate attainment, increased odds for associate degree attainment, and increased odds for bachelor degree attainment. There was a noticeable pattern of the effects of having a disability on the degree completion outcomes: certificate, associate degree, or bachelor degree. In all three outcomes, the main effect of the disability variable showed reduced odds of earning a degree. Students with disabilities were less likely to attain a certificate, associate, or bachelor. Conversely, the odds of degree completion for students with disabilities varied when participating in online courses. The interaction effect between the disability variable and online variable resulted in increased odds of completing a certificate and increased odds of completing an associate degree. Regarding a bachelor degree completion, the interaction effect between the disability variable and online variable showed reduced odds for the baseline model and controlling for student demographics, but increased odds when controlling for academic characteristics, family attributes, and institutional factors. It is important to note that the results of the interaction between the disability variable and online variable were not statistically significant.

Limitations

This study sought to understand the impact of online course-taking on students with disabilities in community colleges and had limitations related to the dataset and methodology. The Beginning Postsecondary Student Longitudinal Study (BPS: 12/17) dataset is a multi-year collection of first-time postsecondary student data of students who started their education in 2011-2012 school year. Limitations were related to the timeframe and group of students. Although BPS 12/17 is the most current BPS dataset to date, the recency of the dataset was a limitation being that the collection of the data ended in 2017. Therefore, any major events

following 2017 that might impact the dataset such as variables related to disabilities, online learning, and degree attainment in community colleges were not part of this study. Another limitation of this dataset was groups of students related to the online course-taking variable being limited to All, Some, and None, namely identifying whether a student took all their courses completely online, some course completely online, or no course online. Therefore, there was a limited understanding of whether the course was hybrid or fully online, the design and quality of the course, and the participation patterns of students. The dataset also had a limited number of identified students with disabilities in community college compared to students with no disabilities (students with disabilities, $n = 777$; and students with no disabilities, $n = 5,752$). This limitation might have contributed to results that were not statistically significant. The limited number of students might be due to the lack of available resources to identify disabilities in community colleges compared to primary and secondary education. This number of identified students with disabilities impacted this study by limiting the associated variable to a binary indicator of whether a student had a disability or not. Therefore, this study did not disaggregate outcomes based on the severity and uniqueness of each student's disabilities.

Another limitation consideration is the methodology and the statistical significance of the results. This quantitative study used a logistic regression analysis to give insight on the relationship between variables, but had limitations on the causal association between variables (Hellevik, 2009). Although there was a directionality that online learning might help for students with disabilities for certain degree attainment, such as increased odds for certificate and associate degree, but less evident for bachelor degree; these results were not statistically significant which poses another limitation to this study. Finally, this research revealed associations regarding online course-taking and degree completion for students with disabilities in community colleges,

but did not address integral issue of inconsistencies that exist between previous research which presents another limitation. Future research might employ a qualitative approach to get a clearer understanding of online course-taking that might explain disparities in various studies, as well as address the differentiated issues for various groups of students with disabilities, and explore the experiences of students with disabilities that might be limited by a quantitative approach.

Responding to Research Question

There was an observable pattern in the directionality of the resulting estimates of the interaction between the disability variable and the online variable. Although the results were not statistically significant, the researcher can address the research question: To what extent, if at all, does online course-taking impact degree attainment among students with disabilities in community college? The noticeable pattern revealed:

- there was increased odds of students with disabilities attaining a certificate who participated in online courses,
- there was increased odds of students with disabilities attaining an associate degree when online courses were taken,
- there was reduced odds in the baseline model and controlling for student demographics of students with disabilities attaining a bachelor degree who participated in online courses, and
- there was increased odds of students with disabilities attaining a bachelor degree when online courses were taken and adding controls for academic characteristics, family attributes, and institutional factors to student demographics.

Although these findings show an observable pattern on the outcome of degree completion for students with disability who participated in online courses, it is important to note that these

results were not statistically significant. Thus, future studies must be conducted to produce statistically significant results.

Chapter Summary

This chapter presented the results of this research's purpose to explore the impact, if at all, of online course-taking on postsecondary degree completion among students with disabilities in community colleges. The sample used in this study were the 6,529 students identified from the Beginning Postsecondary Student Longitudinal Study: 12/17 as those who started at a public, two-year institution in 2011 and continued until 2017. The descriptive analysis showed degree attainment for students with disabilities were concerning because of lower outcomes compared to students without disabilities, and showed a greater proportion of students who participated in online attained a degree compared to those students who did not participate in online courses. The logistic regression analysis revealed the main effect of each of the online variable, the main effect of the disability variable, and the interaction effect of the online variable and disability variable. The results indicated that the main effect of the online variable showed reduced odds for certificate attainment, but increased odds for associate and bachelor degree. This result was not statistically significant. The main effect of the disability variable showed reduced odds for certificate, associate, and bachelor degree attainment. The interaction effect between the online variable showed increased odds of attaining a certificate for students with disabilities who took online courses; increased odds of attaining an associate degree for students with disabilities who took online courses; increased odds of attaining a bachelor degree controlling for academic characteristics, family attributes, and institutional factors, but reduced odds for the baseline model and controlling for student demographics. This study had limitations such as results that were not statistically significant, dataset timeframe and student sample, access to course design

information, and the generalizability of the main effects and interaction effects on degree completion outcomes.

Chapter 5: Conclusions, Implications, and Recommendations

Chapter Overview

Chapter 5 describes the conclusions of this study, the implications for scholarship and practice, and the recommendations for future research. As a way to provide context to this study's conclusion, this chapter summarizes the study issue, conceptual and theoretical framework, methodology and methods, and key findings. The conclusion of this study asserts that online course-taking could conceivably support students with disabilities in community college earn a certificate and associate's degree, and to some extent a bachelor's degree.

Study Issue

This study investigated the impact of online learning on degree completion for students with disabilities in community colleges. Specifically, the research question is: To what extent, if at all, does online course-taking impact degree attainment among students with disabilities in community college? Attending community colleges has been a plausible option for many students, including students with disabilities, because of the reduced barriers of entry compared to other postsecondary institutions such as four-year colleges or universities. Online course offerings have increased in community colleges. Therefore, many students choose community colleges to learn, and there is a rising number of students who choose to learn online. Of concern is that outcomes for students with disabilities fare worse than students without disabilities. Students with disabilities in community colleges are less likely to attain a degree (Newman et al., 2009), which exhibits an alarming equity gap in education. Online learning is a conceivable option to help students with disabilities in community colleges. There are studies that show positive outcomes for online learning (Edmunds et al., 2021; Johnson & Cuellar Mejia, 2014; Shea & Bidjerano, 2014, 2016, 2019) and other studies such as show negative outcomes (Hart et

al., 2018; Huntington-Klein et al., 2017; Jaggars & Xu, 2010; Xu & Jaggars, 2011). Although few studies examine the impact of online course-taking on degree completion for students with disabilities, online learning might be a feasible option to help degree outcomes for students with disabilities in community colleges.

Online learning can conceivably address barriers that students with disabilities experience in community colleges. Students with disabilities experience barriers that impact their learning, such as unreliable safe learning environment, inflexible instruction, and inaccessibility of learning content that impact their learning outcomes (Flink & Leonard, 2019; Mullins & Preyde, 2013). First, unawareness regarding necessary accommodations for learning and inconsistent support for students with disabilities create stigma and fear leading to exclusion (Flink & Leonard, 2019). Continual requests to provide disability accommodations cause shame and guilt for students with disabilities. Second, students with disabilities experience instructional inflexibility especially with the one-sided inclusion of students without disabilities and the exclusion of students with disabilities. A study by Mullins and Preyde (2013) found that students with disabilities were excluded through social and organizational barriers. For instance, social exclusion occurred when questions arose about the legitimacy of their disabilities from both students and professors. Also one-sided inflexible instruction was illustrated through organizational barriers such as room size, distracting noises and challenges to request accommodations (Mullins & Preyde, 2013). Lastly, barriers appear when learning content becomes inaccessible such as hesitation or opposition from professors to provide accommodations which causes frustration for students with disabilities.

Online learning has the potential to provide flexible instruction, improved access to course content, and a learning environment where students feel safe (Cavanaugh et al., 2013;

Center on Online Learning and Students with Disabilities, 2016). Online courses can be flexible through the use of diverse platforms and multiple ways students can interact with the course content. Students with disabilities can choose the way they access content that accommodates for their specific disability. Online courses can provide increased accessibility for course content by providing synchronous and asynchronous learning choices to students. Through a selection of self-directed learning options, students with disabilities can learn at a pace and time that might be the most convenient for their disabilities. Online courses can conceivably offer a safe learning environment by reducing the intimidation that students with disabilities might experience in an in-person course. Students with disabilities can interact with other students in ways that reduce the stress and stigma that they might experience due to having a disability.

Conceptual and Theoretical Framework

Learning online could offer a conceivable option for students with disabilities in community colleges attain a degree because of the conceptual framework that online learning provides students with disabilities increased flexibility, accessibility of content, and a safe learning environment. The flexibility of online learning could allow the opportunity for students with disabilities to choose how to learn. With various options for how a student could receive information, how a student engages with information, and how a student can communicate learning; online learning has the potential to provide personalized learning through self-directed learning options that give students independence to learn in ways that supports their individual learning styles. The accessibility of online learning gives students with disabilities a choice of when learning can happen and the pace in which learning occurs. Asynchronous online learning gives the choice of when to learn at convenient times which can be integral for students with disabilities who might experience overwhelming moments of anxiety related to their disabilities

that are uncontrollable. Examples of benefits are taking needed learning breaks or more time for learning. Online learning can conceivably provide a safe learning environment for students who might feel or experience insecurities in face-to-face classes by offering alternative options to physical interactions with others that are less stressful and address the stigma that students with disabilities might be subjected to when learning in person.

Although this study utilizes a constructivist worldview, the researcher is influenced by critical theory with respect to Crenshaw's theory of intersectionality (1989) and Mezirow's perspective transformation theory (1981). Student identity and the intersectionality of identities are important. Students with disabilities might have one or more disabilities as part of their identities. Educational institutions might have varying levels of disability inclusion or exclusion. Barriers for disabilities can cause discrimination in education can create barriers for one or more of these identities. With Perspective Transformation, disruption can lead to change for more inclusiveness (Mezirow, 1981). Institutions might address disabilities in varying ways, with some using policies and practices that are more inclusive, and others using policies and practices that are more exclusive. Disrupting past exclusive policies and practices through online learning that includes more flexibility of learning, more access to content, and a safer learning environment; change might occur for more inclusiveness for students with disabilities. Online course-taking can address the inequities of a one-way fits all approach from exclusive policies and practices.

This research design used Jago's (2019) framework as a guide to the goal, approach, worldview, methodology, methods, and tools. The goal was to investigate the impact of online course-taking on postsecondary degree attainment for students with disabilities by answering the research question: To what extent, if at all, does online course-taking impact degree attainment

among students with disabilities in community college? This study used a quantitative approach influenced by the researcher's constructivist worldview that adult students, including with disabilities, shape their own learning based on experiences and prior knowledge associated with their intersectional layers of identities (Crenshaw, 1989). Through a logistic regression analysis of a sample from the Beginning Postsecondary Student Longitudinal Study that utilized survey tools to collect student information, the researcher estimated the odds of degree attainment: certificate, associate's degree, bachelor's degree, and a combination of all degree attainment associated with the interaction between online course-taking and having a disability.

Methodology and Methods

This study employed a logistic regression analysis to investigate the odds of degree completion associated with the interaction between online course-taking and having a disability. This analysis was used to answer the research question: To what extent, if at all, does online course-taking impact degree attainment among students with disabilities in community college? Degree attainment variables were: certificate, associate's degree, bachelor's degree, and a combination of all degree attainment. A series of logistic regression models were applied to address each of these degree attainment variables as a function of the interaction between disability and online course-taking. The main predictor variable was the interaction between online course-taking and whether a student had a disability. This study attempted to replicate the study by Sublett and Chang (2018) that investigated outcomes for students with disabilities in high school by utilizing control variables related to student demographics, academic characteristics, family attributes, and institution factor. This research was guided by similar community college online studies that used similar control variables categories (Jaggars, 2011; Jagger & Xu, 2010; Shea & Bidjerano, 2014; Sublett, 2019).

Key Findings

The key findings showed the impact of online course-taking on degree completion for students with disabilities in community college. The researcher used a logistic regression analysis to investigate the association between community college degree completion (certificate, associate degree, and bachelor's degree) and the interaction of online course-taking and having a disability. Of significance is the main effect of the variable for online course-taking, the main effect of the variable for having a disability, and the interaction effect between the two variables. The main effect for online course-taking variable indicated reduced odds for certificate achievement and increased odds for completing an associate and bachelor degree. The results were not statistically significant. The main effect for the disability variable was reduced odds for attainment of certificate, associate degree, and bachelor degree. The results were significantly significant except for attainment of certificate. There was a concerning pattern that students with disabilities did not fare well in the odds of earning a certificate, associate degree, or bachelor degree. Interestingly, the effect of the interaction between the variable for disability and the variable for online course-taking revealed increased odds of achieving a certificate and an associate degree. There was increased odds for students with disabilities to earn a certificate or an associate degree if online courses were taken. Conversely, this interaction effect on a bachelor's degree attainment indicated reduced odds for the baseline model and reduced odds when controlling for student demographics, but the interaction effect showed increased odds when controlling for academic characteristics, family attributes, and institutional factors. It is essential to note that the finding for the interaction effects between the disability variable and online variable on degree attainment were not statistically significant.

Certificate Degree Attainment

The analysis using a baseline logistic regression model without control variables resulted in increased odds 1.492 for attaining a certificate for students with disabilities who took online courses. Controlling for student demographic had increased odds 1.498 for attaining a certificate associated with the interaction between the disability variable and online course-taking variable. When controlled for academic characteristics as well as student demographics, the interaction between online course-taking and disabilities yielded increased odds of 1.349 for earning a certificate. When family attributes were added to the control variables and when institutional factors were added to the control variables, there was increased odds of earning a certificate for the interaction between online course-taking and disability. The results for these interactions were 1.334 and 1.282. It is important to note that the results for all the interactions were not statistically significant, but there was a directionality of increased odds. In other words, there was a directionality that online course-taking might help certificate degree attainment for students with disabilities.

Associate Degree Attainment

The analysis using a baseline logistic regression model without control variables showed increased odds 1.280 of earning an associate degree for the interaction effect between the online variable and disability variable. Improving the analysis by controlling for student demographics indicated an increased odds of 1.283 for earning an associate degree for the interaction between online course-taking and disability. When the analysis was improved upon by adding controls for academic characteristics in addition to the student demographics, the interaction between disability and online course-taking illustrated the odds of 1.331 for earning an associate degree for students with disabilities who took online courses. When additional controls were added for

family attributes and then were added for institutional factors, the results for the interaction between disability and online course-taking were 1.342 and 1.338. These results were not statistically different from zero, but a directionality existed that suggests participating in online course-taking might help students with disabilities attain an associate degree.

Bachelor Degree Attainment

The baseline logistic regression analysis without control variables indicated odds of earning a bachelor degree were reduced. The interaction effect of disability and online showed the odds 0.958. When controlled for student demographics, students with disabilities had reduced odds of completing a bachelor degree when participating in online classes. The result of this interaction between disability and online course-taking was 0.950. Improving the model by adding other control variables related to academic characteristics in addition to the student demographics, showed that the odds of earning a bachelor degree for students with disabilities was increased when online courses were taken. The results of this interaction between disability and online was 1.060. When additional controls were employed, namely adding control variables related to family attributes and then adding control variables related to institutional factors, the interaction effects of the disability variable and the online course-taking variable yielded increased odds of 1.111 and 1.113. These results were not statistically significant, but there was a directionality of increased odds of bachelor degree attainment, specifically when controls for academic characteristics, family attributes, and institutional were added to student demographics.

Any Degree Attainment

The odds of earning any degree, including certificate, associate, and bachelor as a function of a baseline logistic regression model with no control variables yielded the interaction effect of the disability variable and online variable that showed increased odds of 1.335. Adding

controls for student demographics resulted in increased odds of 1.340 for earning any degree when students with disabilities participated in online courses. By utilizing controls associated with academic characteristics in addition to the controls associated with student demographics, there were increased odds for attaining any degree for students with disabilities when online courses were taken. Specifically, the results showed the odds of 1.413 for the interaction between the disability and online course-taking variable. By adding controls related to family attributes and then adding controls related to institutional factors the interaction effects between the disability and online variable yielded increased odds 1.444 and 1.416. Although these results were not statistically significant, there as an apparent directionality of increased odds of any degree attainment.

Overall, the key findings addressed the research question: To what extent, if at all, does online course-taking impact degree attainment among students with disabilities in community college? The resulting estimates of the interaction effect between the disability variable and the online variable, suggested directionality of degree attainment outcomes: There was increased odds of certificate attainment for students with disabilities who participated in online courses, there was increased odds of associate degree achievement for students with disabilities who took online courses, there was reduced odds for bachelor degree completion for students with disabilities who participated in online courses when looking at the baseline model and when student demographics variables were controlled, there was increased odds for bachelor degree completion for students with disabilities who took online courses when added variables for academic characteristics, family attributes, and institutional factors were controlled. It is important to point out that these findings were not statistically significant, therefore, future studies must be done to address the research questions using statistically significant results.

Study Conclusion

The conclusion of this study is that online course-taking is a feasible option to support students with disabilities in community colleges attain degree completion. There was a noticeable directionality in the results of this study that online course-taking might help students with disabilities earn a certificate or associate degree, although not statistically significant. This conclusion addressed this study's research question: To what extent, if at all, does online course-taking impact degree attainment among students with disabilities in community college? While students with disabilities in community colleges do not fare well in attaining a certificate, an associate degree, or bachelor degree, the results of this study showed increased odds for these students with disabilities who take online courses. Specifically, there are increased odds for students with disabilities in community colleges to attain a certificate or an associate degree when participating in online courses. The researcher adds there is a need for further investigation that yields statistically significant results to reinforce the findings of this study.

Implication for Scholarship

This study's conclusion that online learning might help degree completion for students with disabilities in community colleges supports existing research that demonstrate the benefits of online course-taking. Existing research shows online course-taking provides flexible instruction, increased access to content, and safe learning environment that can help students with disabilities. Song and Hill (2007) assert online learning establishes flexible control for how students study by making use of existing knowledge, autonomy in the learning process, and options for context. Badge et al. (2008) discovered that students with disabilities used control features and options more than students without disabilities because they reinforced the flexibility to personalize their learning. The tools that increased flexibility of accessing content

for students with disabilities are: audio-visual recordings, textual transcripts, audio-visual subtitles, and customizable downloadable materials (Rodrigo & Tabuenca, 2020).

This study's conclusion that online learning can conceivably help students with disabilities attain a community college degree reinforces the literature that online course-taking provides greater accessibility to content that can increase the odds for degree completion for students with disabilities. Increased access to content through online learning is illustrated in various studies. K. Smart and Cappel (2006) noted that students found online learning beneficial because they could access content regardless of the location and time. T. Zimmerman (2012) examined accessing content through learner-to-content interactions and found that grades were higher for students who spent more time accessing content versus students who spent less time with the content. Students with high social anxiety such as depression reported less anxiety when accessing content online compared to face-to-face interactions (Yen et al., 2012).

This study's conclusion that online course-taking can plausibly increase the odds of degree completion in community colleges supports the literature that online learning can offer a safe learning environment. Studies have shown the importance of a safe learning environment and that online learning can provide a safe environment to learn. Posdiadlik (2021) asserts that students are concerned about making mistakes, and online learning reduces the stress associated with making mistakes in a face-to-face situation, especially with students who suffer from anxiety. Cavanaugh et al. (2013) emphasize that online learning can support the academic needs of students when the learning environment is safe. The Center for Online Learning and Students with Disabilities (2016) asserts that online learning can conceivably provide a safe learning environment for students with disabilities through various learning options, schedules that are flexible, and special accommodations.

Conversely, this study's conclusion contradicts existing research that show online course-taking worsens outcomes for students. For developmental English courses in community college, students are more likely to withdraw or fail if the course is online or hybrid (M. Smart & Saxon, 2016). Similar findings were identified for students in Virginia community colleges. Students taking remedial courses online were less likely to progress to college-level courses (Jaggars & Xu, 2010). Retention and course performance for students in remedial course are impacted by online course-taking. Students choosing online learning for remedial math and English are more likely to drop out compared to choosing face-to-face courses. More students earn a C grade or better in a face-to-face remedial English class compare to an online class and this grade performance outcome is more prominent with remedial math class (Xu & Jaggars, 2011). Online learning negatively impacts certain groups of students. For instance, male, Black, and low academically prepared students showed lower persistence and grades when courses were taken online (Xu & Jaggars, 2013). This study's conclusion contradicts the research that assert negative outcomes for students who participate in online course-taking because the findings of this study show that online course-taking can conceivably help students with disabilities attain a degree in community colleges.

This study will have implications for scholarship on both the national level and worldwide. This study's conclusion is that online learning might help degree completion for students with disabilities in community colleges in the United States. It is the researcher's intent that this study provokes more research attention on the impact of online course-taking for students with disabilities in US community colleges. Students with disabilities are choosing community colleges over four-year colleges, yet the degree outcomes for these students are concerningly low (Newman et al., 2009). The urgency to support students with disabilities might

be addressed through additional research on online course-taking in US community colleges. Examples of such future research are investigating the impact of online course-taking in community colleges on the disaggregate range of disabilities, identifying online course design practices, and exploring the implication of online paradox for students with disabilities in community colleges where online learning show negative short-term outcomes but positive long-term outcomes. It is proposed that the exigency to fill the gap in literature for students with disabilities who participate in US community colleges online courses be addressed in future studies.

The implication of this study can conceivably impact global scholarship by describing the current landscape of online learning for students with disabilities around the world in postsecondary education similar to U.S. community colleges. This study will support other researchers around the world who seek to fill the gap in literature on students with disabilities who participate in online courses. There is a growing number of people with disabilities worldwide, yet few studies focus on students with disabilities who take online courses in postsecondary education. The World Health Organization and World Bank (2011) declared an increasing trend of people with disabilities with 10% of the population worldwide identified as having a disability in 1970 compared to 15% from the latest study. This trend is alarming because disabilities disproportionately impact poor and developing countries (UNESCO, 2010). As global aide moves towards equitable education for all people around the world, it is the responsible approach to study online learning for students with disabilities all over the world. Future global research might explore the region-specific online educational experience of students with disabilities in postsecondary education similar to U.S. community colleges. The onset of COVID forced many postsecondary institutions around the world to shift to online

learning as a primary mode of delivery for course. This shift not only highlighted the varying levels of preparedness for online learning but also emphasized the need for more widespread training and resources to support faculty and students in the online. Similar to this current study, future global studies might investigate the impact of online learning degree outcomes for students with disabilities.

Implication for Practice

Based on the conclusion of this study and other studies on students with disabilities in postsecondary education and online course-taking related to student outcomes in community college, there are considerations for practice to address barriers impacting learning outcomes for students with disabilities and to take advantage of the benefits of online course-taking that support students with disabilities in U.S. community colleges when pursuing degree attainment. These practices might be considered to guide global educational policies to support countries with a disproportionate number of people with disabilities.

The results of this study point to the notion that online course-taking might be considered as an option to help students with disability in community college with degree completion. Specifically, it is proposed that community colleges consider continuing to make online course-taking available for students with disabilities attaining a certificate and associate degree, and allocate resources to provide more supports for students with disabilities taking online courses to attain their bachelor degree. Although the results of this study on the impact of online course-taking were not statistically significant, there was a directionality based on increased odds for certificate and associate degree completion when students with disabilities participate in online courses, but not as apparent for bachelor degree completion. The results also confirmed that students with disabilities continue to have reduced odds of degree completion when not

participating in online courses. Online course-taking is a feasible option to address the exigency to support students with disabilities attain degree completion in community colleges.

Previous research has acknowledged that students with disabilities in postsecondary education experience barriers related to unreliable safe learning environment, inflexible instruction, and inaccessibility of learning content. Flink and Leonard (2019) assert the safeness that students with disabilities need to learn is compromised by the lack of knowledge of disabilities and the disapproval of special accommodations received which exasperates the feeling of stigma and fear for many students with disabilities. Mullins and Preyde (2013) found inflexible instruction was apparent when instruction served the majority of students and excluded the minority of students such as students with disabilities. Learning content became inaccessible when accommodations were challenged in situations such as questioning the validity of learning disabilities. Online course-taking can provide a safe learning environment, flexible instruction, and increased access to content. Online learning can provide a perception of safety in a learning environment such as anonymity for students who suffer from anxiety especially when there is a fear of making mistakes in front of others (Podsiadlik, 2023). Song and Hill (2007) assert that online learning can provide flexibility by utilizing the student's unique capacity for learning and prior knowledge, encouraging learning autonomy and control of learning, and options for learning context. The limitation of accessibility of content in face-to-face instruction such as the pace of lectures is addressed with online course-taking through asynchronous instruction where students can access learning content any place and at any time of the day or night. K. Smart and Cappel (2006) noted that this convenience of accessing content is a perceived benefit for students who participate in online courses.

In practice, policymakers might support students with disabilities by considering the opportunities for online course-taking that are identified by previous studies (Cappel, 2006; Podsiadlik, 2023; Song & Hill, 2007) which include a safe learning environment, flexible instruction, and increased access to content. A safe learning environment would give students with disabilities a choice of where they can learn. When disability symptoms occur, students need an environment that is conducive of learning that safely accommodates their disability such as their own home where there are few distractions and people who might know how to safely support the student. Accommodations for safe learning reduces the negative affective filters such as anxiety that might hinder learning. Student-to-student interaction and student-to-teacher interactions in an online platform encourages the deliberation and critical thinking needed to learn. Therefore, it is proposed that education policy assure that students with disabilities not be limited to in-person learning and have the option to choose the location in which they would learn that could accommodate their disability. For example, it is proposed that every community college student have access to a device and internet connectivity to support their choice of learning environment and have the information technology support in case there are problems with technology or access to internet. Another policy is online course designers might find ways to develop and encourage ongoing interaction between students and between teachers that are safe. For instance, online discussion boards could be used in small group and large group discussions as ways to contribute knowledge and recognize various points of view and support safe interactions between students and between students and teacher (McCarthy et al., 2010).

A flexible learning environment would provide a choice of how students with disabilities can receive information and more control in directing their learning. Every disability is different and the ways that disabilities are addressed differ for every student. Providing a wide range of

accessibility tools to receive content such as recordings that have both audio and visual, transcripts of lectures, and subtitles support every student to succeed. It is proposed that online course designers find ways to incorporate accessibility tools so the learning content can be personalized based on the needs of disabilities. Self-directed learning gives the student control and flexibility on how content is received, engaged, and articulated. Therefore, educational policy might consider advancing the concepts of Universal Design of Learning to maximize the flexibility of content that include students with disabilities. It is proposed that course designers utilize concepts from Universal Design of Learning in practice to support multiple options for students to receive information to differentiate information processing, multiple options for students to engage in content by reducing barriers and advancing ways for persistence, and multiple options for articulating knowledge through choice of demonstration of learning (Black et al., 2014; Burgstahler & Russo-Gleicher, 2015; Griful-Freixenet et al., 2017; Seok et al., 2018). Overall, it is proposed that online courses be designed in ways to give students more options and more control of learning.

Increased access to content would give students with disabilities a choice of when information can be accessed. Interactions with the content such as the pace of the learning or the learning time are important when addressing accessibility for students with disabilities. Pace of learning is an integral factor for students with disabilities especially those with learning disabilities. As oppose to face-to-face learning, online learning can give students the option of the learning pace or even taking breaks. The time that students learn is a critical consideration especially with unplanned onset of disability symptoms such as stress or anxiety. Lambert and Dryer (2018) assert that the time and effort in managing disability symptoms are valuable to students and impact the quality of life and relationships with friends and family. It is important

for students to be able to choose times to learn when the impact of their disability is minimized or more controlled. Educational policies might consider accommodating for the students' choice of when learning occurs. For example, it is proposed that online course designers consider developing meaningful online grouping units of learning that advances various learning pace and breaks so students could accommodate their own disabilities by slowing down the pace of intaking information, repeat content, or take breaks to optimize learning sessions.

The implication of this study can feasibly impact educational practices around the world. The growing number of people with disabilities around the world is disproportionately impacting poor countries and developing countries (UNESCO, 2010). Access to education is part of the United Nation's Sustainable Development Goals to advance peace and prosperity and transform our world (United Nations, 2022). As education becomes more available to poor countries and developing countries around the world, it is proposed that online course-taking be considered to help students with disabilities because this study's results show a directionality in the odds of online course-taking helping students with disabilities with degree completion in community colleges. The researcher asserts that online course-taking can feasibly help students with disabilities and educational practices that are applied globally should be derived from past literature. Previous literature point to online course-taking ideas that will help students with disabilities which include providing a safe learning environment, flexible instruction, and increased access to content (Cappel, 2006; Podsiadlik, 2023; Song & Hill, 2007). Therefore, it is proposed that world organizations consider implementing policies that will provide a safe learning environment for students with disabilities. For instance, it is proposed that every student have a computer and internet connection so they can choose a location to learn that is safe. The implications of this policy will help many students with disabilities, but especially those who's

physical disability might make it difficult, or even dangerous, to travel for education. Global educators might also utilize policies that support flexible instruction. For example, policy makers might adopt concepts of Universal Design of Learning for online instructional design in order to capitalize on the flexibility of content that accommodates the greatest amounts of students including students with disabilities. Universal Design of Learning gives students opportunities to personalize and differentiate instruction such as choosing how they receive learning content and choosing how they demonstrate their learning. Finally, educational policies that advance increased access to content might help students with disabilities who are overly represented in poor and developing countries. For instance, it is proposed that there is a policy that gives students the ability to choose when and how long to access content. Giving students this control to access content will help mastery of learning because students will not be limited to a prescribed learning timeframe and will be able to learn at a pace that accommodates their disabilities. Many students with disabilities will benefit from this policy, especially those who have learning disabilities and might need extra time to learn.

Limitations

This study explored the impact of online course-taking on degree completion for students with disabilities in community colleges, and this study had limitations. The results of this study showed that there was a directionality in the results in which online course-taking yielded increased odds of certificate and associate degree completion, reduced odds for bachelor degree completion for the baseline analysis and controlling for student demographics, and increased odds for bachelor degree completion adding controls for academic characteristics, family attributes, and institutional factors. The first limitation was results for the analysis of interaction between students with disabilities who took online courses were not statistically significant.

Specifically, the results of the main effect of the online variable were not statistically significant; the results of the main effect of the disability were statistically significant, with the exception of the impact on certificate completion; and the results of the interaction effect between the disability variable and online variable were not statistically significant. Another limitation was related to the timeframe and sample of students of the dataset. The Beginning Postsecondary Student Longitudinal Study dataset was limited to student who started their education in the 2011-2012 school year and ended six years later. The sample of students who identified as having a disability were few ($n = 777$) compared to students with no disabilities ($n = 5,752$). The low number of students might have impacted the results that were not statistically significant. The reason that there were low number of students might be due to the lack of accessible resources that would assist in identifying disabilities. Resources to identify disabilities are available in primary and secondary education, but are limited in postsecondary education. Consequently, the researcher decided to use a binary variable for disability, identifying whether or not a student had a disability or no disability. The disability variable was not disaggregated into categories of disabilities and posing another limitation. This was similar to the study done by Sublett and Chang (2018). The lack of community college course design information and course participation information were limitations. The researcher did not have access to whether the course design was fully online or a hybrid of online and in-person; whether the course was synchronous or asynchronous; or how many online classes student took. Therefore, the online course-taking variable was limited to All, Some, and None namely identifying whether a student took all their courses completely online, some course completely online, or no course online. Using these categories, the researcher collapsed *All* and *Some* into one outcome, and *None* was another. Therefore, another limitation was using a binary variable for online. This was similar to

past studies by Shea and Bidjerano (2014) and Sublett (2019). Finally, the research methodology had limitation. The researcher utilized a logistic regression analysis. This quantitative approach gave insight on the main effects and the interaction effects on degree completion outcomes, but limited the generalization of the results for the greater population (Osborne, 2015).

Recommendation for Future Research

It is proposed that future research on online learning address the urgency in education gaps by further studying students with disabilities and exploring the specific needs that exist from the wide range of disabilities that students experience. There has been an increased number of studies that address online course taking and students outcomes, but many of these studies are limited to general student population with little focus on students with disabilities. Students with disabilities have differentiated needs compared to the general population. Unfortunately, there is a dearth in the literature for students with disabilities who take online courses in community college. The exigency of future research to address this gap is imperative because students with disabilities continue to fare worse in learning outcomes than the general population, and online course-taking is a feasible option to improve learning outcomes for these students. Future studies might also consider the wide range of disabilities by utilizing the various categories of disabilities. This study investigated the impact of online course-taking on degree completion for students with disabilities in community colleges. The disability variable utilized was a binary variable, an aggregate of all disabilities, namely whether a student had a disability or not had a disability. By disaggregating disabilities into more categories such as physical disabilities and learning disabilities, results might vary based on the differentiated impact of each specific disability.

It is proposed that future studies utilize qualitative methods that might give insight to how students with disabilities benefit from online course-taking and course design related to the flexibility in learning, increased accessibility to course content, and a safe learning environment. Previous studies have shown that online course-taking can support students with flexibility in learning (Badge et al., 2008; Pittman & Heiselt, 2014; Rodrigo & Tabuenca, 2020; Song & Hill, 2007), but these studies do not investigate disabilities. Future studies might utilize a qualitative approach to look into the flexibility of online learning for students with disabilities such as revealing themes from the experience of self-directed online learning or identifying the themes from participating in synchronous or asynchronous online course designs. Previous studies have explained how online course-taking offers accessibility to content for students (K. Smart & Cappel, 2006; Yen et al., 2012; T. Zimmerman, 2012), but these studies do not address students with disabilities. Future qualitative studies might focus on students with disabilities and their experience accessing online content. An example of this is studying what design practices, such as fully online or hybrid, might reinforce increased accessibility to course content for students with disabilities. Finally, previous studies have asserted that online courses support a safe learning environment (Catalano, 2014; McAndrew et al., 2012; Podsiadlik, 2023). Future qualitative studies might provide increased insight on safe online learning environments specifically for students with disabilities. For instance, future studies might consider ways to support online relationships through safe interactions between student-to-student and student-to-teacher.

It is proposed that future studies explore the online paradox related to students with disabilities. Studies that address the online paradox have revealed that students who study online seem to experience short term negative learning outcomes but had long term advantages.

Johnson and Cuellar Mejia (2014) examined students in California community colleges and uncovered that despite negative short-term outcomes from online learning, the long-term outcomes showed more transfers to four-year universities and more associate degrees for student who enrolled in online courses. Sublett (2018) referenced this online paradox by discovering students completed their bachelor degrees two to three months faster if they participated in distance education in their first year of college compared to students who did not participate. None of these studies focused on students with disabilities. Future studies might investigate the extent to which the online paradox pertains to students with disabilities.

Future studies might be done to improve the results of the analytical model of this study, such that future results are statistically significant. This study employed a logistic regression analysis using BPS 12/17 to investigate the impact of online course-taking on degree attainment for students with disabilities in community colleges. Although the results were not statistically significant, there was an observable directionality that student with disabilities who participated in online courses had increased odds of attaining a certificate and associate degree. Future studies might be done to produce statistically significant results in order to reinforce or contradict the results of this study that online course-taking might help the odds of certificate and associate degree completion for students with disabilities in community college.

Closing Comments

The purpose of this study is to address the increasing achievement gaps for students with disabilities in community colleges. Specifically, the research question of this study is, To what extent, if at all, does online course-taking impact degree attainment among students with disabilities in community college? Students with disabilities who pursue postsecondary education are twice as likely to choose a two-year community college as oppose to four-year

colleges or universities (Newman et al., 2011). The problem is that students with disabilities in community colleges are doing worse in learning outcomes than students without disabilities, such as long-term learning outcomes like degree attainment (Newman et al., 2009). Studies have shown that learning barriers for student with disabilities are inflexible instruction, learning content that is inaccessible, and intimidating and unsafe learning environment (Flink & Leonard, 2019; Mullins & Preyde, 2013). Online learning is a feasible solution to support students with disabilities because it can conceivably provide flexibility in learning, accessible content, and a comfortable and safe environment to learn (Cappel, 2006; Podsiadlik, 2023; Song & Hill, 2007). It's important to note, that studies regarding online learning are mixed with some researchers proclaiming the benefits of online learning (Edmunds et al., 2021; Shea & Bidjerano, 2014, 2016, 2019) while other researchers asserting that online learning has a negative impact on students (Hart et al., 2018; Huntington-Klein et al., 2017; Jaggars & Xu, 2010; Xu & Jaggars, 2011). Johnson and Cuellar Mejia (2014) found challenges for online students in the short-term, but rewards in learning outcomes in the long-term.

The findings of this study showed a directionality of the odds of positive outcomes that support degree completion that aligns with previous existing research that show positive impacts for students who participate in online learning. Examples of these positive outcomes in previous research are students who take online courses early and students who complete an online course were more likely to complete a degree and transfer (Shea & Bidjerano, 2014, 2019). In another study, Sublett (2019) contested the notion that online learning yields lower outcomes compared to in-person learning. In this study, students who participated in online classes during their first year earned a degree or transferred in the same time as those students who did not participate in online classes. These previous studies did not focus on students with disabilities. This current

study focused on students with disabilities and found results that align and support the positive outcomes of online course-taking. Using a multi-year national dataset, this study focused on students with disabilities in community college and the impact of online course taking on degree completion. The findings show a directionality that online course-taking yielded increased odds of certificate and associate degree completion, although not statistically significant. Even though these findings could not offer evidence of causality, the associations discovered align with the positive online learning outcomes from previous research and give insight to the existing gap in literature for online students with disabilities in community college.

It is reasonable to suggest that online learning may support students with disabilities through increased flexibility, accessibility of content, and safe learning environment. It is proposed that researchers and practitioners work collaboratively to explore the differentiated ways that online course-taking can benefit the wide-range of students with disabilities in community colleges in order to pursue degree attainment. For instance, researchers might work with educators to use a qualitative approach to identify the themes that emerge from the lived experiences of students with disabilities pertaining to the flexibility of online courses. Another example, researchers can interview online course designers to identify best practices in developing and organizing content in ways that increases accessibility for various disabilities. Finally, researchers can observe instructors' use of techniques and tools to nurture online relationships through safe interactions. The impact of researchers and practitioners collaborating will also help address equity in education for students with disabilities around the world as the number of disabilities increase and disproportionately impact poor and developing countries (UNESCO, 2010). Online learning is not exclusive to the United States and technology is becoming available to students who might not have had access to technology in the past. Without

continued accommodations such as flexibility in learning, accessibility of content, and safe learning; the achievement gap for students with disabilities in community colleges and around the world might persist, or worse might be exacerbated.

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APPENDIX

IRB Approval Letter

Pepperdine University
24255 Pacific Coast Highway
Malibu, CA 90263
TEL: 310-506-4000

NOTICE OF APPROVAL FOR HUMAN RESEARCH

Date: April 11, 2022

Protocol Investigator Name: Francisco Narciso

Protocol #: 22-03-1791

Project Title: Is Online Course-Taking Helping or Hindering Students with Disabilities in U.S. Community Colleges?

School: Graduate School of Education and Psychology

Dear Francisco Narciso:

Thank you for submitting your application for exempt review to Pepperdine University's Institutional Review Board (IRB). We appreciate the work you have done on your proposal. The IRB has reviewed your submitted IRB application and all ancillary materials. Upon review, the IRB has determined that the above entitled project meets the requirements for exemption under the federal regulations 45 CFR 46.101 that govern the protections of human subjects.

Your research must be conducted according to the proposal that was submitted to the IRB. If changes to the approved protocol occur, a revised protocol must be reviewed and approved by the IRB before implementation. For any proposed changes in your research protocol, please submit an amendment to the IRB. Since your study falls under exemption, there is no requirement for continuing IRB review of your project. Please be aware that changes to your protocol may prevent the research from qualifying for exemption from 45 CFR 46.101 and require submission of a new IRB application or other materials to the IRB.

A goal of the IRB is to prevent negative occurrences during any research study. However, despite the best intent, unforeseen circumstances or events may arise during the research. If an unexpected situation or adverse event happens during your investigation, please notify the IRB as soon as possible. We will ask for a complete written explanation of the event and your written response. Other actions also may be required depending on the nature of the event. Details regarding the timeframe in which adverse events must be reported to the IRB and documenting the adverse event can be found in the *Pepperdine University Protection of Human Participants in Research: Policies and Procedures Manual* at community.pepperdine.edu/irb.

Please refer to the protocol number denoted above in all communication or correspondence related to your application and this approval. Should you have additional questions or require clarification of the contents of this letter, please contact the IRB Office. On behalf of the IRB, I wish you success in this scholarly pursuit.

Sincerely,

Judy Ho, Ph.D., IRB Chair

cc: Mrs. Katy Carr, Assistant Provost for Research