

DISSERTATION

UNIVERSAL DESIGN FOR LEARNING: PERCEPTIONS OF FACULTY AND STUDENTS
AT A NORTHEASTERN COMMUNITY COLLEGE

Submitted by

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ABSTRACT

UNIVERSAL DESIGN FOR LEARNING: PERCEPTIONS OF FACULTY AND STUDENTS AT A NORTHEASTERN COMMUNITY COLLEGE

To examine community college faculty and student attitudes toward and actions associated with inclusive instruction based on Universal Design for Learning (UDL) principles and practices, two online surveys, the Inclusive Teaching Strategies Inventory (ITSI) and the Inclusive Teaching Strategies Inventory-Student (ITSI-S), were administered at a medium-sized Northeastern public Community College (n=449). The ITSI and ITSI-S contain six subscales representing the following constructs: (a) accommodations, (b) accessible course materials, (c) course modifications, (d) inclusive lecture strategies, (e) inclusive classroom, and (f) inclusive assessment. A series of Multivariate Analyses of Variances (MANOVA's) were performed to identify predictors of these attitudes and actions among faculty and students. Results found significant differences among faculty (N=179) in overall action scale scores based on age and ethnicity. However, similar analyses conducted on students were not significant. Results of the current study respond to the gap in the literature by examining inclusive instruction based on universal design for learning in the community college environment. Discussion, implications of these findings and recommendations for future research were discussed.

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DEDICATION

I dedicate this dissertation to my wife, Nikki, and my children Mikey, Maddie, Jude, and Abbie, for your unconditional love, support and understanding. I love each of you so very much. Kids, just remember, you can do anything you set your mind to.

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CHAPTER 1: INTRODUCTION

Universal Design for Learning (UDL) shows great promise for reducing barriers in postsecondary education for an increasingly diverse student body regardless of age, gender, ethnicity, socioeconomic status, English as a second language, level of preparedness, and most importantly, degree of disability. UDL, a scientifically valid framework for guiding educational practice, has generated support and reduces barriers in instruction by providing faculty with a blueprint for creating curriculum, materials, and the classroom environment that are more accessible and usable by all students from different backgrounds and with different learning needs (King-Sears, 2014; Rao, Ok, & Bryant 2014; Rose, & Meyer 2002). Although the UDL framework has existed for over two decades and while research studies examined faculty and students at 4-year colleges and universities, very little, if any research exists on supporting UDL's efficacy and use in the community college environment (Lombardi, Murray, & Dallas, 2013; Lombardi, Murray, & Gerdes, 2011). Today, the population of students in postsecondary education is becoming increasingly diverse, resulting in diverse learning needs. Using UDL principles in postsecondary educational environments may be one way to reduce barriers, increase opportunities for success and meet the ever-changing needs of a diverse and continually growing number of postsecondary students, especially in community colleges.

In contrast to four-year colleges and universities, community colleges were formed in the early 20th century with the goal of providing all individuals, many who might not otherwise enroll, a chance at a college education (Bok, 2013). Today, community colleges enroll more than half the nation's undergraduates, the majority of which are increasingly diverse in every respect including age, ethnicity, socioeconomic status, level of preparedness, learning English,

working full time, supporting a family, and degree of disability (Boggs, 2010; Desai, 2012). Many community college students lack basic skills in reading, writing, and mathematics and are required to successfully complete remedial course prior to enrolling in regular college classes (Bok, 2013). Community colleges enroll the highest percentage of students with disabilities among all public postsecondary institutions (American Association of Community Colleges, 2013). Approximately 12% of community college students report having a disability (American Association of Community Colleges, 2013; Aud et al., 2010). Among undergraduates who reported having a disability, the percentage indicating each disability type is as follows: more than 20% report suffering from a mental illness or depression, 19% reported other disability type, 18% reported attention deficit disorder, 17% orthopedic disorder, 6% hearing disorder, 2 % visual disorder (Newman, Wagner, Cameto, Knokey, & Shaver, 2010; Raue & Lewis, 2011). Students with disabilities are not the only group increasing their presence on college campuses in the U.S.

Nontraditional, first generation, and international students are also enrolling in college in greater numbers than ever before (Bok, 2013; McGuire, 2011; McGuire & Scott, 2006; McGuire, Scott, & Shaw, 2006). Adding to this population on college campuses are veterans who have sustained injuries of war such as post-traumatic stress disorder (PTSD), traumatic brain injury (TBI) or major depression.

With the changes to student demographics, one of the major challenges for community colleges is promoting inclusion by reducing barriers and supporting the needs of an increasingly diverse student body (Edyburn, 2010; Zeff, 2007). More specifically, the *Americans With Disabilities Act* (1990) (ADA) and Section 504 (1973) and 508 (1998) of the *Rehabilitation Act* mandate: accommodation for students. As a result of this legislation, accommodations are

guaranteed to students with verified disabilities under federal law. The manner in which these services are offered is up to each individual college. Most institutions put the responsibility on the student with the disability to self-identify and request academic accommodations in order to keep up with their classmates (Izzo, Murray, Priest, & McArrell, 2011). For a variety of reasons, students with disabilities choose not to identify as having a disability and therefore go without individual accommodations (Getzel, 2008; Ketterlin-Geller & Johnstone, 2006). In addition, research suggests that students with disabilities perceive that faculty members are not receptive to accommodation requests (Murray, Lombardi, & Wren, 2011).

While the increase in the numbers of students with disabilities enrolling in postsecondary education is encouraging, the graduation rates are not (Shepler, & Woosley 2012). Federal data show that 29% of students with disabilities who enroll in college receive a degree compared with 42% of their typical peers (Sanford et al., 2011). According to Izzo, Murray, and Novak (2008) students with disabilities in postsecondary education continue to face barriers in terms of participation, retention, and degree completion. Student diversity is now the norm in college classrooms, yet colleges and universities continue to require students to identify and fit their needs to the existing curriculum and learning environment (Cavanagh, 2013).

The literature suggests that the problems and solutions for the continually growing number of diverse students lie within the design of the curriculum and the instructional strategies and materials and not the diverse student (Center for Applied Special Technology (CAST), 2011). Thus, there is a need to fix the curriculum rather than the learner (CAST, 2011). One framework for addressing the diversity of all students and creating an inclusive instruction that supports access and participation for all learners is universal design for learning (Meyer & Rose, 2005; Rose & Meyer, 2002). UDL is one approach that addresses the primary barrier to

education for all students, a one-size-fits-all curriculum (CAST, 2011). Learners with disabilities are most vulnerable to such barriers, but many students without disabilities also find that curricula are poorly designed to meet their learning needs. Universal design for learning emphasizes the need for a curriculum that can adapt to student needs rather than requiring learners to adapt to an inflexible curriculum (Meyer & Rose, 2005). However, little is known of the benefits of UDL principles and instruction in postsecondary education, especially in community college environments.

Universal Design for Learning is based on the concept of Universal Design (UD). The term Universal Design was coined by Ron Mace, an architect, as a way of “designing all products and the built environment to be aesthetic and usable to the greatest extent possible by everyone, regardless of their age, ability, or status in life” (Center for Universal Design, 2008). UDL emphasizes three core principles that work towards eliminating barriers from the educational environment (CAST, 2011). The three principles consist of: providing *multiple means of representation* or presenting ideas and information in a variety of ways (e.g. text, graphics, audio, and video); providing *multiple means of action and expression* or giving students various alternatives to express their comprehension and mastery (e.g. oral presentations, photo essays, web publications); and providing *multiple means of engagement* or targeting ways in which students’ can be engaged and motivated to learn (e.g. discussion groups, recorded lectures, creating a welcoming class environment) (CAST, 2011). Each principle has guidelines that apply to instructional goals, methods, materials, and assessments and provide a framework from which faculty can build a flexible, inclusive learning environment that appeals to a broad range of students (CAST, 2011).

Recognizing UDL's importance, recent federal policy changes indicate that UDL is becoming more widely accepted as an educational framework within the national policy landscape. In 2008, the U.S. Congress recognized the power of UDL by including a federal definition of the term in the Higher Education Opportunity Act (HEOA):

“Universal Design for Learning is a scientifically valid framework for guiding educational practice that (a) provides flexibility in the ways information is presented, in the ways students respond or demonstrate knowledge and skills, and in the ways students are engaged; and (b) reduces challenges in instruction, provides appropriate accommodations, supports, and challenges, and maintains high achievement expectations for all students, including students with disabilities and students who are limited English proficient.”

The HEOA also included several provisions encouraging postsecondary institutions and teacher preparation programs to incorporate the principles of UDL into their instruction.

Although principles of UD in education have become increasingly popular in the past decade, the research base supporting its efficacy is still emerging. There is a growing body of literature regarding inclusive teaching based on UD principles that mostly focused on the preparation of teachers for K-12 settings (Schelly, Davies, & Spooner, 2011; Spooner, Baker, Harris, Ahlgrim-Delzell, & Browder, 2007), while several other investigations have reported on instructional strategies (Burgstahler, 2008; CAST, 2011; Higbee & Goff, 2008; Rose, Harbour, Johnston, Daley, & Abarbanell, 2006; Scott, McGuire, & Foley, 2003). Recent efforts in the literature explored the perspectives and professional development needs of 4-year college and university faculty related to inclusive instruction based on UDL (Izzo et al., 2008; LaRocco & Wilken 2013; Lombardi, 2010; Lombardi et al., 2011). Although UDL has been studied in

postsecondary education environments, the primary focus has been on faculty and students at 4-year colleges and universities. Few if any studies exist that examine UDL in a community college environment.

Statement of the Problem

Traditionally, community colleges are the most inclusive public postsecondary institutions. What's more, they have provided student populations with opportunities for personal development and social mobility that they have not been able to realize in other college settings (Bok, 2013). The enrollment of students in community colleges with diverse learning needs continues to increase (Lombardi & Murray, 2011; McGuire, 2011; Scott, McGuire & Scott, 2006; Snyder & Dillow, 2012).

Community colleges have many characteristics that make them a setting in which Universal Design for Learning (UDL) can flourish. Community colleges serve students of all ages and ethnic and cultural heritages, students with life and time conflicts, and students possessing a great range of skill levels. Community colleges also serve as the entry point to higher education for many students with disabilities. More adult students than traditional-age students are likely to access education in the community in which they live. Students who are still in high school, or who have left school before the age of 18, also access community colleges through concurrent enrollment during high school. Community colleges emphasize teaching as their primary mission, offer small class sizes, hands-on and experiential learning, flexibility in designing and changing curricula, and meet student developmental needs, all features that facilitate the implementation of UDL. There is a need to further develop and examine inclusive teaching practices based on UDL in postsecondary education (Izzo, 2012; LaRocco & Wilken,

2013; Lombardi, Gerdes & Murray, 2011; Lombardy, Murray, & Gerdes, 2011; Schelly et al., 2011).

More recently the literature on the application of UD into the higher education environment has expanded; however, it is still limited in several respects. First, it appears that many higher education faculty are not well versed in the principles of UD and how they might apply UD principles to the redesign of their own courses and learning environments (Zeff, 2007). Second, a number of studies have only examined faculty attitudes toward inclusive teaching practices (Lombardi et al., 2013). Third, colleges and universities that have been among the first to adopt UD into the design of learning environments and coursework have generally been linked to a grant-funding source and have encountered problems continuing the UD implementation following the termination of funding (Zeff, 2007). Finally, researchers have begun to provide instruments to examine faculty attitudes toward and actions associated with UDL, however, students were not considered (Lombardi & Murray, 2011; Lombardi, Murray, & Gerdes, 2011).

It is important to get feedback from faculty on their attitudes toward and actions associated with UDL as it may give insight on the differences between specific faculty groups. If UDL is accepted by faculty and implemented, it may lessen the need for individual accommodations and perhaps lead to more positive student outcomes. Yet, few studies have investigated faculty and student attitudes, beliefs, and experiences regarding the use of inclusive instructional practices at community colleges. As stated previously, community colleges have many characteristics that make them a setting in which UDL can flourish. Many researchers agree that UDL is a positive step toward accommodating student diversity in the classroom. Although the idea of UDL has been defined since the late 1990s there is not widespread research examining UDL implementation across all postsecondary institutions. Moreover, little, if any

research exists regarding the experiences of faculty and students in a community college setting. Thus, community colleges, because of their unique population, is the ideal setting for research in order to assess the overall campus climate and evaluate how UDL is perceived and implemented to enact change toward an inclusive learning environment for all students, especially those in need of accommodation and assistance. UDL emphasizes the need for curriculum that can adapt to students needs rather than requiring learners to adapt to inflexible curriculum and little is known of the benefits of UDL, especially in community college settings.

Purpose of the Study

The purpose of this study was to examine faculty and student attitudes toward and actions associated with UDL principles and practices on a community college campus. The researcher wanted to better understand respondent beliefs and perceptions in these areas as well as to add to the UDL body of research.

Research Questions

The following research questions guided the study:

1. What are the differences in faculty self-reported attitudes toward and actions associated with UDL principles and practices in the classroom based upon age, gender, ethnicity, position type, academic discipline, academic rank and amount of teaching experience?
2. What are the differences in students' attitudes toward and perceptions of faculty actions associated with UDL principles and practices in the classroom based upon gender, disability status, ethnicity, and age?
3. To what degree are there differences in faculty and students' attitudes and actions pertaining to UDL principles and practices in the classroom?

Definition of Terms

For the purposes of this study, the following definitions of terms are provided:

Academic Accommodations: Changes to in-class instruction, assessments, or course materials that make them accessible to students with disabilities (i.e., extended time on exams, braille syllabus, note taking assistance), (Ketterlin-Geller, & Johnstone, 2006).

Disability: The ADA defines disability as (a) a physical or mental impairment that substantially limits one or more of the major life activities of such individual, (b) a record of such an impairment, or (c) being regarded as having such an impairment (Americans with Disabilities Act, 42 U.S.C. § 12102).

Faculty: for the purpose of this study, faculty referred to anyone who taught in postsecondary education.

Postsecondary Education: for the purpose of this study, postsecondary education referred to education provided in a 2-year or 4-year institute of higher learning, also referred to as higher education.

Reasonable Accommodation: Reasonable accommodations are considered changes in the postsecondary environment (e.g., classroom, tests, services) that do not place an undue administrative or cost burden on the institution (Americans with Disabilities Act, 42 U.S.C. § 12111, 1990; Ketterlin-Geller & Johnstone, 2006)

Universal Design (UD): "...the idea that all new environments and products, to the greatest extent possible, should be usable by everyone regardless of their age, ability, or circumstance" (Center for Universal Design, 2010).

Universal Design for Learning (UDL): Universal Design (UD) principles applied to the instructional environment to meet the learning needs of a diverse student population (Roberts et

al., 2011). Also known as Universal Design for Instruction (UDI) or Universal Instructional Design (UID). Some authors use these terms interchangeably; others separate them as having different principles. All are based on the principles of UD. For consistence and lack of confusion, this study used UDL.

Delimitations and Limitations

The scope of this study is delimited to one northeastern United States community college. The study was delimited to faculty members who were employed at this community college during the spring 2014 semester. The study was delimited to students who are enrolled at this community college during the spring 2014 semester. Identification of participants were through faculty and student email listserves obtained from the Vice President for Academic Affairs and Vice President for Student Services offices. All study participants will be self-motivated to participate and choose to complete the online survey on their own accord.

Several limitations were identified relative to this research study. First, the study was conducted at one community college. Thus, the generalizability of the findings to other similar institutions is limited. Second, findings represent the perspectives of only faculty and students at one institution. Therefore, the perspectives of these individuals may not reflect the perceptions of other community college faculty and students. Finally, other limitations involve the self-reporting nature of survey research. Such factors as not disclosing disability status, or misunderstanding of the instrument may potentially limit the usefulness of the findings.

Significance of the Study

With the increase in student diversity, especially in community colleges, today's college classrooms include students with different age, ethnicity, socioeconomic status, level of preparedness, learning English, employment and caregiver responsibilities and characteristics.

Additionally, colleges must meet the learning needs of students with impairments affecting mobility, vision, hearing, language, cognitive processing, and emotions. In a classroom of diverse learners, there is no single method of teaching that can meet the needs of all students. Instead, multiple, flexible methods of instruction are needed (Hitchcock, Meyer, Rose & Jackson, 2002). Classroom instruction must take into account “widely diverse learners and build in options to support learner differences from the beginning” (Hitchcock et al., 2002, p. 9). Whether students have disabilities, are English language learners, or are returning veterans, they deserve full access to course materials with which they can interact in meaningful ways. Many students of color and those with disabilities are coming to college campuses less prepared than their peers for college level courses and are less successful in terms of course completion and graduation rates (Board, 2010).

Educational leaders and faculty are searching for better ways to accommodate diversity in the classroom, particularly in community colleges where the open-door-policy welcomes all students through its doors. For community colleges, placement tests determine the level of courses students may begin their studies. Remedial classes are required for students who do not place a level high enough to enter college level courses. General education degree (GED) programs are offered to students who do not have high school diplomas. Therefore, community college faculty members, whose primary responsibility is teaching, are bound by the open access policy to receive students from all levels of abilities, backgrounds, and diversity of preparedness. Faculty members must not only be experts in their field of study, they must also implement teaching methods that support their students’ academic success.

In order to meet the current challenge in community colleges today, administration and faculty will have to focus their attention on positive changes in retention, graduation, and

evidence-based practices (McGuire et al., 2006; Orr & Hammig, 2009; Ouellett, 2004; Schelly et al., 2011). The challenge that faculty members face when engaging diverse student learning needs is substantial. The more prepared faculty members are to meet a wide variety of student needs, the more instructional impact they could have in the classroom (Abel, Jung, & Taylor, 2011; Schelly et al., 2011). UDL recognizes that all students have learning strengths and weaknesses. The UDL approach, as a method of instruction, could benefit all diverse learners and may lessen the need for individual accommodations and perhaps lead to more positive student outcomes, especially for students with diverse learning needs (Lombardi et al., 2011; Schelly et al., 2011).

This study is an important initial step in the examination of UDL in the context of a community college. In order to better understand UDL in this context, it is necessary to develop an overall understanding of the attitudes and actions of faculty and students. Gathering information on faculty members' beliefs and teaching methods is useful. However, even more significant is gathering information on the best teaching methods that have worked to enhance student learning based on the students' own opinions. These are important to evaluate in relation to where the focus should be in utilizing UDL principles in curriculum design. Recognizing faculty perspectives on UDL and familiarity in working with students from diverse backgrounds and learning needs serves as valuable information in determining gaps in knowledge and where training needs may be. All this data can be determined through use of survey instruments.

Researchers Perspective

As an Occupational Therapist, I have worked in many different settings, including elementary, middle, and high schools, higher education, business and manufacturing work environments, rehabilitation centers, outpatient clinics, and in the private homes of clients.

Through continued professional development, while working at a rehabilitation center, I became nationally certified as an Assistive Technology Practitioner (ATP) through the Rehabilitation Engineering and Assistive Technology Society of North America (RESNA). It was through this education and specialized practice of Assistive Technology, specifically in the application of home modifications, where I was introduced and utilized the concepts and principles of Universal Design (UD). The framework and principles of UD allowed me to help individuals of all ages and abilities to participate as independently as possible in the activities and daily occupations that were most important to them.

As my career shifted from practitioner to professor, I was able to retain my clinical responsibilities allowing me to integrate my experiences into the classroom. To teach students about the real-life challenges in health care enhances their ability to conceptualize the theoretical and practical aspects of their developing knowledge base. I believe this enriches the learning experience for both professor and student. I continue to practice as an Occupational Therapist/Professor/Administrator and presently serve as the Associate Vice President (Dean) of the Health Professions Division at the institution under study.

Recognizing that I came to this research because of my clinical experience both in Occupational Therapy and Assistive Technology together with my teaching and educational experience speaks to the researcher bias that I must overcome to conduct this study. I bring my past experience to this study as I view and understand the data that were collected, but I make every effort to be objective to fulfill my responsibilities as a trustworthy researcher. Being aware of these issues and prejudices helps me to keep on the true path of research.

CHAPTER 2: REVIEW OF LITERATURE

College campuses report a rapid and sustained increase in student diversity, especially in the number of students with students requesting academic accommodations and related services (Davies, Schelly, & Spooner, 2013; Lombardi et al., 2013; McEwan, & Downie, 2013; Roberts, Park, Brown, & Cook, 2011; Stodden, Brown, & Roberts, 2011). As the term implies, diversity is not limited to one or two attributes, but encompasses a multiplicity of differences including age, gender, ethnicity, socioeconomic status, English as a second language, level of preparedness, first generation students, and individuals with disabilities. This increasingly varied student body presents diverse needs often not addressed through mandated accommodations and services or traditional instruction (Roberts et al., 2011).

One way to address the needs of the increasingly diverse student population, and work towards equity of access and participation in the learning environment, is to examine strategies that support student learning and success regardless of their personal characteristics or circumstance. Universal Design for Learning (UDL) is a framework that guides the development of curricula and instructional practice that embraces diversity based upon the needs of all students (Schelly et al., 2013). According to King-Sears (2014) at its core, UDL principles assert that all students benefit when they are given multiple ways to take in new information, express their comprehension, and become engaged in learning, including those with disabilities or who are from culturally and linguistically diverse backgrounds.

The case for UDL begins by acknowledging the diversity found in today's college classrooms, including students with disabilities, both apparent and non-apparent. The goal of UDL is to reduce barriers in instruction and engage all students in learning (King-Sears, 2014).

Despite increased recognition of UDL as a valid framework for guiding educational practice in colleges and universities, little is known about faculty and student attitudes and actions at community colleges. By examining UDL from the perspective of faculty and students, we can gain a better understanding of how they view the UDL principles and practices in the context of a community college. Thus, it is important to investigate UDL to examine how this framework holds the potential to meet the needs of diverse learners and eliminate barriers to education for all students, especially students with disabilities (Izzo et al., 2008; McGuire & Scott, 2006; Murray et al., 2008).

Student Diversity

Today, the population of college students is increasingly more diverse across the nation. In recent years, the term diversity has grown in use and now embraces all of the ways in which people are different including age, gender identity, ethnicity, life experiences, academic preparation, native language, learning styles, and disability status (McGuire, & Scott, 2006; Schelly et al., 2011; Zeff, 2007). According to data gathered by the National Center for Education Statistics, 2007-08 National Postsecondary Student Aid Study, the percentage of students enrolled in postsecondary institutions, by level, disability status, and selected student characteristics shows that well over a third (38%) are now aged 24 or older, and more than half (53%) are not enrolled exclusively full-time. Instead they attend part-time or part-year. Almost half (47%) are financially independent, and half of those (25%) have financial dependents of their own. A mere 13% of beginning students live on campus, while about half commute from off-campus, and close to a third live with their parents or family (National Center for Education Statistics, 2011).

Enrollment for students with disabilities in postsecondary institutions has seen a steady increase over the past decade (Newman et al., 2010). In a 1999-2000 study by the National Center for Education Statistics (NCES), researchers found that approximately 9% of those enrolled as undergraduates reported having a disability (NCES, 2009). In a similar 2007-2008 study, researchers found that this number had grown to approximately 11% (NCES, 2011). A study conducted by the Office of Special Education and Rehabilitative Services in the U.S. Department of Education show that almost all (99%) of public 2-year and 4-year institutions reported enrolling students with disabilities and all (100%) of medium and large institutions reported enrolling students with disabilities during the 2008-2009 academic year (Raue & Lewis, 2011). Among undergraduates who report having disabilities, the major disabilities cited are specific learning disabilities 31%, ADD or ADHD 18%, psychiatric conditions 15% and mobility/orthopedic impairment 7% (Raue & Lewis 2011).

The results of these studies show that institutions of all sizes, especially community colleges, are statistically likely to serve students with disabilities at some point. This growth has been partially fueled by new legislation which aims to protect students with disabilities and ensure that they received access to educational content and instruction equal to that of their peers within higher education institutions (Katsiyannis, Zhang, Landmark, & Reber, 2009; Ketterlin-Geller & Johnstone, 2006; McGuire, 2011; Scott, McGuire, & Shaw, 2003; Shaw, 2011).

Community Colleges

Community colleges are being challenged to play a key role in the national effort to double the number of college graduates in the next 10 years (Boggs, 2011). With the growing diversity of community college students, UDL is a way to improve equity and access for students who may otherwise be less successful in the college environment (Engleman & Schmidt, 2007).

The Morrill Land Grant of 1862 set the precedent that established tax-supported public institutions of higher education in every state. Community colleges, called junior colleges until the 1940s, in their first two decades of the 20th century were designed to provide access to higher education for those not ready or able to attend four-year universities because they lacked the necessary preparation for postsecondary education. Their missions typically reflected their primary audiences' needs: broad general education (Cohen & Brawer, 2008; Dassance, 2011).

After World War II, community colleges grew in response to the needs of returning soldiers and to train veterans for the postwar era. The GI Bill, a federally supported funding source for veterans to attend college, was implemented in 1944 and increased attendance and demand for the community college. By the 1960s, many community colleges expanded their mission and thus their offerings to include workforce development programs that prepared their students and veterans for new business and industry demands.

This shift to comprehensiveness and multiple functions was not without controversy then as it is now (Cohen & Brawer, 2008; Dassance, 2011; McPhail & McPhail, 2006). Dickenson (2010) likens the expansion of the community college mission to “colleges have purchased a gown that is overlarge by several sizes and they are trying to grow into it” (p. 39). While each community college is different due to many factors that include its demographics, size, governance, and possible statewide coordination, community colleges today are viewed as having six primary service areas that drive their mission: transfer education, workforce or occupational education, continuing education, student services, developmental education, and community service (Cohen & Brawer, 2008; Dougherty & Townsend, 2006). These multiple functions are at the center of the debate of the role of community colleges and the seemingly impossible task to better prepare all students for the twenty-first century.

Today, community colleges are complex institutions serving a multitude of constituencies with dozens of programs and activities. The mission of public community colleges is to serve their local taxing districts and service areas in offering vocational, technical, academic courses for certification or associate's degrees. Continuing education, developmental and compensatory education consistent with open-admission policies, and programs of counseling and guidance also are provided. Community colleges have open-door policies that allow all students admission to the college. In addition, community college leaders emphasize their concern for the welfare of their community as a whole, economically and socially (Cohen & Brawer, 2003). Community college faculty members are increasingly challenged to meet the needs of diverse learners. In addition to being an expert in their field, they also need to apply pedagogy that will help different learners on a larger scale. According to Scott, McGuire and Shaw (2003) making individual accommodations may have seemed manageable when students' with learning disabilities were a small, nearly invisible, cohort of the college population. Today, growing numbers of students with apparent and hidden disabilities combined with students at risk for academic failure require new approaches to provide assessable and effective instruction for this diverse cohort of college learners.

The United States needs people who are college educated to meet the many challenges of the 21st century (Brown, King, & Stanley, 2011). Community colleges serve as a gateway to a four-year degree for many students, and play a central role in providing educational access for an increasing numbers of diverse college students (Brown, King, & Stanley, 2011). However, in order for increased access to be meaningful, students must persist in college, complete their programs, and where applicable, transfer to four-year institutions (Brown, King, & Stanley, 2011). Earning a college degree is a challenge for many students, especially students with

disabilities, and is linked to a reduced quality of life, underemployment, and unemployment (Mamiseishvili, & Koch, 2010).

Compared with students at 4-year colleges and universities, community college students are much more likely to come from low-income households, to be first-generation college students, and to attend part time while working or taking care of children. These challenges are evident in both urban and rural community colleges. Policymakers often are surprised to learn that many rural community colleges enroll even higher proportions of low-income students and first-generation college students than do their urban and suburban counterparts.

More than half of U.S. Hispanic and Native American undergraduate students are enrolled in community colleges, and so are more than 40% of Black students and students of Asian and Pacific Islander origin. Yet completion rates for students of color in some groups, often those students facing the greatest challenges are disappointing in the extreme. For example, one analysis indicates that 6 years after college entry, only 30% of low-income community college students, 26% of African American students, and 26% of Hispanic students have completed either a degree or a certificate, compared with 39% and 36% of Caucasian and high-income students, respectively (Raue & Lewis 2011).

The college campus is becoming an increasingly diverse environment. Institutions must consider accommodating not only students with disabilities, but also students from different socioeconomic backgrounds, those from different cultures, languages, and learning preferences. As diversity has continued to increase, researchers have begun to examine ways in which to best meet the needs of a changing student population.

Universal Design

Universal Design for Learning (UDL) has its root in the concept of Universal Design (UD) that was originally developed by architect Ronald Mace, founder of the Center for Universal Design at North Carolina State University (Edyburn, 2010). The term *Universal Design* (UD) was coined by Ron Mace and defined as “the design of all products and the built environment to be usable by everyone, to the greatest extent possible, regardless of their age, ability, or status in life” (Center for Universal Design, 2008).

Prior to the development of UD, architects and designers seldom addressed the needs of individuals with disabilities, resulting in barriers found in consumer products and buildings that were inaccessible to many people. Stairs are an example of a barrier to people with mobility impairments that prevents them from both entering and navigating through buildings (Rose et al., 2006). When the Americans with Disabilities Act (ADA) passed in 1990, public buildings in the U.S. began to change. ADA mandates retrofitting public buildings for accessibility. In order to accommodate individuals with disabilities, accessibility ramps, elevators and wider doorways were added to most public buildings. Many times these retrofits proved costly, problematic, and unattractive (Hitchcock et al., 2002). Universal Design provides a better approach that challenges architects to address the needs of users at the start, in order to integrate universal accessibility and produce an aesthetically pleasing and functional product (Rose & Meyer, 2002; Rose et al., 2006). A classic example of UD is the sidewalk curb cut. Curb cuts were initially designed to benefit individuals with mobility impairments, but curb cuts proved to be useful for all individuals. Bike riders, skateboarders, people pushing strollers or pulling luggage on wheels, and people with canes all benefit from the use of curb cuts. Thus, an architectural design that improved access for one group of individuals proved useful for other users.

As the idea of UD spread, people realized that addressing the needs of individuals with disabilities actually benefited and increased usability for everyone (Rose & Meyer, 2002; Rose et al., 2006). Designing new buildings with accessibility features to accommodate everyone from the onset was better, easier, and more cost effective than making later modifications to the building (Hitchcock et. al., 2002).

Educational models based on the UD concept, such as UDL, extended the idea of access to the learning environment. Over the years, the principles founded by Ron Mace have been adopted by educators examining potential ways to provide equal opportunities to all of their students regardless of ability (Center for Universal Design, 2008).

Universal Design Education Models

According to the literature, the most referenced frameworks for increasing access to curriculum and educational environments in addition to UDL are Universal Design of Instruction (UDI) and Universal Instructional Design (UID) (Rao, Ok, & Bryant, 2014). Each UD model has a set of principles that focus on reducing barriers in learning environments and increasing access to curriculum and instruction for diverse learners, especially students with disabilities. Table 1 provides an overview of the main principles and guidelines associated with each model.

Table 1
Principles of Universal Design Education Models

Model	Principles and Guidelines
UDL (National Center on Universal Design for Learning, 2010; www.udlcenter.org/)	Principle I: Provide multiple means of representation Principle II: Provide multiple means of action and expression Principle III: Provide multiple means of engagement
UID (Goff & Higbee, 2008; http://www.cehd.umn.edu/passit/)	a. Creating welcoming classrooms b. Determining essential components of a course c. Communicating clear expectations d. Providing timely and constructive feedback e. Exploring use of natural supports for learning, including technology f. Designing teaching methods that consider diverse learning styles, abilities, ways of knowing, and previous experience and background knowledge g. Creating multiple ways for students to demonstrate their knowledge h. Promoting interaction among and between faculty and students
UDI (Burgstahler, 2009; http://www.washington.edu/doiit/ CUDE/)	a. Class climate b. Interaction c. Physical environments and products d. Delivery methods e. Information resources and technology f. Feedback g. Assessment h. Accommodation

All three UD educational models highlight ways in which resources, pedagogy, and the flexible design of curriculum and instruction can address students' needs and support diverse learners. UD principles can be applied to curriculum and instruction at many levels, from lesson objectives and materials to instructional methods and assessments (Hall, Meyer, & Rose, 2012).

The three frameworks provide guidelines for building in support and flexibility during the

planning process and for proactively designing instruction with the objective of including the greatest number of learners possible (King-Sears, 2014).

Along with the three main principles presented in Table 1, the UDL framework, associated with the work of the Center for Applied Special Technology (CAST), presents 9 guidelines and 31 specific checkpoints under the three principles, detailing how flexible options and learner supports can be built in to lesson design and implementation. The UDI and UID frameworks provide broader, less specific guidelines for lesson and curriculum design; however, these frameworks address additional factors such as student–instructor interactions, classroom environment, and accommodations. The principles of all three models are applicable to both pre-K–12 and post-secondary environments, and are derived from Chickering and Gamson’s (1987) seven principles of good practice for undergraduate education (Goff & Higbee, 2008).

Descriptive differences exist between UDI, UDL and UID, however all are based upon the original seven principles of UD with an added focus on the instructional environment (Roberts et al., 2011). Each of these concepts owes its existence to the original principles and goals set forth by UD. As new concepts have emerged through research, researchers have begun to examine ways in which they could be applied to the educational environment.

Universal Design for Learning

Similar to Universal Design for the built environment, Universal Design for Learning (UDL) in the educational environment advocates for removing barriers to learning through expanding access to those with disabilities. Similar to UD, it also benefits many more people than originally intended. The Center for Applied Special Technology (CAST), a nonprofit research and development organization that works to expand learning opportunities for all individuals, especially those with disabilities, was one of the first groups to apply the idea of

universal design to education (Edyburn, 2010). Anne Meyer, David Rose, and colleagues, while working at CAST, developed the conceptual framework for Universal Design for Learning (UDL). They outlined how UDL was grounded in learning, designing curricula (i.e., methods, goals, materials, and assessments) that reduce barriers for all students (Roberts et al., 2011; Rao et al., 2014). The premise behind UDL is that the classroom naturally includes students with diverse backgrounds and abilities, including students with disabilities, and that UDL supports the instructors efforts to meet the challenge of diversity by providing flexible instructional materials, techniques, and practices that guide the design and development of curriculum that is inclusive for all learners (CAST, 2011; Edyburn, 2010; Rao et al., 2014).

Just as UD in the architectural environment was beneficial to all users, UDL in the learning environment enables all students to gain knowledge, skills, and enthusiasm for learning, including those with disabilities and those with diverse and varied needs. Within the educational field, the concept of UDL was first applied in the K-12 classroom system and shortly after began to be applied to postsecondary education (McGuire et al., 2006). Moreover, Lieberman, Lytle, and Clarcq (2008), have inquired into ways that UDL can be applied to a variety of educational disciplines, including physical education courses. The concept and practice of implementing UDL strategies is becoming better known and is being referenced in educational policy briefs, teacher professional development, books, and articles for educators and research literature.

Based on universal principles that guided architectural design, the concept of universal design was extended to the educational environment and the term “learning” was added, transforming universal design to universal design for learning (Center for Applied Special Technology, 2008). According to the Center for Applied Special Technology (CAST), universal design for learning is a system for providing a variety of means for students to access and engage

with course material and demonstrates their knowledge of the curriculum. This approach to teaching and learning allows individuals to draw upon and utilize their particular learning strengths, while acknowledging that not all students learn in the same manner. Educators at CAST began to recognize that by providing flexible instruction and curriculum they could create significant advantages for all learners (Rose & Meyer, 2002).

UDL incorporated the principles of universal design in an instructional paradigm that offers new ideas about teaching, learning and designing curriculum. In this paradigm shift, Rose, Sethuraman, and Meo, (2000) state that philosophies about teaching and learning are changed in four essential ways: (a) educators begin to view students with disabilities as occupying a position along a continuum of learners rather than being a distinct and separate group; (b) adjustments for learner differences are applied to all students not just those with disabilities; (c) curriculum materials become more varied, diverse, and expansive by including a variety of resources, both digital and online, instead of just a single text; and (d) educators transform their instructional goal from a focus on fixing students so that the student can fit into and manage the traditional curriculum, into an instructional goal that focuses on fixing the curriculum so that it adjusts to fit the varying learning needs of the student.

Creating a UDL curriculum means creating materials to minimize student barriers and maximize student access to both learning opportunities and curriculum. One of the major advantages is that student access is built into the foundation of the curriculum by eliminating barriers that impede performance and entry into the traditional curriculum (e.g., providing alternatives to written text such as Braille for students with visual impairments), which in turn can eliminate the need for further accommodations. Another advantage is that students no longer

have to wait for undetermined amounts of time while materials are accommodated to suit their specific needs (Rose & Meyer, 2000; Rose & Strangman, 2007).

In order to understand the rationale behind UDL it is imperative to consider it in a meaningful way. On the surface the term “universal” appears to denote a one-size-fits all curriculum. However, just the opposite is true. The relevant term is not “universal” but rather “universal design”, which as noted previously, describes products and environments “usable by all people, to the greatest extent possible, without the need for adaptation or specialized design” (Center for Universal Design, 2008). Thus, a UDL curriculum is one that is designed to be sufficiently flexible to meet the specific needs of every student, rather than requiring either the student to adjust him or herself to fit the limitations of the curriculum or the teacher to make an ad hoc adjustment to the curriculum so that it can accommodate the needs of the student.

In summary, UDL emphasizes the need for inherently flexible and adaptable content, assignments, and activities (Izzo et al., 2008; Rose & Meyer, 2002). This inherent flexibility reduces barriers in the curriculum by providing multiple approaches to access the content (e.g., video, websites, text) thereby significantly reducing the need for teachers to provide adaptations or modifications to students after the initial instruction has taken place. Additionally, providing multiple approaches to access the content also helps teachers maximize the equality of instruction for students (Hitchcock et al., 2002) by addressing the diverse learning needs of the students. Ultimately, UDL is not only better for student learning but is also better for teachers as it frees them from much of the need to make ad hoc accommodations or modifications, thus generating increased time for observing the needs of, and meaningfully interacting with, all of their students.

Universal Design for Learning Framework

There are three main principles that combine to create the UDL framework. In learning environments, such as community colleges, effective instruction to all learners is improved by providing: (a) *multiple means of representation* or presenting ideas and information in a variety of ways (e.g. text, graphics, audio, and video); (b) *multiple means of action and expression* or giving students various alternatives to express their comprehension and mastery (e.g. oral presentations, photo essays, web publications); and (c) *multiple means of engagement* or targeting ways in which students' can be engaged and motivated to learn (e.g. discussion groups, recorded lectures, creating a welcoming class environment) (CAST, 2011). Each principle has guidelines that apply to instructional goals, methods, materials, and assessments and provide a framework from which faculty can build a flexible, inclusive learning environment that appeals to a broad range of students (CAST, 2011). Additionally, the UDL framework assumes that the typical classroom contains highly diverse learners, that the curriculum needs fixing, not the students and that instructor adjustments to the curriculum benefit all learners (CAST, 2011). These three principles help to reduce unplanned barriers to learning and maximize instruction by addressing learner diversity through set of strategies that can be used to overcome the barriers inherent in most existing curricula. These principles can serve as the basis for building in the options and the flexibility that are necessary to maximize learning opportunities that support the differences of individual students (CAST, 2011; Izzo, 2012; Meyer & Rose, 2000).

Universal Design for Learning Approach

Applying the UDL principles in higher education is aided by two essential assumptions that are embedded in the UDL framework and principles. The first assumption is the need for

concise and flexible teaching goals that meet the need of all students. The second assumption is the need to design instruction that provides access to learning the curriculum.

Prior to addressing the principles of UDL, teachers must establish clear and concise learning goals for all students. UDL emphasizes that all students should have appropriate goals based on their skills, interests, abilities, expertise, and rates of progress (Rose et al., 2006). An inflexible goal (e.g., all students will use a standard algorithm to subtract two 3-digit number with regrouping) will never be an adequate UDL goal because it cannot challenge each student to learn, as it does not afford multiple options for presentation or performance (Hitchcock et al., 2002). An inflexible goal, such as the example above, asks students to demonstrate their learning solely in one way, and only recognizes that one way of attaining the instructional goal. The inflexibility in this example is emphasized by the concept of using a “standard algorithm with regrouping” to demonstrate learning. It does not challenge each student to learn because it does not recognize that there are many ways of achieving and demonstrating the instructional goal. In contrast, however, a teacher who has established a flexible goal (e.g., students will use standard algorithms, alternative algorithms, or manipulatives to subtract two 3 digit numbers with regrouping) can develop various means to provide flexible instruction and support to help each student reach the goal (subtraction and regrouping accuracy) without undermining the challenge of learning (Hitchcock et al., 2002; Rose & Meyer, 2002).

Additionally, UDL has been proposed as a method to provide access to learning the curriculum. Curriculum typically refers to the knowledge and skills students are expected to learn. An individual instructors curriculum includes learning standards or objectives students are expected to meet; the units and lessons that guide instruction; the assignments and projects given to students; the books, materials, videos, presentations, and readings used in a course; and the

tests, assessments, and other methods used to evaluate student learning. Its purpose is to guide instruction, activities, content, methods, and outcomes. This is achieved through the use of student materials, teacher's guides, assessments, and other supplementary materials (Hitchcock et al., 2002; Rose & Meyer, 2002). In many cases, faculty members develop their own curricula, often refining and improving them over years. It is also common for faculty to adapt lessons and syllabi created by other instructors, use curriculum templates and guides to structure their lessons and courses, or purchase prepackaged curricula from individuals and companies (Abbott, 2014).

In this light, it is imperative that faculty understand the critical difference between universal design for access to the curriculum and universal design for access to learning the curriculum (Rose & Meyer, 2002). Universal design for access to the curriculum provides the greatest amount of support possible for a student, but that support can also reduce the challenge in the level of that work. Ultimately, the reduction or elimination of the cognitive challenge of the material can undermine student learning because challenge and complexity are essential to the development of higher-order thinking, problem-solving, deep understanding, and critical reasoning abilities (Rose et al., 2006). In contrast, designing instruction that consciously addresses universal design for access to learning the curriculum provides only enough support to create a level of challenge that optimizes the learning opportunity for students (Rose & Meyer, 2002).

Universal Design for Learning Principles

Once teachers understand the importance of creating flexible goals and the need to implement universal design to access learning the curriculum, they are ready to design curricular activities that incorporate the three instructional principles of UDL, namely: (a) multiple means of representation; (b) multiple means of action and expression; and (c) multiple means of

engagement. Additionally, there are instructional methods (i.e., strategies) germane to each principle that ensure that learning is not only efficacious, but addresses the diversity of the students in today’s classrooms (Rose & Meyer, 2002). Table 2 provides an overview of the UDL principles, guidelines and descriptors.

Table 2
Principles and Guidelines of Universal Design for Learning (CAST, 2011)

Principles and Guidelines	Descriptors
Principle I: Provide Multiple Means of Representation	Provide content and materials in a variety of formats, including physical, symbolic, and linguistic.
Guideline 1: Provide options for perception	Offer content and materials in multiple, flexible formats (audio, visual, tactile).
Guideline 2: Provide options for language, mathematical expressions, or symbols	Clarify language, mathematical expressions, or symbols and scaffold understanding with alternative or multiple representations.
Guideline 3: Provide options for comprehension	Build on or supply background knowledge, emphasize important ideas.
Principle II: Provide Multiple Means of Action and Expression	Provide multiple and varied opportunities for students to demonstrate their knowledge and skills.
Guideline 4: Provide options for physical action	Use varied and alternative ways for students to physically interact with instructional materials.
Guideline 5: Provide options for expression and communication	Offer multiple media, tools, opportunities, and formats for students to demonstrate their knowledge and understanding of a subject.
Guideline 6: Provide options for executive functions	Support students’ goal setting, planning, information and resource management, and progress monitoring.
Principle III: Provide Multiple Means of Engagement	Provide students with multiple and varied opportunities to develop and sustain interest in a topic, as well as monitor their skill and knowledge development.
Guideline 7: Provide options for recruiting interest	Present relevant learning activities with authentic opportunities for students to make choices.
Guideline 8: Provide options for sustaining effort and persistence	Build in reminders, vary the level of task demand, and foster collaboration.
Guideline 9: Provide options for self-regulation	Foster self-reflection, present opportunities for students to monitor their knowledge and skill development.

The design of physical environments has long been impacted by the need for UD. It is relatively new, however, to the postsecondary learning environment (Roberts et al., 2011). As such, the research surrounding its use and effectiveness remains limited. In a 2011 literature review conducted for the *Journal of Postsecondary Education and Disability*, only eight articles were found to match the authors' initial criteria which included (a) empirical studies in peer reviewed journals, (b) articles published in 2000 or after, and (c) articles on the use of UDI, UDL, UID, and UD in postsecondary education settings (Roberts et al., 2011). This limited return prompted the authors to indicate the need for additional research in the field with a specific focus on encouraging the development of empirically based research on UD in postsecondary environments. The authors also noted the increased focus on UD principles with the passage of the Reauthorization of the Higher Education Opportunity Act, 2008 which referred to UD 18 times and which highlighted UD as a valid framework for guiding educational practices (Roberts et al., 2011). Rao et al., (2014) conducted a systematic review of 13 intervention studies in pre-K–12 and post-secondary settings referencing the three UD educational models (i.e., UDL, UID, UDI). After examining how researchers are applying and evaluating UD in educational settings the authors concluded that research supporting universal design's efficacy is still emerging. Furthermore, the authors identified a void of empirical studies exploring the efficacy of UD models. The authors reported that most of the literature consists of descriptive studies and of the 13 articles reviewed; over a third used qualitative methods to describe how UD educational models was perceived by faculty and students. The authors noted that further research on UD's application to curriculum and instruction is needed. Given this call for increased research in the field of UD, it is important to examine the current state of research related to the field.

Research on Universal Design

Research on Universal Design (UD) and its application to postsecondary education continues to grow (Burgstahler, 2009; Edyburn, 2010; Orr & Hamming, 2009). Currently, there are several well-known UD frameworks including Universal Design for Instruction (UDI; Burgstahler, 2009; Scott, Mcguire, & Shaw, 2003), Universal Instruction Design (UID; Goff & Higbee, 2008) and Universal Design for Learning (UDL; Center for Universal Design for Learning, 2008; Rose et al., 2006). Although there are a variety of related frameworks in the literature, each refers to the application of UD principles and is focused on assisting all students, including those students with disabilities, to reduce barriers, thereby increasing opportunities for positive outcomes (Brown, & Cook, 2011; LaRocco & Wilken 2013; Orr, & Hamming, 2009; Rao et al., 2014; Zeff, 2007).

Given the major frameworks of Universal Design (UD) in the literature, several themes that they all share common include: (a) Multiple Means of Representation, (b) Multiple Means of Expression, and (c) Multiple Means of Engagement (Center for Applied Special Technology, 2011; Lombardi & Murray, 2011; Lombardi et al., 2011; Orr & Hamming, 2009). These principles generally suggest that faculty provide more variety in how information is presented and more choice for students to demonstrate they have learned and can apply course information. Examples of UD features may include multiple testing formats, assigned reading material available in multiple formats (e.g., audio, print), combinations of in-class and online discussions, various learning tools (e.g., captioned videos, guest speakers) or allowing students more choices for assignments (e.g., group projects, field-based study).

Given the increasing diversity of today's college students, faculty members need to recognize that no two students learn the same way (Dunn & Honigfeld, 2013). Ways in which

students learn vary greatly. Some students learn best through visual means (video, demonstrations), others learn through lecture, whereas others do extremely well with hands-on learning (clinical internships, simulation labs (Kolb & Kolb 2005). To ensure that the highest quality education is available to all students, including students with disabilities, faculty must begin to recognize the importance of inclusive teaching methods based on the universal design (Getzel, 2008; Izzo et al., 2008).

According to Lombardi, Murray, and Gerdes (2011) there are three reasons why inclusive teaching practices are important in planning, delivering, and evaluating instruction. First, these practices have the potential to benefit all students, including those students with disabilities. Second, inclusive teaching methods could impact a wide range of learners, including historically underrepresented groups (e.g., first generation college students, English language learners, and students of color). Finally, application of inclusive teaching based on the principles of universal design may lessen the need for accommodations for students with disabilities.

Barriers still exist at postsecondary institutions that make it difficult for students with disabilities to successfully complete their degrees (Paul, 2000). Raue and Lewis (2011) surveyed postsecondary institutions on the implementation of Universal Design for Instruction (UDI) and found that there were limited staff resources to provide training to faculty and staff on classroom accessibility issues, cost concerns about purchasing the needed technology, and more pressing institutional priorities. According to Schelly et al., (2011) existing literature in higher education about UD lack empirical evidence of its benefits.

Research Examining Students

To date, few empirical studies have been done to gain insight into the perceptions of college students towards inclusive teaching practices incorporating UDL concepts (Lombardi et

al., 2011; McGuire-Schwartz, & Arndt, 2007; McGuire & Scott, 2003; Parker et al., 2008; Rao, & Tanners, 2011; Schelly et al., 2011, 2013; Spooner et al., 2007). Although findings suggest that students' perceptions of their instructors' implementation of UDL are positive, results may be considered inconclusive due to differences in research design, methodology, survey instrument, and setting. A gap in the research exists given that very little, if any research has been conducted at community colleges. As student diversity increases in colleges and universities, especially community colleges, a better understanding of how student perceptions vary across institutional settings becomes even more important.

McGuire and Scott, (2003) conducted focus group research with undergraduate students with learning disabilities about their perceptions towards instructional methods and strategies that promote learning, and barriers experienced in college instruction. Focus groups were conducted at three colleges in the northeast, a research university, and two community colleges. A total of 23 students with learning disabilities participated in the study. Demographic information was obtained from 15 of the participants. Of those, 9 were males and 4 were females. Students ranged in age from 19 to 42, and ranged from the second to tenth semester status. Eleven academic majors were represented. Findings revealed that instructor teaching methods such as establishing clear expectations, providing outlines of notes, reading guides, presenting information in multiple formats, giving frequent informative feedback, and using diverse assessment strategies as well as creating a welcoming classroom climate were effective and helpful to student learning. In addition, essential to the students were the characteristics of the teacher. Faculty who were considered excellent were those who were approachable, available, connected to students, and created challenging standards for learning by encouraging students to do their best. The authors made connections between many of the faculty attributes

and teaching methods that were found to be positive by students were also found to be similar to the principles of universal design for learning. In contrast, students reported barriers to learning related to the particular attributes and attitudes of individual faculty. The students' identified faculty teaching strategies that were unclear in overall course expectations and demands, not following the course syllabus consistently, and inconsistent with assignments or exams related to lecture material as barriers to learning. Overall, students suggested that faculty members be clear and straightforward in their expectations, become involved and engaged with their class, and compassionate regarding student learning needs. The authors report that the observations of the focus groups provide evidence to support the use of universal design principles to improve the quality of instruction provided to college students with learning disabilities.

McGuire-Schwartz, and Arndt, (2007) performed two studies that examined how teacher candidates understood and used UDL principles in lesson planning and teaching. The first was an action research study conducted at a private college with 36 teacher candidates during their student teaching. While on their practicum, the teacher candidates implemented UDL principles and practices designed to benefit all students. The results showed that the implemented UDL strategies improved accessibility to instruction, as well as improved learning for students with and without learning difficulties. The second study, which took place at a public college with five teacher candidates during their practicum, involved planning a thematic unit plan with universally designed lessons.

Researchers explained that the entire group of teacher candidates reported that using the principles and practices of Universal Design for Learning frequently or almost always benefited their lesson plans and almost always or frequently met the needs of a wide variety of students

including those with disabilities, and made education more inclusive and effective for all students (McGuire-Schwartz, & Arndt, 2007).

Spooner, Baker, Harris, Ahlgrim-Delzell, and Browder (2007) examined the effects of UDL training on seventy-two undergraduate and graduate students in education. The purpose was to find out if UDL training affected the way education students created lessons plans for students with disabilities. Subjects were randomly assigned to control and experiment groups and the intervention was a one hour lecture on how to use UDL in lesson plan writing. Results showed that a brief introduction to UDL helped future teachers design learning plans that reflected inclusive teaching methods. The results of this study supported the use of UDI principles and demonstrated that training can help introduce instructors to new teaching methods that benefit all students.

A 2007 case study by Parker, Robinson, and Hannafin documented the efforts to redesign a large core undergraduate level special education course by utilizing UDI principles along with adult learning theory. Researchers analyzed students' online interaction and course evaluations of 114 students following the implementation of the newly UD-based designed course. Results showed that students were more satisfied with the newly designed course than other courses offered by their department and other undergraduate courses in general that did not utilize UDI in the curriculum.

Rao and Tanners (2011) conducted a case study on 25 graduate students enrolled in a 16-week online course that incorporated elements of both UID and UDL. The purpose of the study was to examine how UID and UDL guidelines can be applied and incorporated into an online course environment and to identify the UD-based course elements that were most valued to students enrolled in the online course. As part of the study, the authors broke the design of the

course into two separate components; the technology component and the pedagogy component. Using each of these components as well as prior research, the authors noted that, although several instructional design methods exist and are commonly used when developing new online courses, few if any of these methods specifically account for the inclusion of UD principles (Rao & Tanners, 2011). Instead, it is often left up to instructors and designers as to the specific incorporation of these principles into the course design. Data was collected through a 25-question online survey. Additional data were gathered through interviews from a purposive sample of 6 students from the course. The study found that the majority of the students in the course indicated a preference for and appreciated the UDL efforts made in the design of the course which involved the inclusion of multiple representation and modes for content, methods of interaction and communication, and options for demonstrating knowledge throughout the course. The authors, however, found that UD does not eliminate the need for formal accommodations, but provides faculty with a proactive means to addressing many of the needs of diverse learners in their classrooms including students with disabilities.

Schelly, Davies, and Spooner (2011), conducted a study in an effort to respond to educators calling for evidence of the benefits of using Universal Design for Learning (UDL) with regards to student learning, performance, persistence, and retention. The purpose of the study was to measure the effectiveness of instructor training, as indicated by student perceptions of UDL implementation. Participants included five Ph.D.-level graduate students and 1,615 students in nine sections of Introduction to Psychology. Surveys were administered to the students during class in the beginning and towards the end of the semester. During the semester, after the first administration of the survey, instructors were mentored as a group and attended five 1-hour training sessions that included topics on UDL categories for creating accessible

course materials and classroom teaching. Approximately 1,362 students (84%) filled out the first survey and 1,223 students (76%) filled out the second survey. Results indicated that students reported a significant increase in the use of UDL strategies by their faculty after training. Authors noted that training faculty in the use of UDL appears to impact students' perceptions about how their faculty presents ideas and information, and their learning experiences. In addition, two areas of training that resulted in the most actual change in teaching by the faculty were presenting information in a variety of ways and summarizing key content before, during and after presentation. The authors conclude that with the increasing diversity of college students and the fact that students with disabilities typically do not request accommodations, the use of UDL strategies ought to be a benchmark across postsecondary education environments to enhance learning for all students, including those with disabilities.

Davies, Schelly, and Spooner (2013), continued their previous research on examining the effectiveness of instructor training (Schelly, et. al., 2011) by comparing student perceptions about an intervention group of instructors who received UDL training to student perceptions from a control group of instructors who did not receive UDL training as measured by a revised UDL survey instrument. Pre- and post-student surveys were administered online using the university's course management system and were revised to more accurately gather student perceptions of their instructors' teaching practices, especially practices that correspond to UDL principles. Participants included 6 faculty in the intervention group and 3 faculty in the control group. Both groups of faculty participants were Ph.D candidates in the Psychology Department, and were mentored by the same assistant professor. Both groups received equal amounts of formal mentoring time; however, only the faculty in the intervention group received UDL training. A total of 1,164 students were enrolled in the intervention group and 646 students were

enrolled in the intervention group. All students were administered pre- and post-training questionnaires of the effectiveness of UDL instructor training. The intervention group, a total of 386 students (33%) completed both the pre- and post-questionnaire. For the control group, a total of 204 students (32%) filled out both the pre- and post-questionnaires. Results of this study suggest that UDL training had a significant effect on students' perceptions of instruction in university courses as measured by student perceptions on the UDL questionnaire. The strategies that were most significantly impacted by the training, according to student report, included (a) presenting material in multiple formats, (b) relating key concepts to the larger objectives of the course, (c) providing an outline at the beginning of each lecture, (d) summarizing material throughout each class session, (e) highlighting key points of an instructional video, (f) using instructional videos, and (g) using well-organized and accessible materials. The addition of a control group in this study allows the interpretation that the increased use of these UDL strategies is a direct result of the training the faculty received.

While this study expands the scope of previous studies (Schelly, et. al., 2011) on the effectiveness of instructor UDL training by adding a control group and utilizing a more comprehensive instrument, one of the limitations is the use of graduate student instructors. The authors recognize that the results may have been different if the participants had been full-time faculty and thus, the results may not be generalizable to UDL training for full-time faculty. Despite this drawback, as student diversity increases in colleges and universities, including an increase in the number of students with disabilities, the use of UDL strategies in higher education becomes even more important (Fichten, Jorgensen, Havel, & Barile, 2006; Raue & Lewis, 2011; Davies et al., 2013).

A study conducted by Lombardi, Gerdes, and Murray (2011), focused on undergraduate students with disabilities (n=197) utilizing several measures designed to measure student perceptions of postsecondary services, instructional practices, as well as support from families and peers. Of the three surveys, the College Students with Disabilities Campus Climate (CSDCC) survey was designed to measure the impact of individual actions and perceptions of postsecondary and social supports on students with disabilities. The authors acknowledged that the CSDCC survey included items that were adapted from previous surveys intended for college faculty that measured constructs related to accommodations and that included inclusive teaching practices related to Universal Design for Learning (UDL) and Universal Design for Instruction. Results suggest that the CSDCC survey showed initial evidence of reliability and validity in measuring individual actions and perceptions of postsecondary and social supports. Researchers suggested that this instrument fills a void in the literature related to reliable and valid instruments designed to measure the experiences of college students with disabilities. Content validity was established as many items were from preexisting instruments and was based on literature pertaining to postsecondary supports that enhance experiences of college students with disabilities. Experts in the field provided further validation by reviewing the instrument. The authors determined that further research is needed in order to gain a better understanding of postsecondary supports for students with disabilities. Finally, researchers suggest that it is important for institutions of higher education to assess their campus climate with a reliable and valid measure to develop evidence-based interventions directed toward students and faculty that will ultimately enhance the quality of education received by all students, including those with diverse learning needs.

As researchers note, on college and university campuses, results of the studies that examined student perceptions reported increased student engagement and found that instructor training on UDL resulted in changes and improvements in instruction from a student perspective (Parker et. al., 2007; Rao & Tanners, 2011; Schelly et al., 2011, 2013). However, to date, there are little, if any studies in the literature about the use of UDL and perceptions of community college students.

Research Examining Faculty

While a few peer-reviewed empirical research journal articles measured and presented viewpoints of 4-year college and university students, the remaining studies describe research that examines UDL from the faculty perspective (Izzo 2008; Lombardi, 2010; Lombardi & Murray, 2010; Lombardi et al., 2011).

Madaus, Scott, and McGuire (2003) conducted a case study of an instructor's response to student diversity using UDI. The instructor informed herself more on academic accommodations and UDI. She changed her own teaching practices, switching from a lecture format to include more group work and problem-solving assignments. Other changes included allowing students to replace a low test grade with a project grade, online notes, and extra credit for students who took good notes and distributed them. The instructor also published a "newsletter" that reiterated important class aspects. This is an example of how faculty could slowly start to make changes in how they teach. UDI principles were designed to be a guide for institutions to start to think of how principles can be operationalized on individual campuses.

The results of Skinner's (2007) investigation into the willingness of postsecondary faculty to provide instructional and examination accommodations and their support of course alternatives shed further light on this discussion. Two hundred and fifty three faculty members

teaching at a mid-sized, liberal arts institution located in the southeastern United States were surveyed. Although survey participants were well represented and fairly evenly distributed at full, associate, and assistant professor ranks, considerably fewer responses were obtained from instructors and faculty in the School of the Arts and the School of Business. The survey employed in this study was designed to collect three types of data: (a) background information (years teaching at college level, academic rank, school and department, and an estimate of the number of students with learning disabilities requiring accommodations in their classes over the past five years), (b) willingness to provide specific accommodations, and (c) level of agreement with providing course alternatives for the college's general education mathematics and foreign language requirements. Although faculty members as a whole expressed a willingness to provide examination and academic accommodations to students with disabilities, many classroom adjustments received "neutral" ratings, with willingness to provide extra credit ranked as "unwilling". On average, instructor willingness to provide accommodations and course adjustments varied as a function of school affiliation (i.e., School of Business-neutral; education, mathematics and science –willing). Agreement with providing alternatives to mathematics and foreign language course requirements was also mixed. Although the mean rating for all faculty members was in the neutral to agree ranges, faculty from the School of Business disagreed with the provision of course alternatives.

Myers (2008) conducted a case study on her own attempts to integrate more fully Universal Design into her courses as part of the Higher Education graduate program at the institution where she worked as a faculty member. In the study, Myers (2008) sought to determine how much her graduate students knew about disability inclusion as well as to gauge their interest in a course that would be designed around disability issues. Results of the survey

showed a significant interest in a course providing more information on this topic as well as a lack of understanding in the steps needed to design a course that would allow those with disabilities to more fully participate. Equipped with this information, Myers (2008) developed a hybrid pilot course, which eventually became approved as a requirement for the master's program within the Higher Education Department at the institution. Myers (2008) found that, over time, faculty and students both became more interested in designing accessible courses rather than providing unplanned accommodations to students on an as-needed basis. Myers' study demonstrates the changing attitudes toward disabilities in postsecondary education. Institutions can no longer be content with retroactively fitting courses to meet the needs of their students. Instead, these accommodations must be built into the course at the outset. When provided with information and support, faculty members are more willing to meet this challenge Myers (2008).

Izzo et al., (2008) presented findings from two research projects related to the applicability of universal design in higher education. In the first study, they surveyed 271 faculty and teaching associates (TAs), followed by focus groups of 92 faculty and TA's examining their perspectives regarding the instructional climate for students with disabilities, perceived need for professional development, effective instructional strategies in the classroom, and suggestions for improving the educational experience for all students, including those students with disabilities. Respondents from the survey reported they were most interested in training on UDL. Further analysis revealed that there is a greater need for inclusive multimodal teaching practices. Findings from the focus groups revealed various themes including creating a welcoming climate, designing instructional practices to meet diverse student learning needs, and student disclosure of learning needs.

Based on the findings from the survey and focus groups, the researchers developed a training tool, the Faculty and Administrator Modules in Higher Education (FAME). FAME is a web-based, self-paced learning module for higher education faculty to train in effective teaching and learning practices, including one module of UDL. After participating in FAME training, respondents indicated that they supported the learning tool and 92% of participants reported an increase in their ability to meet the instructional needs of students with disabilities. The researchers recommended further studies to validate the UDL approach because they believe it has the potential to produce better learning outcomes for all students. Researchers stressed that faculty should set clear goals, provide multiple learning opportunities for students, and evaluate student progress often with multiple assessment opportunities. This, in turn, would decrease barriers and increase positive perceptions to allow successful UDL implementation.

A study conducted by Cook, Rumrill, and Tankersley (2009), used survey methodology to examine faculty members (n = 2,168) at a large university system in the Midwestern United States. The survey measured faculty perceptions on issues regarding college students with disabilities and what faculty felt was most important and adequately addressed at their institution. The 38-item survey contained two rating scales regarding respondents' perceived importance and agreement with the statements in the following areas: (a) Legal, (b) Accommodations-Willingness, (c) Accommodations-Policy, (d) Universal Design for Instruction, (e) Disability Characteristics, and (f) Disability Etiquette. Faculty were asked to rate the degree to which they feel that each statement reflects an idea or behavior that they personally feel is important on a four point Likert-type scale of 1 (*very unimportant*), 2 (*unimportant*), 3 (*important*), and 4 (*very important*). Then faculty members were asked to rate the degree to which they agree the statement represents the general climate or practices at their university,

again using a 4 point Likert-type scale of 1 (*strongly disagree*), 2 (*disagree*), 3 (*agree*), and 4 (*strongly agree*).

Of the 307 respondents, various themes emerged from the data. Specifically, related to Universal Design for Instruction (UDI), faculty members' had a tendency to rate these items as "highly important" but not "widely implemented". Two items with the lowest agreement index scores noted were specific UDI techniques (i.e., "Faculty members are familiar with assistive technology that can facilitate learning" [agreement index of 32%] and "Faculty members provide lecture and course material in a wide variety of formats and media" [agreement index of 46%]). On the other hand, the two that were rated as "highly important" and "widely implemented" associated with the UDI theme appear to be the most unspecific (i.e., "Faculty members have high expectations of success for all students" and "Faculty members ensure that the learning environment enables all students access to the course content"). The authors noted that this was the first step in assessing faculty members' priorities and understanding of critical issues regarding students with disabilities on an eight-campus university system in the Midwest.

LaRocco and Wilken (2013) conducted a faculty action-research project and found that faculty indicated they were at a stage of concern that centered on themselves. At this stage, individuals are most often thinking about how an innovation (i.e., UDL) will affect them personally, and what is required in terms of effort, time commitment, knowledge and skill development. Similarly, faculty overwhelmingly reported that they were nonusers of UDL with the majority at an orientation level of use for each principle. In other words, study participants were generally not applying the principles of UDL in their classes.

Lombardi and Murray (2011) developed and evaluated the Expanding Cultural Awareness of Exceptional Learners (ExCEL) survey that measured 289 full-time, postsecondary

faculty members' attitudes and beliefs regarding disability, disability laws, support services, and instruction. The ExCEL survey contains three sections including 39 items pertaining to faculty attitudes and perceptions in the areas of accommodations, disability law, and inclusive instructional practices. Of the 39 items, subscales included items based on universal design principles developed from literature in Universal Design for Learning (UDL) and Universal Design for Instruction (UDI). The overall reliability on all items were ($\alpha = 0.88$). Also, the ExCEL survey contains eight reliable factors and faculty responses on these factors varied according to faculty gender, rank, college/school affiliation and prior disability-focused training experiences. The authors demonstrate the importance utilizing reliable and valid instruments when measuring faculty attitudes towards incorporating and using UD principles, which previous studies failed to measure.

Lombardi, Murray, and Gerdes (2011) continued to examine faculty attitudes and actions regarding inclusive teaching practices based on universal design. The researchers revised the ExCEL survey, naming it the Inclusive Teaching Strategies Inventory (ITSI). The ITSI measures six constructs with two response categories where faculty could indicate their attitudes as well as in-class actions. The subscales included: (a) Multiple Means of Presentation, (b) Inclusive Lecture Strategies, (c) Accommodations, (d) Campus Resources, (e) Inclusive Assessment, and (f) Accessible Course Materials. Validity evidence for the attitude subscales had been previously established through confirmatory factor analysis (CFA) (Lombardi & Murray, 2011; Murray et al., 2011). The overall reliability on all items ($\alpha = 0.88$) was confirmed using Cronbach's alpha (Murray et al., 2011). The ITSI is also the only survey known to incorporate principles from the major universal design frameworks (e.g., UDI, UDL) (Lombardi et al., 2011).

Results showed discrepancies between positive faculty attitudes and their actual actions in class. Chi-square analyses were conducted to compare self-reported faculty attitudes and later in-class actions. A significant discrepancy existed between faculty attitudes toward inclusive teaching practices and instructor actions. The researchers noted mixed results where faculty responded positively toward actions more than attitudes on one subscale, while the opposite was discovered on other subscales. For example, a greater proportion of faculty responded with positive attitudes toward providing accommodations and using campus resources than faculty that responded with affirmed action.

The opposite was found with regards to the subscales of multiple means of presentation, inclusive lecture strategies, inclusive assessment, and accessible course materials. Multiple regression analyses showed that faculty who received prior disability-related training or had experiences with disability were more likely to express positive attitudes on three of the six subscales, but significant findings related to faculty actions were not apparent. No significant results were found based upon amount of teaching experience. Lombardi et al., (2011), recommended an important next step in research would be to create a similar student version of the ITSI to measure student perceptions of inclusive instruction and compare it with faculty perceptions.

Lombardi, Murray, and Dallas (2013) utilized the Inclusive Teaching Strategies Inventory (ITSI) to examine participation in prior disability-related training and training intensity and the implementation of inclusive instruction on two university campuses in the mid and pacific northwest. Faculty at one university was emailed the ITSI during the spring 2011 semester and faculty at the second university was emailed the ITSI during the fall 2011 semester. In this study, the items based on Universal Design (i.e., Accommodations, Accessible Course

Materials, Inclusive Lecture Strategies, Inclusive Classroom, Inclusive Assessment, and Course Modifications) were measured their utilizing self-reported attitudes beginning with the response stem “I believe it is important to” and the response options ranged from “1 strongly disagree” to “6 strongly agree.” Along with the UD constructs, faculty were asked to report prior disability-related experience (i.e., prior training: yes or no) and type of training opportunities (i.e., less intensive – articles, books, or more intensive: workshops, courses). While the authors’ primary focus was to evaluate associations between participation in prior training, training intensity and implementation of inclusive teaching practices, they also examined gender differences toward inclusive instruction.

Authors point to prior research that suggests that faculty gender is often related to faculty attitudes about students with disabilities (Lombardi & Murray, 2011; Lombardi, Murray, & Gerdes, 2011, Murray, Wren, & Keys, 2008; Skinner, 2007). Mean subscale scores by institution, gender, and prior training were compared. Analysis shows at both institutions, females with prior disability related training scored the highest on Accommodations, Inclusive Lecture Strategies, and Inclusive Classroom subscales. On two other subscales, Accessible Course Materials and Inclusive Assessment, males with prior disability training scored highest at one of the Universities whereas females with prior disability training scored the highest at the other University. In fact, faculty with prior disability training, regardless of gender and university, scored higher on all ITSI subscales. According to Lombardi et. al., (2013) the results confirm the importance of training opportunities for college faculty in increasing awareness and support to students with disabilities.

Sprong, Dallas, and Upton, (2014) measured faculty attitudes toward UDI and academic accommodations as measured by the Multiple Means of Presentation (MMP), the Inclusive

Lecture Strategies (ILS), and the Accommodations (ACC) subscales of the ITSI survey. The researchers wanted to better understand faculty attitudes toward the three subscales as well as examine differences among faculty groups. Participants in the study consisted of a non-random sample from a population of 1,621 faculty employed at a medium-sized, public research university in the Midwest. Researchers stated that by omitting the action-related items they were able to focus on attitudinal-based research questions, which shortened the survey instrument and reduced the time needed for participants to complete the instrument.

The survey gathered faculty demographic information, amount of experience with people with disabilities, amount of prior disability-related training, and then asked faculty to express their attitudes toward items on three subscales. Overall, data from 381 respondents were used that equaled a 23.5% response rate. On average, all respondents had favorable attitudes toward Multiple Means of Presentation, Inclusive Lecture Strategies, and Accommodations subscales of the ITSI survey.

Summary of Literature Review

Universal Design for Learning is a framework for instruction that holds great promise in terms of improved student outcomes, perceptions of learning and performance, and perceptions of the instructors implementing the principles of UDL into their course curriculum. Researchers consistently provided a strong rationale for the need to use UD principles within educational environments. However, the extent to which researchers explicitly connected UD principles to their interventions, measures, and findings varied greatly, posing challenges for the analysis and interpretation of the effectiveness of applying UD principles to educational practices.

As described above, existing literature about UDL contains historical and pedagogical information; however, little has been written in terms of student outcomes. Researchers agree

that there is a need for continued research to validate the use of UDL to improve student-learning outcomes and to learn the most efficient and effective way to train instructors in the utilization of UDL (Izzo et al., 2008; McGuire et al., 2007; Schelly et al., 2011; Spooner et al., 2007). Schelly et al. (2011) and Spooner et al. (2007) recommend further research to examine UDL strategies to determine which are most effective. Evaluation of the literature, thus far, has provided a framework for understanding the perceptions of faculty and students, and disability service providers as to implementing UDL in the classroom. Much of the literature on the topic of UDL has explained the need for and the principles of UDL but has revealed little in terms of outcomes of implementation related to student learning and/or teacher and student perceptions of the experience learning within this framework (Meo, 2008). Of the research that does exist, most have focused attention to UDL in 4-year colleges and universities. No studies were found that examined faculty and students' attitudes and actions in a community college setting. Very little has been published about UDL implementation in community colleges.

Although UDL appears to be a promising way to improve instruction for all students, there is still much research that needs to be done to determine the effectiveness of UDL in the classroom. Research on the concept of UDL is limited, although the underlying principles that create the foundation of the UDL framework are themselves built on evidence-based practices. With continued rigorous research of the UDL curricular framework it should be possible to determine if it can be considered an evidence-based practice in its own right.

Additionally, it is important to remember that as student diversity increases in colleges and universities, including an increase in the number of students with disabilities (Fichten, et al., 2006; Raue & Lewis, 2011), the use of UDL strategies in higher education becomes even more important. The need for strategies that address the demographic changes in higher education

continues to correspondingly grow. Thus, the promise of UDL strategies becomes of paramount importance.

In aggregate, the findings of the studies supported the use of UD principles by providing evidence of the benefits and positive outcomes for students and educators. However, because the studies used a range of research designs, most of which did not establish causality of effectiveness, the evidence should be interpreted with caution as a set of preliminary positive results based on varied methods of analysis.

CHAPTER 3: METHODOLOGY

The literature suggests that Universal Design for Learning (UDL), with its emphasis on diversity and curriculum, benefits all students, especially students with disabilities, without need for individualized academic accommodations. Previous studies focused on attitudes and actions of faculty and students' toward inclusive instruction based on UDL principles at 4-year colleges and university's (Lombardi et. al., 2011, 2013; Schelly et. al., 2011, 2013). However, what they have failed to explore are the attitudes and actions of faculty and students' towards inclusive instruction based on UDL principles at community colleges. The purpose of this study was to examine faculty and student attitudes toward and actions associated with inclusive instruction based on UDL principles and practices on a community college campus. The researcher wanted to better understand respondent beliefs and perceptions in these areas as well as to add to the UDL body of research.

Research Design

This study utilized a quantitative, cross-sectional online survey research design. A quantitative design was chosen for this study because a post-positivist theory has been employed to measure and explain relationships between variables. Use of the theoretical lens of postpositivism guided this study. Postpositivism emphasizes disciplined, competent inquiry to investigate and understand the actions and behaviors of the human experience (Phillips, 2000). Thus, using quantitative measures of actions and statistical analysis of those actions, findings may develop knowledge based on deductive analysis of the observed facts that can begin explain the relationship among the research variables (Creswell, 2013; Phillips, 2000). Cross-sectional

studies are appropriate for the comparison of many different variables at the same time (Lavarkas, 2008).

Online surveys have become an increasingly popular and reliable way to administer surveys. Benefits of using online surveys include flexibility in design, more economical and easier to administer, less intrusive, and quicker response time from respondents (Dillman, 2011). Survey research design in this study was appropriate because it allowed for gathering information about different population groups at a single point in time by asking the group members questions about their individual behaviors that would otherwise be difficult to obtain.

Given that little, if any research studies up to this point have examined the community college environment in the context of UDL, a well-known survey instrument in the field of higher education and disability studies, the Inclusive Teaching Strategies Inventory (ITSI) (Lombardi et al., 2011) was selected. The ITSI was selected as the most appropriate published and validated tool for examining inclusive instructional practices that align with UDL principles and guidelines. The ITSI examines inclusive instructional practices using six constructs: (a) Accommodations, (b) Accessible Course Materials, (c) Course Modifications, (d) Inclusive Lecture Strategies, (e) Inclusive Classroom, and (f) Inclusive Assessment (Lombardi et al., 2011). These six constructs align with the core principles of UDL as mentioned earlier and therefore have the potential to provide insight into UDL implementation in the community college classroom.

In this study, two survey questionnaires were used to gather Faculty and student perceptions in a community college setting. Subsequently, the Inclusive Teaching Strategies Inventory (ITSI) measured faculty' self-reported attitudes toward and actions associated with UDL principles and practices in the classroom. A similar instrument, the Inclusive Teaching

Strategies Inventory-Student version (ITSI-S) measured students' attitudes toward and perceptions of faculty actions associated with UDL principles and practices in the classroom.

Faculty variables of age, gender, ethnicity, position type, academic discipline, academic rank and amount of teaching experience were taken into consideration to gain a greater understanding of how they view inclusive instruction and determine if they significantly affected subjects' self-perceptions in the implementation of UDL principles and practices they use in the classroom. Student variables of gender, disability status (i.e. with or without a disability), ethnicity, and age were taken into consideration to gain a greater understanding of how they view inclusive teaching and determine if they significantly affected subjects' perceptions of faculty implementation of UDL principles and practices in the classroom. Finally, student and faculty variables of age, gender, and ethnicity were taken into consideration to gain a greater understanding of how they view inclusive instruction and determine if they significantly affected subjects' perceptions of implementation of UDL principles and practices in the classroom. The surveys were self-administered, distributed by email and collected utilizing *Qualtrics*, a reputable and professionally administered web-based server. At the conclusion of data collection, all data were exported into SPSS 22 for analysis.

The following research questions guided the study:

1. What are the differences in faculty self-reported attitudes toward and actions associated with UDL principles and practices in the classroom based upon age, gender, ethnicity, position type, academic discipline, academic rank and amount of teaching experience?

2. What are the differences in students' attitudes toward and perceptions of faculty actions associated with UDL principles and practices in the classroom based upon gender, disability status, ethnicity, and age?
3. To what degree are there differences in faculty and students' attitudes and actions pertaining to UDL principles and practices in the classroom?

Participants and Site

This study took place at a 2-year public community college located in the northeastern part of the United States of America. The college was established in 1950 and is accredited by the Middle States Association of Colleges and Schools. The college consists of two campuses located approximately 25 miles apart. Academic credits can be earned through full or part-time study. The college offers three degrees, the Associate in Arts, Associate in Science, and Associate in Applied Science. The college also offers extensive technical programs in career fields and one-year certificates.

The target population of this study consisted of two groups: (a) all faculty (full-time and part-time) teaching credit courses during the spring 2014 semester, and (b) all students enrolled in credit courses at this institution during the spring 2014 semester. The sampling frame consisted of a list of e-mail addresses of both faculty and students from a pre-existing database. The sampling frame for faculty were acquired from the office of the Vice President for Academic Affairs. The sampling frame for students were acquired from the office of the Vice President for Student Affairs.

Faculty

As of spring 2014, there were approximately 500 faculty members employed at this institution. Of those, 42% were male faculty members and 58% were female faculty members.

Faculty age in this institution were reported as: 1% were 20-24 years old, 9% were 25-34 years old, 18% were 35-44 years old, 34% were 45-54 years old, and 37% were over the age of 55. Approximately 55% were full-time faculty and 45% were part time faculty. Faculty ethnicity were reported as: 6% African American/Black (Non-Hispanic), 2% Asian, 84% Caucasian/White (Non-Hispanic), 6% Hispanic/Latino, 2% Multi-ethnic, and .1 % reported Other. At this college, Academic Affairs is organized into three divisions (a) Business, Math and Technology (b) Health Professions and (c) Liberal Arts. Each division is made up of Academic Departments ranging from five to seven departments.

Students

As of spring 2014, there were 5,796 students enrolled at the college. Of those, 40% were male students and 59% were female students. Students' age at this institution were reported as: 32% were 18-19 years old, 32% were 20-24 years old, 16% were 25-34 years old, 6% were 35-44 years old, 3% were 45-54 years old, and 1% were over 55. Approximately 51% were full-time students and 49% were part time students. Students' ethnicity were reported as: 12% were African American/Black (Non-Hispanic), 2% were Asian, 57% were Caucasian/White (Non-Hispanic), 24% were Hispanic/Latino, 2% were Multi-ethnic, 1 % reported Other. At the time of the study, there were 360 students with documented disabilities enrolled at the college, comprising 6% of the student population. Of the students with disabilities, diagnoses included autism, deafness, serious emotional disturbance, hearing impairment, specific learning disability, speech or language impairment, traumatic brain injury, and visual impairment or blindness.

Measures

Variables

Independent variables. The independent variables for faculty in this study included age, gender, ethnicity, teaching status (i.e. full-time, part-time), academic discipline, and amount of teaching experience. The independent variables for students in this study included age, gender, ethnicity, disability status (i.e. with or without), and documentation of disability. Table 3 describes faculty and student independent variables and level of measurement.

Table 3
Description of Faculty and Student Independent Variables and Level of Measurement

Variable	Description	Type
Age	Faculty and Students' reported their age.	Continuous
Gender	Faculty and Students' identified as either male or female.	Dichotomous
Ethnicity	Faculty and Students' identified as: African American/Black (Non-Hispanic); Asian; Caucasian/White (Non-Hispanic); Hispanic/Latino; Multi-ethnic; Other [type answer].	Nominal
Teaching Status	Faculty identified as: Full-Time or Part-Time.	Dichotomous
Academic Discipline	Faculty identified as: Applied Technologies Department, Biology Department, Business Department, Mathematics Department, Science, Engineering, Architecture Department; Athletics Department, Dental Hygiene Department, Diagnostic Imaging Department, Laboratory Technology Department, Movement Science Department, Nursing Department, Occupational	Nominal

	Therapy Asst. Department, Physical Therapy Asst. Department; Arts and Communications Department, Criminal Justice Department, Education Department, English Department, Global Studies Department, Behavioral Sciences Department; Other Area of the College: [type answer].	
Amount of Teaching Experience	Faculty identified: Total number of years teaching at the postsecondary level [type answer].	Continuous
Disability Status	Students' identified as either: a student with a disability or student without a disability.	Dichotomous
Documentation of Disability	Students' who either: contacted the OAS and submitted the appropriate documentation; contacted the OAS but have not submitted the appropriate documentation; have not contacted the OAS	Dichotomous

Dependent variables. The dependent variables for faculty came from the Inclusive Teaching Strategies Inventory (ITSI) survey and included self-reporting of attitudes and actions that assessed the provision of inclusive teaching practices including the provision of accommodations, accessible course materials, inclusive lecture strategies, inclusive classroom, inclusive assessment, and course modifications (Lombardi et al., 2011; 2013). Faculty's self-reported attitudes were scored on a Likert scale of 1 (*strongly disagree*) to 7 (*strongly agree*). Faculty's self-reported actions were scored on a Likert scale of 1 (*no opportunity*) to 5 (*always*).

The dependent variables for students came from the ITSI-S survey and included self-reporting attitudes and the perceived actions of their faculty members in the classroom that

assessed the provision of inclusive teaching practices including the provision of accommodations, accessible course materials, inclusive lecture strategies, inclusive classroom, inclusive assessment, and course modifications (Lombardi et al., 2011; 2013). Student's self-reported attitudes were scored on a Likert scale of 1 (*strongly disagree*) to 7 (*strongly agree*). Student's perceived actions of faculty were scored on a Likert scale of 1 (*I don't know*) to 5 (*always*).

Instruments

Two separate survey questionnaires were utilized in this study: the Inclusive Teaching Strategies Inventory (ITSI) and a newly developed student version, the Inclusive Teaching Strategies Inventory, Student (ITSI-S) (Lombardi et al., 2011). Permission to use and modify the ITSI was obtained from the author (Appendix C). A small pilot test was used to help establish content validity and to improve the questions for students of the final ITSI-S instrument. The instruments are described in further detail below and are included in the (Appendix D, E).

Inclusive Teaching Strategies Inventory (ITSI). The Inclusive Teaching Strategies Inventory (ITSI) were administered to full-time and part-time faculty at this community college. The ITSI measures six constructs regarding inclusive instructional practices based on the tenets of Universal Design across several frameworks. These constructs are: (a) Accommodations, (b) Accessible Course Materials, (c) Course Modifications, (d) Inclusive Lecture Strategies, (e) Inclusive Classroom, and (f) Inclusive Assessment (Lombardi et. al., 2011).

The first subscale, Accommodations, contains eight items related to accommodations requests from students (e.g., “make individual accommodations for students who have disclosed their disability to me). The second subscale, Accessible Course Materials, contains four items related to the use of a course website, posting electronic course materials, and allowing students

to submit assignments in electronic formats. The third subscale, Course Modifications, contains four items related to changes in course assignments or requirements for students with and without disabilities (e.g., “allow a student with a documented disability to complete extra credit assignments” and “allow any student to complete extra credit assignments”). The fourth subscale, Inclusive Lecture Strategies, contains four items that measure teaching strategies specific to a typical postsecondary lecture-style class, including simple strategies faculty may utilize to assess student comprehension such as repeating student questions to the class before answering and periodically summarizing key points throughout the lecture. The fifth subscale, Inclusive Classroom, contains nine items related to presentation of course content with a particular emphasis on flexibility, use of technology, and various instructional formats (e.g., small group work, peer-assisted learning, and hand-on activities). The sixth subscale, Inclusive Assessment, contains four items pertaining to flexible response options on exams, non-traditional exams, and flexibility with deadlines. Along with the survey, faculty were asked to report demographic characteristics. Instructor demographic characteristics included age, gender, ethnicity, position type, academic discipline, academic rank and amount of teaching experience.

The Inclusive Teaching Strategies Inventory (ITSI) has experienced multiple development phases and validation studies (Lombardi & Murray, 2011; Lombardi, Murray, & Gerdes, 2011; Lombardi, Murray, & Dallas, 2013). Researchers found the instrument had adequate internal consistencies (.65 to .85), and factor scores were associated with faculty gender, rank, department, and prior disability-focused training (Lombardi & Murray, 2011). In a recent study, Lombardi (2013) examined the reliability of the ITSI subscales with Cronbach’s alpha. The values ranged from .70 to .87. All values met acceptable .70 or higher criteria and indicate that the items form a scale that has good internal consistency reliability (Gliner et al.,

2009). Alpha values for each subscale, in descending order, were as follows: Accommodations (= .85), Inclusive Classroom (= .84), Inclusive Lecture Strategies (= .80), Course Modifications (= .76), Inclusive Assessment (= .71), and Accessible Course Materials (= .70). In the most recent testing phase, findings from a cross-validation study using exploratory and confirmatory factor analysis confirmed this seven-factor structure (Lombardi & Sala-Bars, 2013).

Inclusive Teaching Strategies-Student (ITSI-S). With the original author's permission (Appendix C), a preexisting instrument, the Inclusive Teaching Strategies Inventory (ITSI) (Lombardi et al., 2011) was used to form a new student instrument, the Inclusive Teaching Strategies Inventory-Student (ITSI-S) (Appendix E). The ITSI-S were administered to examine students' attitudes and perceptions of faculty implementation of UDL principles and practices in the classroom. As previously mentioned, the ITSI measures six constructs regarding inclusive instructional practices based on the tenets of Universal Design across several frameworks. These constructs are: (a) Accommodations, (b) Accessible Course Materials, (c) Course Modifications, (d) Inclusive Lecture Strategies, (e) Inclusive Classroom, and (f) Inclusive Assessment (Lombardi et al., 2011). In an effort to maintain the integrity of the Inclusive Teaching Strategies Inventory (ITSI), minimal modifications were made to its original form. Revisions to the ITSI included: adjustments to the item stems, removal of questions pertaining to disability law and campus resources, addition of student demographics and disability information, one adjustment to the action response scale, and minor grammatical adjustments.

Adapting an existing validated survey improves the likelihood that the findings will be valid and reproducible (Passmore, 2002). It is important to note that the ITSI was previously known as the Expanding Cultural awareness of Exceptional Learners (ExCEL) survey (Lombardi, 2010; Lombardi & Murray, 2011). The ExCEL survey measures faculty attitudes

and perceptions towards students with disabilities based on the principles of Universal Design (UD) (Lombardi, 2010; Lombardi & Murray, 2011). In addition, ITSI-S also contains elements that are closely related to the College Students with Disabilities Campus Climate (CSDCC) survey (Lombardi et al., 2011).

The ITSI-S item stems were adapted for student respondents. Students were asked to report their perceptions of faculty' actions/behaviors. For example, the action item stem “*I post electronic versions of course handouts*” was changed to “*My instructor posts electronic versions of course handouts.*” Several items were reworded to align grammatically with the adapted action item stem. For example, the action item stem “*My instructor use a course website*” was changed to “*My instructor uses a course website.*” The response scale for action items range from 1 (*I don't know*) to 5 (*always*). The response option “*I don't know*” was recommended by the original author for the current study, which replaced 1 (*never*) in the original instrument.

Along with the survey, students were asked to report demographic and disability related information. Demographic characteristics were gender, ethnicity, and age. Disability related information were disability status (student with a disability, yes/no), contacted the disability services office and provided documentation of disability (yes/no), and type of disability. Demographic characteristics were adapted from the original instrument and disability related information were new to the student version. Other items from the original survey were removed for student respondents (teaching status, number of years teaching, prior disability-related training and personal experience, regarding a friend, family, or the respondent had a diagnosed disability).

After the initial ITSI-S survey was adapted this researcher asked peers (i.e., PhD students in the Education Department of the same university) to review it for clarification of content and

provide feedback about items that could be problematic for student respondents (de Leeu, Hox, & Dillman, 2008). Changes to the ITSI-S were made based on the feedback from the group. In addition, the researcher asked the original author to review the survey prior to administration. Based on the author's feedback, one change was made to the action response options to better relate to the target audience.

The ITSI-S was piloted with a purposive sample of community college students to determine the instruments validity to be used for this study. Responses were received from 74 participants. The response rate was 34% and is comparable to response rates of similar attitudinal studies (Lombardi & Murray, 2011; Lombardi et al., 2011). Participants were asked to report demographic information including, gender, age, and race. In addition to demographic information, participants were asked to report disability related information including, student with a disability (yes/no), contact with disability services office/provided documentation of disability (yes/no), and disability type.

In the pilot study, to assess whether the data from the variables within the entire instrument and subscales form reliable measures, Cronbach's α , were computed. Measures of internal consistency, such as Cronbach's α , are used to indicate the extent to which the instrument is consistent among the overall scale and subscale items measuring a single concept or construct (Gliner, Morgan, & Leech, 2009). Cronbach's coefficient alpha is the most common test of reliability (Morgan, Leech, Gloeckner, & Barrett, 2010) and is reported like a correlation coefficient with a numerical value between 0 and 1. Alpha levels should typically range between .70-.90 to show modest to high levels of internal consistency (Royse, Thyer, & Padgett, 2019). The alpha level for the overall instrument was good, $\alpha = .83$, exceeding the acceptable .70 or higher criteria and indicates that the items form a scale that has good internal consistency

reliability (Morgan et. al., 2010). Similarly, the alpha levels for the subscales ranged from excellent "Accommodations" ($\alpha = .95$) and "Multiple Means of Presentation" (0.90) to questionable "Course Modifications" ($\alpha = .66$) and "Inclusive Assessment" (0.68).

Overall, the subscales "Course Modifications" and "Inclusive Assessment" were the only subscales that indicated questionable internal consistency reliability. In the pilot study, it is important to note that due to the nature and design of this study, no alternate forms or test-retest design were appropriate to further establish reliability.

Measurement validity is concerned with providing evidence for the use of a particular instrument with a particular population (Gliner et. al., 2009). Despite the fact that validation should integrate as many types of evidence for validity (content, response process, internal structure, relations to other variables and consequences of testing) as possible, evidence based on the content of the measure were obtained through the findings in the pilot study (Gliner et. al., 2009).

Content validity in the pilot study were established in several ways: (a) all of the items were drawn from a pre-existing instrument that showed good evidence of reliability and validity (Lombardi et al., 2011), and (b) content is consistent with major frameworks represented in the literature related to universal design in postsecondary education as well as previous research studies (Lombardi et al., 2011). In addition, the items were reviewed by content experts in the field, including the original author of the instrument to ensure clarity and fit with the construct and intended audience being measured. Specifically, a detailed discussion was undertaken with three peers (i.e., PhD students in the education department of the same university) to review it for clarification of content and provide feedback about items that could be problematic for student respondents and their suggestions were incorporated into the instrument. In addition, the

instrument were reviewed the content validity of the response scale, regard to the action rating was analyzed the original author. In this case, the expert suggested a minor change in the scale wording to better relate to the target audience.

Validity and Reliability

Validity

In brief, validity relates to both design and methods within the study and is often used by researchers to evaluate the quality or merit of a study (Gliner et. al., 2009). Validity is synonymous with the term ‘accuracy’ and refers to the degree to which a study assesses the specific concept that the researcher is attempting to measure (Huck, 2012).

Validity can be categorized as either internal or external. Internal validity refers to the extent to which one can conclude that the independent variables of a study caused the dependent variable to change (Gliner et. al., 2009). For this study, a non-experimental, cross-sectional online survey research design was utilized. This research design examines the presumed effect of attribute independent variables (i.e., age, gender, ethnicity) in terms of the dependent variable (i.e., use of inclusive instructional practices). Based on this design, the researcher cannot randomly assign participants to groups or control the independent variables. Despite not being able to control for random assignment of participants to groups, similarity of the groups as well as retention across groups were checked after the study.

External validity refers to whether the study’s results can be generalized to other populations or settings (Gliner et. al., 2009). Two components of external validity are population and ecological external validity. Population external validity involves how participants were selected to be in the study. Ecological external validity addresses the conditions, settings, times, or naturalness of procedures of the study and whether the results can be generalized to real-life

outcomes (Gliner et. al., 2009). The theoretical population for this study was all community college faculty and students in the United States. For this study, the accessible population was all community college Faculty and students at the study institution. The participants were asked to participate and self-reported via the online survey questionnaire. Efforts were made to increase the validity by following Dillman's (2011) recommendation of administering multiple contacts with potential participants. Additional efforts to attempt to obtain an adequate response rate included offering incentives, a "save and continue" option while taking the survey and making multiple contacts/reminders.

Reliability

Reliability is the consistency of measurement within the study and can be used interchangeably with the word 'consistency' (Huck, 2012). According to Gliner, Morgan, and Leech (2009), overall reliability is the degree to which the instruments, statistical techniques, presentation of the results and interpretation of the analysis are appropriate. For this study, the reliability of the measurement instruments was established. Every effort were made to present the necessary statistical information (i.e., M, SD, N) and provide accurate interpretation of the statistics (i.e., MANOVA).

Data Collection

Data collection in this study consisted of two online survey questionnaires that were used to gather students' and faculty members' demographic information and their perceptions of the provision of inclusive teaching practices in a community college setting. The ITSI were used to gather faculty self-reported use of inclusive instructional practices and the ITSI-S were used to gather student's perceptions of their faculty' inclusive instructional practices. Both the ITSI and ITSI-S collected demographic information of the respondents and included items that assessed

the provision of inclusive teaching practices including accessible course materials, inclusive lecture strategies, inclusive classroom, and course modifications. The online survey questionnaires were hosted by *Qualtrics*, a reputable and professionally administered online survey program. Data collection and analysis is easier, faster, and more accurate when captured electronically (Gliner et. al., 2009).

Approval to proceed with the study was obtained from the Institutional Review Board (IRB) of Colorado State University and the IRB of the study site (Appendix A, B) before the study was conducted. Dillman (2011) recommends making multiple contacts with participants in order to increase response rates for online surveys. In order to attain the largest sample size possible, thus increasing survey validity, administration of the survey was based on Dillman's methods (Dillman, 2011). Faculty were distributed the ITIS survey through email notification via the college faculty and staff Listserv. Students were distributed the ITSI-S survey through email notification via the student spring 2014 Listserve. A recruitment email was sent as a pre-notice to faculty and students explaining that they would receive a link for the survey in the next couple of days (Appendix F). The recruitment email contained a brief introduction to the study, the purpose of the study, researcher and IRB contact information. This constituted the first of multiple contacts. Two days after the recruitment email, an email was sent to potential participants that included the purpose of the study, informed consent, and a link to the survey (Appendix G). Following the survey email, additional email reminders were sent to faculty and students spaced approximately one week apart (Appendix H). The survey was closed after six weeks of administration.

Additionally, several strategies were implemented to maximize the survey response rate. First, the researcher used incentives to try to increase participation. Prospective respondents

were informed of the incentive that there was a drawing to win one of 10 ten-dollar-e-cards. The last page of the survey provided survey respondents with an opportunity to enter the drawing. Respondents were informed that participation in the drawing could not be linked back to their survey data thereby allowing them to retain their anonymity. If respondents elected to participate in the drawing they were required to provide their email address and select which gift card, either an iTunes or an Amazon.com e-card, they would like to receive if they won. Once the information was submitted the respondent was entered in the drawing. At the end of the survey administration, a random drawing took place and a winner was chosen from those survey participants that opted to participate in the drawing. Second, the survey was created with a “save and continue” option provided in *Qualtrics*. This allowed respondents to return to the survey where they left off if they were interrupted or if they desired to finish the survey at a later time. Additionally, this option allowed the designer to have reminder emails sent only to participants who have not completed the survey. Participants who started the survey but did not finish, as well as those who never started the survey, will receive a reminder. Third, potential respondents were provided multiple opportunities to choose to participate in the survey. Multiple contacts increase the likelihood that surveys will be answered (Dillman, 2011). This provided potential participants with a reminder to participate in the survey as well as serving as an additional reminder to finalize the survey for those who had started, but not yet completed, it (Dillman, 2011). A final thank you notice was provided upon completion of the survey. At the conclusion of data collection, all data were exported into SPSS 22 for analysis.

Data Analysis

Data analysis for each research question consisted of descriptive and inferential statistics. Descriptive and inferential statistics were analyzed using the Statistical Package for the Social

Sciences (SPSS) Version 22. For each research question, a series of Multivariate Analyses of Variances (MANOVA's) were performed. MANOVA is used when there are several correlated dependent variables, and the researcher desires a single, overall statistical test on this set of variables instead of performing multiple individual tests (Gliner et al., 2009; Huck, 2012).

Question 1: What are the differences in faculty self-reported attitudes toward and actions associated with UDL principles and practices in the classroom based upon age, gender, ethnicity, position type, academic discipline, academic rank and amount of teaching experience?

To answer research question one, a series of Multivariate Analyses of Variances (MANOVA's) were performed. Two dependent variables were used: (a) overall scale score for attitudes consisting of the six attitude subscale scores (i.e., accommodations, accessible course materials, course modifications, inclusive lecture strategies, multiple means of presentation, inclusive assessment) and (b) overall scale score for actions consisting of the six attitude subscale scores (i.e., accommodations, accessible course materials, course modifications, inclusive lecture strategies, multiple means of presentation, inclusive assessment). The independent variables were age, gender, ethnicity, position type, academic discipline, academic rank and amount of teaching experience.

Question 2: What are the differences in students' attitudes toward and perceptions of faculty actions associated with UDL principles and practices in the classroom based upon gender, disability status, ethnicity, and age?

To answer research question two, a series of Multivariate Analyses of Variances (MANOVA's) were performed. Two dependent variables were used: (a) overall scale score for attitudes consisting of the six attitude subscale scores (i.e., accommodations, accessible course

materials, course modifications, inclusive lecture strategies, multiple means of presentation, inclusive assessment) and (b) overall scale score for actions consisting of the six attitude subscale scores (i.e., accommodations, accessible course materials, course modifications, inclusive lecture strategies, multiple means of presentation, inclusive assessment). The independent variables were age, gender, ethnicity, and disability status.

Question 3: To what degree are there differences in faculty and students' attitudes and actions pertaining to UDL principles and practices in the classroom?

To answer research question three, one Multivariate Analyses of Variances (MANOVA's) were performed on a merged data set consisting of faculty and student data. A new independent variable "academic status" (i.e., faculty, student) was determined based the new data set. The two overall attitude and action scale scores were again used as dependent variables for this analysis.

CHAPTER 4: RESULTS

Preliminary Analysis and Testing of Assumptions

The data consisted of responses to the Inclusive Teaching Strategy Inventory (ITSI) and Inclusive Teaching Strategy Inventory – Students (ITSI-S) distributed to a total sample of 500 faculty members and 5,796 students enrolled at a northeastern community college during the spring 2014 semester. Overall, 197 faculty members and 588 students responded to their respective surveys. Data were imported from Qualtrics to Statistical Package for the Social Sciences (SPSS) version 22 and was examined prior to analysis. Participants leaving large portions of the survey incomplete (over 80%) were removed from the analysis. Of the 197 faculty members, 18 participants' responses were removed from the analysis. Of the 588 students, 139 participants' responses were removed from the analysis. Therefore, 179 faculty and 449 student surveys were used in the data analysis with a response rate of 36 % and 7% respectively.

For faculty, approximately 1% of the attitude responses and 4% of the action responses across UDL subscales were missing. For students, approximately 1% of the attitude responses and 2% of the action responses across UDL subscales were missing. The Little's MCAR test for faculty resulted in ($p < .675$) and for students resulted in ($p < .000$). The results of this analysis indicated that data for Faculty and students were missing at random (i.e., no identifiable pattern exists to the missing data). Missing data were treated with imputation using the expectation-maximization (EM) algorithm (Dempster, Laird, & Rubin, 1977). Because violations of the missing completely at random assumption do not change experimental results in many settings and because the percentage of missing data was relatively small, data were analyzed using

imputed values. Data were checked for normality and all variables were approximately normally distributed with no items or variables markedly skewed.

Participant Characteristics

Faculty Characteristics

Descriptive information of faculty members by ethnicity, position type, academic department, academic rank, and teaching experience is provided in Table 4. These variables were selected based on prior research on inclusive instruction and interest of the researcher.

Overall, a total of 179 participants' data were analyzed. Of those, 121 (68%) were female faculty members and 55 (31%) were male faculty members. Three faculty members did not indicate gender. Faculty members in this study ranged in age from 26 to 75 ($M = 52$; $SD = 11.82$).

Table 4
Number and Percentage of Faculty Characteristics

Faculty Characteristics	Population		Sample	
	N	%	N	%
Ethnicity				
African American/Black (non-Hispanic)	30	6	2	1
Asian	10	2	1	.6
Caucasian/White (non-Hispanic)	420	84	167	94
Hispanic/Latino	30	6	4	2
Multi-ethnic	10	2	2	1
Other, please specify	5	1	1	.6
Position Type				
Full-time	275	55	91	51
Part-time	225	45	88	49
Academic Department				
Applied Technologies	*		4	2

Arts and Communication	*	7	4
Behavioral Science	*	12	7
Biology	*	13	7
Business	*	14	8
Criminal Justice	*	7	4
Dental Hygiene	*	3	2
Diagnostic Imaging	*	5	2
Education	*	4	2
English	*	30	17
Global Studies	*	4	3
Laboratory Technology	*	2	1
Mathematics	*	16	9
Movement Science	*	9	5
Nursing	*	24	14
Occupational Therapy Assistant	*	7	4
Other, please specify	*	5	3
Academic Rank			
Assistant Professor	*	49	28
Associate Professor	*	20	11
Instructor	*	69	39
Professor	*	21	12
Other, please specify	*	19	10
Teaching Experience			
0 – 4 yrs.	*	26	15
5 – 9 yrs.	*	42	24
10 – 14 yrs.	*	34	19
15 – 19 yrs.	*	10	6
20 – 24 yrs.	*	13	7
25 + yrs.	*	52	29

Note: For ethnicity, “Other” respondent indicated South Asian/Indian Subcontinent; Two respondents did not indicate ethnicity.

Note: For academic department, “Other” respondents indicated: Library and Academic Advising; Thirteen respondents did not indicate academic department.

Note: For academic rank, “Other” respondents indicated: Adjunct, Coordinator, Administrator, Librarian, Technical Lab Assistant, and Professor Emeriti; One respondent did not indicate academic rank.

Note: Two respondents did not indicate teaching experience.

* data is incomplete or missing at this institution.

Student Characteristics

Descriptive information of students by ethnicity, disability status, contact with the office of accessibility services, and diagnosed disability is provided in Table 5. These variables were selected based on prior research on inclusive instruction and interest of the researcher.

Overall, a total of 449 participants' data were analyzed. Of those, 348 (77%) were female students and 97 (22%) were male students. Overall, at this institution, 3,432 (60%) were female students and 2,337 (40%) were male students. Four students did not indicate gender. In the sample, students ranged in age from 18 to 65 ($M = 27$; $SD = 10.73$).

Table 5
Number and Percentage of Students Characteristics

Student Characteristics	Population		Sample	
	N	%	N	%
Ethnicity				
African American/Black (non-Hispanic)	687	34	43	10
American Indian/Alaskan Native	20	1	2	.4
Asian Native	146	7	11	2
Hawaiian/Pacific Islander	9	.45	1	.2
Caucasian/White (non-Hispanic)	3,347	167	264	59
Hispanic/Latino	1,379	69	79	18
Multi-ethnic	158	8	36	8
Other, Please specify	35	2	13	3
Disability Status				
I am a student with a disability	*		59	13
I am a student without a disability	*		386	86
Contact with OAS				
Yes, I have contacted the OAS and	*		29	14

submitted the appropriate documentation			
Yes, I have contacted the OAS but have not submitted the appropriate documentation	*	6	3
No, I have not contacted the OAS	*	180	84
Diagnosed Disability			
ADD, ADHD	*	20	32
Chronic Health Impairment	*	4	6
Developmental Disability	*	1	2
Learning Disability	*	23	37
Psychiatric Disability	*	7	11
Visual Impairment, Blind	*	1	2
Other, please specify	*	7	11

Note. For ethnicity, “Other” respondents indicated Caribbean American, Persian, West Indian, Irish American, Pakistan, Unknown, Caucasian and Hispanic, Native American and Caucasian.

Note. Four participants did not indicate disability status.

Note. 234 respondents did not indicate contacting the OAS.

Note. For diagnosed disability, “Other” respondents indicated Anxiety, Asperger’s, Asthmatic/Hypothyroidism, PDD with Autistic Tendencies, GAD, and never tested due to no insurance; 386 respondents did not indicate diagnoses of a disability.

* data is incomplete or missing at this institution.

Reliability

To assess whether the constructs from the ITSI and ITSI-S formed reliable overall scale scores, Cronbach’s alphas were calculated. Alpha is frequently used to indicate how well a set of items, as a group, measure a single construct and is the most common test of reliability (Urduan, 2010; Morgan et al., 2010). Reliability is concerned with the ability of an instrument to measure consistently and is reported like a correlation coefficient with a numerical value between 0 and 1 (Urduan, Huck, GLM). An alpha level .70 or higher, is considered acceptably reliable (Urduan, 2010).

For the ITSI, the overall alpha for attitude subscales (6 subscales, 33 items) was .88, which indicates that the average associations among overall attitude scores have good internal reliability. The alpha for action subscales (6 subscales, 33 items) was .90, which indicates that the average associations among overall action scores have good internal reliability. The overall internal consistency for the entire ITSI (66 items) was .92. These alphas were consistent with previous studies of faculty attitudes and inclusive instruction (Lombardi, 2013, Lombardi & Murray, 2011).

For the ITSI-S, the overall alpha for attitude subscales (6 subscales, 33 items) was .75, which indicates that the average associations among overall attitude scores have good internal reliability. The alpha for action subscales (6 subscales, 33 items) was .79, which indicates that the average associations among overall action scores have good internal reliability. The overall internal consistency for the entire ITSI (66 items) was .84. These alphas were consistent with the pilot study previously conducted, with the overall instrument ($\alpha = .83$), and subscales ranging from excellent "Accommodations" ($\alpha = .95$) and "Multiple Means of Presentation" (0.90) to questionable "Course Modifications" ($\alpha = .66$) and "Inclusive Assessment" (0.68).

Research Questions and Results

Question One: What are the differences in faculty self-reported attitudes toward and actions associated with UDL principles and practices in the classroom based upon age, gender, ethnicity, position type, academic discipline, academic rank and amount of teaching experience?

To answer research question one, a series of Multivariate Analyses of Variances (MANOVA's) were performed. Two dependent variables were used: (a) overall scale score for attitudes consisting of the six attitude subscale scores (i.e., accommodations, accessible course

materials, course modifications, inclusive lecture strategies, multiple means of presentation, inclusive assessment) and (b) overall scale score for actions consisting of the six attitude subscale scores (i.e., accommodations, accessible course materials, course modifications, inclusive lecture strategies, multiple means of presentation, inclusive assessment).

The independent variables were age, gender, ethnicity, position type, academic discipline, academic rank and amount of teaching experience. Due to insufficient sample size in some independent variables, age, ethnicity, academic department, and teaching experience were regrouped. The variable age was regrouped from a continuous item into three groups (i.e., 18-24, 25-34, 35-44+). The variable ethnicity was regrouped from 8 options into two groups (i.e., people of European descent and people of color). The variable academic department was regrouped from 21 items into three academic divisions (i.e., Business, Math, Science, Health Professions, Liberal Arts). The variable teaching experience was regrouped from a continuous item into three groups (i.e., 0-9, 10-19, and 20+). In order to check whether the assumptions of MANOVA were met, preliminary assumption testing for normality, linearity, univariate and multivariate outliers, homogeneity of variance/covariance were conducted. No significant violation was found. There was a statistically significant difference found between age and ethnicity on the combined dependent variables, $F(6, 322) = 2.15, p = .047, \text{Wilks}' \lambda = .924, \text{multivariate } \eta^2 = .04$.

When the results for the dependent variables were considered separately, the only difference to reach statistical significance, using a Bonferroni adjusted alpha level of .025, was overall action scale score for $F(9, 162) = 3.41, p = .019$. An inspection of the mean scores indicated that white 35-44 year old faculty members reported slightly higher levels of action (M

= 3.77, SD = .719) than non-white (M = 2.63, SD = 1.71). Table 6 presents the means and standard deviation of the overall scale scores for ethnic and age group.

Table 6
Mean and Standard Deviation of Faculty Ethnicity and Age Group

Overall Scale	Ethnicity	Age Group	Mean	Std. Deviation	N		
ATT	people of European descent	25-34	5.01	.866	11		
		35-44	5.59	.751	30		
		45-54	5.11	.674	40		
		55-64	4.93	.643	55		
		65+	4.97	.546	26		
		Total	5.11	.708	162		
	people of color	25-34	5.45	.313	3		
		35-44	5.29	.832	2		
		45-54	5.34	.056	2		
		55-64	4.84	.758	2		
		Total	5.25	.492	9		
		ACT	people of European descent	25-34	3.32	.532	11
				35-44	3.77	.719	30
				45-54	3.41	.528	40
55-64	3.30			.511	55		
65+	3.35			.383	26		
Total	3.42			.564	162		
people of color	25-34		3.73	.485	3		
	35-44		2.63	1.714	2		
	45-54		2.84	.593	2		
	Total		3.54	.250	2		
		Total	3.24	.850	9		

Question Two: What are the differences in students’ attitudes toward and perceptions of faculty actions associated with UDL principles and practices in the classroom based upon gender, disability status, ethnicity, and age?

To answer research question two, a series of Multivariate Analyses of Variances (MANOVA’s) were performed. Two dependent variables were used: (a) overall scale score for attitudes consisting of the six attitude subscale scores (i.e., accommodations, accessible course

materials, course modifications, inclusive lecture strategies, multiple means of presentation, inclusive assessment) and (b) overall scale score for actions consisting of the six attitude subscale scores (i.e., accommodations, accessible course materials, course modifications, inclusive lecture strategies, multiple means of presentation, inclusive assessment). The independent variables were age, gender, ethnicity, and disability status. Similar to faculty variables, due to insufficient sample size, age and ethnicity were regrouped. The variable age was regrouped from continuous item into three groups (i.e., 18-24, 25-34, 35+). The variable ethnicity was regrouped from 8 items into two groups (i.e., people of European descent and people of color).

In order to check whether the assumptions of MANOVA were met, preliminary assumption testing for normality, linearity, univariate and multivariate outliers, homogeneity of variance/covariance were conducted. No significant violation were found. There were no statistically significant differences between the results. Table 7 and 8 presents the means and standard deviation of the overall scale scores for student gender and disability status, and student ethnicity and age group.

Table 7

Mean and Standard Deviation of Student Gender and Disability Status

Overall Scale	Gender	SwD SwoD	Mean	Std. Deviation	N
ATT	Male	I am a student with a disability	5.46	.769	22
		I am a student without a disability	5.26	.896	75
	Female	I am a student with a disability	5.65	.760	37
		I am a student without a disability	5.49	.773	311
ACT	Male	I am a student with a disability	3.26	.416	22
		I am a student without a disability	3.01	.729	75
	Female	I am a student with a disability	3.07	.764	37
		I am a student without a disability	3.02	.740	311

Table 8

Mean and Standard Deviation of Student Ethnicity and Age Group

Overall Scale	Ethnicity	Age Group	Mean	Std. Deviation	N
ATT	people of European descent	18-24	5.34	.857	147
		25-34	5.30	.703	47
		35+	5.42	.737	67
	people of color	18-24	5.74	.683	100
		25-34	5.41	.787	43
		35+	5.56	.874	41
ACT	people of European descent	18-24	2.97	.699	147
		25-34	3.09	.637	47
		35+	2.88	.493	67
	people of color	18-24	3.18	.796	100
		25-34	3.11	.741	43
		35+	3.07	.945	41

Question Three: To what degree are there differences in faculty and students’ attitudes and actions pertaining to UDL principles and practices in the classroom?

To answer research question three, one Multivariate Analyses of Variance (MANOVA’s) were performed on a merged data set consisting of faculty and student data. A new independent variable “academic status” (i.e., faculty, student) was created based the new data set. The overall attitude and action scale scores for faculty and students were again used as dependent variables for this analysis. In order to check whether the assumptions of MANOVA were met, preliminary assumption testing for normality, linearity, univariate and multivariate outliers, homogeneity of variance/covariance were conducted. No significant violation were found. There were no statistically significant differences between the results. Table 9 presents the means and standard deviation of the overall scale scores for academic status.

Table 9
Mean and Standard Deviation of Academic Status

Overall Scale	Academic Status	Mean	Std. Deviation	N
ATT	Faculty	5.09	.716	177
	Student	5.46	.795	449
ACT	Faculty	3.40	.576	177
	Student	3.04	.726	449

Continuing the work of Lombardi et al., (2011), this researcher further examined the differences in faculty and students’ attitudes towards inclusive instruction and whether they differed from their actions. Since items on the attitude and action scores were scaled differently, this researcher recoded the attitude and action responses to resemble No/Maybe/Yes categories. For the attitude response scale, responses were coded 1 (*strongly disagree*) and 2 (*somewhat disagree*) as 1 (*no*) responses. Responses 3 (*somewhat disagree*) and 4 (*somewhat agree*) were coded as 2 (*maybe*), and responses 5 (*agree*) and 6 (*strongly agree*) were coded as 3 (*yes*). For the action response scale, responses 1 (*I don’t know*) to 2 (*never*) were coded as 1 (*no*) because

these responses indicated that students did know if the instructor carried out the specific action represented by the item. Response 3 (*sometimes*) was coded as 2 (*maybe*), and responses 4 (*most of the time*) and 5 (*always*) were coded as 3 (*yes*). Table 10 and 11 shows the frequencies and percentage of faculty and students' attitude and action responses on UDL subscales and results of chi-square analysis response category.

Table 10
Frequencies and Percentages of Faculty and Students Attitude Responses on UDL Subscales and Results of Chi Square Analysis.

Subscale	Faculty Attitude			Students Attitude			χ^2
	No	Maybe	Yes	No	Maybe	Yes	
Accommodations	78 (44%)	13 (7%)	88 (49%)	131 (29%)	43 (10%)	275 (61%)	11.98*
Accessible Course Materials	40 (22%)	14 (8%)	125 (70%)	51 (11%)	28 (6%)	370 (83%)	13.71**
Course Modifications	91 (51%)	11 (6%)	77 (43%)	35 (8%)	28 (6%)	386 (86%)	150.20**
Inclusive Lecture Strategies	1 (<1%)	2 (1%)	176 (98%)	10 (2%)	30 (7%)	409 (91%)	10.52*
Multiple Means of Presentation	4 (2%)	8 (5%)	167 (93%)	24 (5%)	34 (8%)	391 (87%)	5.17
Inclusive Assessment	93 (52%)	22 (12%)	64 (36%)	91 (20%)	61 (13%)	297 (66%)	64.59**

Note. df=2 for all chi-square tests

* p.< .05, **p.< .001.

Table 11

Frequencies and Percentages of Faculty and Students Action Responses on UDL Subscales and Results of Chi Square Analysis.

Subscale	Faculty Action			Students Action			χ^2
	No	Maybe	Yes	No	Maybe	Yes	
Accommodations	100 (56%)	25 (14%)	54 (30%)	303 (68%)	54 (12%)	92 (20%)	8.23*
Accessible Course Materials	40 (22%)	55 (30%)	83 (46%)	110 (25%)	149 (33%)	190 (42%)	.986
Course Modifications	77 (43%)	54 (30%)	48 (26%)	201 (45%)	115 (26%)	133 (29%)	1.42*
Inclusive Lecture Strategies	3 (2%)	19 (11%)	157 (88%)	40 (9%)	132 (29%)	277 (62%)	41.09**
Multiple Means of Presentation	12 (7%)	38 (21%)	129 (72%)	70 (16%)	127 (28%)	252 (56%)	15.52**
Inclusive Assessment	121 (68%)	32 (18%)	26 (14%)	253 (56%)	127 (21%)	103 (23%)	7.65*

Note. df=2 for all chi-square tests

* p.< .05, **p.< .001.

CHAPTER 5: DISCUSSION

The purpose of the current study was to examine faculty and student attitudes toward and actions associated with inclusive teaching based on UDL principles and practices on a community college campus. This study relied on quantitative methodology for data collection, analysis and presentation of the results. The three research questions that guided this study were:

1. What are the differences in faculty self-reported attitudes toward and actions associated with UDL principles and practices in the classroom based upon age, gender, ethnicity, position type, academic discipline, academic rank and amount of teaching experience?
2. What are the differences in students' attitudes toward and perceptions of faculty actions associated with UDL principles and practices in the classroom based upon gender, disability status, ethnicity, and age?
3. To what degree are there differences in faculty and students' attitudes and actions pertaining to UDL principles and practices in the classroom?

The research questions were explored through two survey instruments. The Inclusive Teaching Strategies Inventory (ITSI) and the Inclusive Teaching Strategies Inventory-Student (ITSI-S). Both surveys contained similar items that aimed to capture the attitudes and actions of faculty and students associated with inclusive instruction based on UDL principles in the classroom (Appendix D, E).

The population for this study consisted of faculty teaching credit courses and students enrolled in credit courses at a Northeastern Community College during the spring 2014 semester.

Of the 6,296 individuals who were asked to participate in the study 179 faculty members and 449 students responded and were used in the data analysis.

The previous chapter reviewed results from the data analysis. This chapter will discuss research findings, implications for practice and recommendations for future research.

Limitations of the current study will also be discussed.

Study Findings

Question One

The purpose of research question one was to examine faculty members' self-reported attitudes toward and actions associated with inclusive instruction based on UDL principles in the classroom. Levels of each independent variable (i.e., age, gender, ethnicity, position type, academic discipline, academic rank and amount of teaching experience) were compared in order to examine these differences. The results of these analyses showed a statistically significant difference in overall action scale scores based on faculty age and ethnicity. Participants who reported as 35-44 years old and of European decent had slightly higher overall action scale scores than faculty members of color. These findings suggest that faculty demographic characteristics, specifically age and ethnicity, play a small role in predicting faculty actions in the classroom regarding inclusive instruction at this institution. These findings are not reflected in previous research on faculty attitudes and actions towards inclusive instruction (Lombardi et al., 2013; Lombardi et al., 2011; Lombardi, Murray, 2011).

Non-significant findings on faculty attitudes and actions toward inclusive instructional practices at this institution showed obvious disagreement. For example, faculty reported more favorable attitudes that inclusive instruction based on UDL were important yet reported they never or sometimes carry out these practices in the classroom. Disagreement between this

finding could be due to the fact that while faculty believe these practices are important they lack the knowledge and practical skills necessary to implement inclusive teaching practices in the classroom. Furthermore, there is no specific explanation why these results differed from previous studies (Lombardi et al., 2013; Lombardi et al., 2011; Lombardi & Murray, 2011) except to consider the different environmental context as a major factor in influencing faculty actions towards inclusive instruction. Previous studies that examined faculty attitudes and actions towards disability and inclusive instruction (Lombardi et al., 2013; Lombardi et al., 2011; Lombardi & Murray, 2011) were conducted at medium to large, public research universities located in the Midwestern and Pacific Northwest U.S. This finding suggests the importance of further inquiry as to the specific barriers faculty might encounter and if and when they attempt to carry out actions related to inclusive instruction.

No significant findings were found regarding Amount of Teaching Experience. This finding is consistent with previous studies on faculty attitudes toward accommodations (Lombardi et. al., 2011) where no significant results were found based on amount of teaching experience. No significant findings were found regarding Academic Discipline. This finding is inconsistent with previous studies on faculty attitudes toward UDL and accommodations (Lombardi & Murray, 2011; Murray et. al., 2008; Lombardi et. al., 2011). This could be due to the fact that individual departments were condensed into divisions and some of the specificity was lost during the analysis. It would be helpful to know more about the particular differences between academic departments. For example, it is possible that faculty in the Education or Health Professions departments are more willing to carry out actions related to inclusive teaching practices because they believe in UDL as an instructional delivery method. No significant findings were noted when comparing teaching status (i.e., full-time, part-time). No previous

studies on faculty attitudes toward UDL had compared these two variables. Lombardi and Murray (2011) included full-time and faculty teaching half-time in their study because they assumed they had the most impact on teaching. However, the researchers did not look at specific differences between the two variables.

Question Two

The purpose of research question two was to examine students' attitudes toward and perceptions of faculty actions associated with inclusive instruction based on UDL principles in the classroom. Levels of each independent variable (i.e., age, gender, ethnicity, and disability status) were compared in order to examine these differences. The results of these analyses showed no statistically significant relationship between students' overall attitude and action scale scores based on gender and disability status, and student ethnicity and age group. There are no previous findings that students' age, gender, ethnicity, and disability status influence their attitudes toward and perceptions of faculty actions associated with UDL principles in community college environment.

Non-significant findings on student attitudes and actions toward inclusive instructional practices at this institution showed obvious disagreement. These findings are consistent with faculty results. For example, students' reported more favorable attitudes that inclusive instruction based on UDL were important yet reported they never or sometimes observed faculty carry out these practices in the classroom. Disagreement between this finding could be due to the fact that while students believe these practices are important faculty lack the knowledge and practical skills necessary to implement inclusive teaching practices in the classroom.

Similar to a pilot study utilizing the ITSI-S and previous studies using the ITSI (Lombardi et. al., 2011) show that the ITSI-S can be used as a tool for examining students'

attitudes and perceptions of faculty actions associated with inclusive instruction. Most importantly, this is the first study to use the ITSI-S survey to examine community college students' attitudes toward and perceptions of faculty actions associated with UDL principles.

Previous research on comparing student perceptions of instructor teaching methods report that undergraduate students at a large research university located in the Midwest reported a positive change in instructors' use of UDL strategies after five hours of instruction on the use of UDL principles and teaching strategies (Schelly, Davies, & Spooner, 2011, 2013). While several studies examined the effectiveness of UDL implementation in 4-year colleges and universities, very few, if any have been done in community colleges (Lombardi et al., 2011; McGuire & Scott, 2003; Parker et al., 2007; Rao, & Tanners, 2011; Schelly et al., 2011, 2013; Spooner et al., 2007). This study shows the first step towards examining students' attitudes and perceptions towards inclusive instruction on a community college campus. Such assessment can lead to new understanding and targeted interventions that will enhance overall quality of education received by all students, including those with diverse learning needs, especially those with disabilities.

Question Three

The purpose of research question two was to examine differences in faculty and students' attitudes and actions associated with inclusive instruction based on UDL principles in the classroom. Levels of the independent variable academic status (i.e., faculty, student) were compared in order to examine these differences. The results of this analysis indicated there were no statistically significant differences in overall attitude and action scale scores based on academic status. Consistent with previous findings, results showed a discrepancy between overall attitude and action scale scores toward inclusive instructional practices at this institution. For example, faculty and students' positively endorsed or agreed that inclusive instruction based

on UDL were important yet reported they only sometimes implement these practices in the classroom. Further comparison of UDL subscale scores showed consistent results for attitudes and actions toward inclusive instruction on Accommodations, Accessible Course Materials, Inclusive Lecture Strategies, and Multiple Means of Presentation, suggesting that many faculty and students believe they are both important and are acting/seeing them implemented in the classroom. A different pattern emerged from the Course Modifications and Inclusive Assessment subscales. Results showed that many faculty reported they did not believe these practices were important yet many students' reported the opposite view. Both faculty and students reported these practices were not carried out in the classroom. This result may be due to the fact that Inclusive Assessment subscale includes items that faculty may perceive as more challenging to integrate into their teaching practices. For example, Inclusive Assessment items asked about alternate exam formats, an area where faculty may feel that the standards of their course would be compromised. These findings are consistent with previous studies on faculty attitudes toward UDL and accommodations (Lombardi & Murray, 2011; Murray et. al., 2008; Lombardi et. al., 2011) that found faculty were resistant to carry out actions related to inclusive assessment.

As previously stated in the research, Lombardi, Murray and Gerdes, (2011) recommended the development of a parallel student version of the ITSI so that faculty and student perceptions of inclusive teaching can be measured and compared. Consistent with recommendations from previous research, this study is the first to utilize the ITSI and ITSI-S to compare faculty and students perceived the importance of and specific behaviors related to inclusive instruction. While findings were limited, further research of this nature is needed on these two different major stakeholder groups. Because research on community college faculty

and students is so limited in the area this study provides a platform for future research and discussions.

Implications for Practice

The results of this study have a variety of implications for postsecondary education environments, especially community colleges. Results of the current study may be used to add to the literature and discussion of UDL in postsecondary education, especially community colleges. Both the ITSI and ITSI-S are believed to be the first assessments to directly measure teaching practices based on universal design framework (Lombardi et. al., 2011). Using these instruments to examine community college faculty and students could be useful to other researchers interested in examining the overall feel for the campus climate, and attitudes and actions toward inclusive instruction at their own institutions. Regardless of 2-year or 4-year institutions, this study was the first of its kind in comparing the overall faculty and students' attitudes and actions toward inclusive instruction. Furthermore, results could be used to share with administrators or individuals responsible for faculty development. Educating faculty in not only the implementation of UDL teaching techniques but assessment of successfully implementing pedagogical improvements is essential to closing the loop, and documenting enhanced student learning.

Postsecondary stakeholders, such as Deans and Administrators, in an era of budget cuts and reduced public funding for postsecondary education, must make practical decision when allocating resources for faculty training. Information from the survey instruments may be helpful when proceeding with targeting training for faculty on UDL and creating specific training materials or types of training needed in postsecondary settings, especially community colleges. The type of targeted training to increase faculty knowledge and promote inclusive

practices can take various formats. These formats could include on campus workshops, online self-paced courses, webinars, video tutorials and local or national conferences.

Limitations

As with most research studies, this study had several limitations. First, the survey instruments used for the study were distributed one time, electronically, at one specific community college located in the northeast of the United States. Therefore, results may not be generalizable to other community colleges. Second, survey research has the potential for response bias, where the respondents misinterpret or misunderstand survey questions. The ITSI and ITSI-S are self-report surveys, which allow for the potential of response bias or even dishonest responses. Thus, faculty and students may have misunderstood or chosen to misrepresent their beliefs, even if it was not the most honest response. This bias was addressed by assuring confidentiality to participants, however, the potential for respondent bias is important to consider in interpreting study results. Third, unlike previous research on faculty perceptions of UDL (Lombardi et al., 2011; Lombardi et al., 2013; Sprong et al., 2014) this study did not report subscale scores but rather regrouped them into overall attitude and action scale scores. Although the results provided a global sense of faculty and students' attitudes and perceptions toward inclusive instruction, much of the detail of this information was not explored. A fourth limitation is the use of a new quantitative instrument, the ITSI-S, which has not gone through a full development of its validity and reliability. Similar to the ITSI, which shows evidence of reliability and validity, the ITSI-S was developed to measure student attitudes and perceptions toward inclusive instruction based on UDL. Thus, like the ITSI, the ITSI-S should undergo similar evaluation of its psychometric characteristics. Finally, this study did not have the capacity to match faculty to the students in their classrooms. Efforts to address such challenges

were beyond the scope of this study. In this investigation, efforts focused on examining an overall campus climate including faculty and students' attitudes toward and perceptions of inclusive instruction on a community college campus.

Recommendations for Future Research

Further research is recommended on UDL in order to further understand the potential benefit to all students across postsecondary education, especially community colleges. Due to the lack of research on faculty and student beliefs and behaviors associated with UDL principles and practices in community college environments replication of the current study is recommended at other community colleges. Similar studies could include comparisons of faculty and students at different institutions (i.e., rural, suburban; public, private). Although not performed in this study, future research in community college environments could match faculty to students in their classrooms they are teaching.

Although the Inclusive Teaching Strategies Inventory-Student (ITSI-S) survey is adapted from a previous instrument (Lombardi et. al., 2011) and as previously stated, examination of internal consistency on the entire instrument and within subscales was conducted in a pilot study and in the current study, it is important to consider the preliminary stages of development of this instrument. In this study, some items were rewritten and more than one survey administration will be necessary to confirm the factor structure. Future studies could focus on exploring the validity and reliability of the newly formed ITSI-S survey. For further study, a qualitative component could be added to each of the instruments for clarification of results.

Examining differences between faculty and student groups, as well as comparing faculty and student perceptions may lead to new findings regarding effectiveness of UDL for improving outcomes for all postsecondary students, including those with diverse learning needs and

disabilities. Moreover, by examining community college classroom instructional environments from the perspective of students, we can gain a better understanding of how they view their classroom instruction and curriculum in the context of UDL.

Personal Observation/Conclusion

With the increase of student diversity on college campuses comes an increase in the diversity of student learning styles, preferences, and abilities. There is great need for instructional strategies and techniques to be integrated into the classroom environment that will meet the learning needs of a broad range of students, and the need for programs to provide innovative and effective ways of providing training in these methods to community college faculty and staff.

This is the first large-scale study on overall faculty and students' attitudes and perceptions of inclusive instruction in the context of universal design for learning in a community college environment. This study contributes to the growing knowledge base of existing literature, and begins to shed some light on the overall climate of the perceptions and experiences of faculty and students on one community college campus.

Universal Design for Learning has the potential to improve instructional delivery for all students, especially those with diverse learning styles and from historically underrepresented populations. When I think back to this study, and the relevance it has with regards to diversity, and inclusion, I am reminded how important this subject will be for years to come. Community colleges cannot afford to turn a blind eye increasing student diversity and diverse learners. Meanwhile, the more faculty are prepared to meet a wide variety of student ability levels, through the use of UDL, the more effective their teaching practices will be to ensure diverse learners receive an equitable and high quality postsecondary education. Given the changing

nature of today's college student body and increasing diversity on college campuses, many students struggle with issues of persistence, retention, and degree completion. To help improve rates of persistence, retention and degree completion for such a diverse student body, the focus needs to shift to acceptance of UDL as a widely accepted instructional framework making it possible for many more students to be successful in postsecondary education.

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APPENDICES

APPENDIX A



Research Integrity & Compliance Review Office
Office of Vice President for Research
Fort Collins, CO 80523-2011
(970) 491-1553
FAX (970) 491-2293

Date: February 24, 2014

To: Linda Kuk, Education
Michael Gawronski, Education



From: Janell Barker, IRB Coordinator

Re: University Design for Learning: Perceptions of Faculty and Students at a
Northeastern Community College

IRB ID: 033-15H Review Date: February 24, 2014
This project is valid from three years from the review date.

The Institutional Review Board (IRB) Coordinator has reviewed this project and has declared the study exempt from the requirements of the human subject protections regulations as described in 45 CFR 46.101(b)(2): Research involving the use of educational tests,....survey procedures, interview procedures or observation of public behavior, unless: a) information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects.

The IRB determination of exemption means that:

- **This project is valid for three years from the initial review.** After the three years, the file will be closed and no further research should be conducted. If the research needs to continue, please let the IRB Coordinator know before the end of the three years. You do not need to submit an application for annual continuing review.
- You must carry out the research as proposed in the Exempt application, including obtaining and documenting (signed) informed consent if stated in your application or if required by the IRB.
- Any modification of this research should be submitted to the IRB through an email to the IRB Coordinator, prior to implementing any changes, to determine if the project still meets the Federal criteria for exemption.
- Please notify the IRB Coordinator if any problems or complaints of the research occur.

Please note that you must submit all research involving human participants for review by the IRB. Only the IRB or designee may make the determination of exemption, even if you conduct a similar study in the future.

APPENDIX B

SUNY ORANGE IRB
Human Subject Research

Exempt from Full IRB Review Form

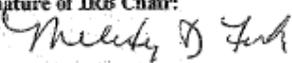
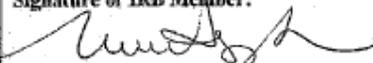
RESPONSIBILITIES OF THE PRINCIPAL INVESTIGATOR:

- Any additions or changes in procedures in the protocol will be submitted to the IRB for written approval prior to these changes being implemented using the Revision to Research Form
- Any adverse events or problems connected with the use of human subjects once the project has begun must be communicated immediately to the IRB Chair using the Reporting an Adverse Event Form.
- The principal investigator is responsible for retaining informed consent documents for a period of three years after the project.
- The principal investigator assures the IRB that he/she will follow the principles, procedures and guidelines established in the present document and agrees to allow the IRB access to pertinent records or research.
- The principal investigator will present all information that will aid in evaluating the research for compliance with this policy.
- The principal investigator is responsible for completing the periodic review using the Periodic Review & Continuing Research Form

Michael Gawronski
Principal Investigator Signature

02/24/14

Co-Investigator/Student Signature (if appropriate)

Signature of IRB Chair: 	Date: <u>2/25/14</u>		
Signature of IRB Member: 	Date: <u>2/25/14</u>		
IRB Chair: Check 1 box:	<input checked="" type="checkbox"/> Approved	<input type="checkbox"/> Approved with stipulations	<input type="checkbox"/> Not Approved

Deferred

Periodic Review Due Sept 22, 2014
Comments from IRB Chair/IRB Member:

APPENDIX C

Permission to use Instrument

From: Michael Gawronski
Sent: Friday, January 25, 2013 12:48 PM
To: Lombardi, Allison
Subject: Ph.D. Research Interest

Hello Dr. Lombardi,

My name is Mike Gawronski. I'm currently enrolled in the Ph.D., Higher Education Leadership Program at Colorado State University. My professional background is in Occupational Therapy and I work at Orange County Community College in Middletown, NY where I serve as Academic Associate Vice President for the Health Professions Division.

In general, my research interests involve exploring higher education experiences of students with disabilities, particularly the relationships between faculty, students, services, assistive technologies and Universal Design for Learning.

I have read your publications and am very interested in speaking to you about: (1) with your permission, using the Inclusive Teaching Strategies Inventory (ITSI), or the College Students with Disabilities Campus Climate (CSDCC) survey and (2) if interested, serving as an affiliate dissertation committee member, given your area of expertise and my research interests.

Thank you for your time. I look forward to speaking with you.

Sincerely,
Mike

On Friday, January 25, 2013 at 3:48 PM, Allison Lombardi wrote:

Hi Michael,

Thanks for your interest in my research, especially the ITSI and the CSDCC survey. You have my permission to use both instruments. Given your interest in both measures and request for my involvement in your committee, perhaps we should set up a time to chat over the phone.

How about sometime next week? The best days for me are Wednesday 1/30 and Friday 2/1. Let me know if either of those days work for you, and if so, some possible times.

Thanks again and I look forward to speaking with you,
Allison

APPENDIX D

Inclusive Teaching Strategies Inventory (ITSI)

The title of this study is: *Universal Design for Learning: Perceptions of Faculty and Students at a Northeastern Community College*. The survey you will be taking is titled: *Inclusive Teaching Strategies Inventory (ITSI)*. It should take you approximately 15 minutes to complete.

The purpose of the study is to measure faculty and student perceptions regarding instructional techniques based on principles of Universal Design for Learning (UDL). UDL is a set of principles for curriculum development that give all individuals equal opportunities to learn. Inclusive teaching methods, such as posting course notes online, are becoming easier to implement with the use of technology and have potential benefits for a diverse student population. Your participation is *vital* in order to understand faculty perceptions of utilizing inclusive teaching methods in the classroom.

This survey is set up with a "save and continue" option. This will allow you to save and continue the survey later. Please note: this option will only work as long as you return to the survey on the same Internet browser and computer you started the survey on. To thank you for completing the entire survey, you will have the opportunity to enter a drawing for a gift card.

This study is anonymous. For this study, we are not obtaining your name or other identifiable data from you, so nobody (not even the research team) will be able to identify you or your data.

If you have questions at any time about the study or the procedures, you may contact the principal investigator, Dr. Linda Kuk, Associate Professor, School of Education via email at: linda.kuk@colostate.edu or via phone at: 970-491-5160. Additionally, if you would like background information on the ITSI survey, a paper copy to fill out and return, or a copy of the current study results please contact the co-principal investigator via email at: michael.gawronski@sunyorange.edu or via phone at: 845-341-4284

Please answer the following questions about your background:

Are you:

- Male
- Female

Please indicate your ethnic background:

- African American/Black (non-Hispanic)
- American Indian/Alaskan Native
- Asian
- Native Hawaiian/Pacific Islander
- Caucasian/White (non-Hispanic)
- Hispanic/Latino
- Multi-ethnic

- Other, please specify:

Your age:

Is your position classified as:

- Full-Time
- Part-Time

What academic department do you primarily teach in?

- Applied Technologies
- Arts and Communications
- Behavioral Science
- Biology
- Business
- Criminal Justice
- Dental Hygiene
- Diagnostic Imaging
- Education
- English
- Global Studies
- Interdisciplinary Studies
- Laboratory Technology
- Mathematics
- Movement Science
- Nursing
- Occupational Therapy Assistant
- Physical Therapist Assistant
- Science, Engineering, Architecture
- Other

Number of years of teaching experience:

- 0 - 4
- 5 - 9
- 10 - 14
- 15 - 19
- 20 - 24
- 25 +

Please indicate your rank:

- Instructor
- Assistant Professor
- Associate Professor
- Professor
- Other, please specify

Directions: Please rate the following statements about your beliefs (i.e., I believe it's important to...)

(1 = strongly disagree; 2 = disagree; 3 = somewhat disagree; 4 = “I have not thought about this”;
5 = somewhat agree; 6 = agree; 7 = strongly agree)

1. allow students with documented disabilities to use technology (e.g. laptop, calculator, spell checker) to complete tests even when such technologies are not permitted for use by students without disabilities.

1 2 3 4 5 6 7

2. provide copies of my lecture notes or outlines to students with documented disabilities.

1 2 3 4 5 6 7

3. provide copies of my overhead and/or PowerPoint presentations to students with documented disabilities.

1 2 3 4 5 6 7

4. allow flexible response options on exams (e.g. change from written to oral) for students with documented disabilities.

1 2 3 4 5 6 7

5. allow students with documented disabilities to digitally record (audio or visual) class sessions.

1 2 3 4 5 6 7

6. make individual accommodations for students who have disclosed their disability to me.

1 2 3 4 5 6 7

7. arrange extended time on exams for students who have documented disabilities.

1 2 3 4 5 6 7

8. extend the due dates of assignments to accommodate the needs of students with documented disabilities.

1 2 3 4 5 6 7

9. use a course website (e.g. Angel, Blackboard or faculty web page)

1 2 3 4 5 6 7

10. put my lecture notes online for ALL students (on Angel, Blackboard or another website)

1 2 3 4 5 6 7

11. post electronic versions of course handouts

1 2 3 4 5 6 7

12. allow students flexibility in submitting assignments electronically (e.g. mail attachment, digital drop box)

1 2 3 4 5 6 7

13. allow a student with documented disability to complete extra credit assignments

1 2 3 4 5 6 7

14. reduce the overall course reading load for a student with a documented disability even when I would not allow a reduced reading load for another student

1 2 3 4 5 6 7

15. reduce the course reading load for ANY student who expresses a need

1 2 3 4 5 6 7

16. allow ANY student to complete extra credit assignments

1 2 3 4 5 6 7

17. repeat the question back to the class before answering when a question is asked during a class session

1 2 3 4 5 6 7

18. begin each class session with an outline/agenda of the topics that will be covered

1 2 3 4 5 6 7

19. summarize key points throughout each class session

1 2 3 4 5 6 7

20. connect key points with larger course objectives during class sessions

1 2 3 4 5 6 7

21. use technology so that my course material can be available in a variety of formats (e.g.

podcast of lecture available for download, course readings available as mp3 files)

1 2 3 4 5 6 7

22. use interactive technology to facilitate class communication and participation (e.g.

Discussion Board)

1 2 3 4 5 6 7

23. present course information in multiple formats (e.g. lecture, text, graphics, audio, video,

hands-on exercises)

1 2 3 4 5 6 7

24. create multiple opportunities for engagement

1 2 3 4 5 6 7

25. survey my classroom in advance to anticipate any physical barriers

1 2 3 4 5 6 7

26. include a statement in my syllabus inviting students with disabilities to discuss their needs

with me

1 2 3 4 5 6 7

27. make a verbal statement in class inviting students with disabilities to discuss their needs with me

1 2 3 4 5 6 7

28. use a variety of instructional formats in addition to lecture, such as small groups, peer assisted learning, and hands on activities

1 2 3 4 5 6 7

29. supplement class sessions and reading assignments with visual aids (e.g. photographs, videos, diagrams, interactive simulations)

1 2 3 4 5 6 7

30. allow students to demonstrate the knowledge and skills in ways other than traditional tests and exams (e.g. written essays, portfolios, journals)

1 2 3 4 5 6 7

31. allow students to express comprehension in multiple ways

1 2 3 4 5 6 7

32. be flexible with assignment deadlines in my course(s) for ANY student who expresses a need

1 2 3 4 5 6 7

33. allow flexible response options on exams (e.g., change from written to oral) for ANY student who expresses a need

1 2 3 4 5 6 7

Directions: Please rate the following statements about your actions in the classroom (i.e., I do...)

(1 = No opportunity; 2 = Never; 3 = Sometimes; 4 = Most of the time; 5 = Always)

34. allow students with documented disabilities to use technology (e.g. laptop, calculator, spell checker) to complete tests even when such technologies are not permitted for use by students without disabilities.

1 2 3 4 5

35. provide copies of my lecture notes or outlines to students with documented disabilities.

1 2 3 4 5

36. provide copies of my overhead and/or PowerPoint presentations to students with documented disabilities.

1 2 3 4 5

37. allow flexible response options on exams (e.g. change from written to oral) for students with documented disabilities.

1 2 3 4 5

38. allow students with documented disabilities to digitally record (audio or visual) class sessions.

1 2 3 4 5

39. make individual accommodations for students who have disclosed their disability to me.

1 2 3 4 5

40. arrange extended time on exams for students who have documented disabilities.

1 2 3 4 5

41. extend the due dates of assignments to accommodate the needs of students with documented disabilities.

1 2 3 4 5

42. use a course website (e.g. Angel, Blackboard or faculty web page)

1 2 3 4 5

43. put my lecture notes online for ALL students (on Angel, Blackboard or another website)

1 2 3 4 5

44. post electronic versions of course handouts

1 2 3 4 5

45. allow students flexibility in submitting assignments electronically (e.g. mail attachment, digital drop box)

1 2 3 4 5

46. allow a student with documented disability to complete extra credit assignments

1 2 3 4 5

47. reduce the overall course reading load for a student with a documented disability even when I would not allow a reduced reading load for another student

1 2 3 4 5

48. reduce the course reading load for ANY student who expresses a need

1 2 3 4 5

49. allow ANY student to complete extra credit assignments

1 2 3 4 5

50. repeat the question back to the class before answering when a question is asked during a class session

1 2 3 4 5

51. begin each class session with an outline/agenda of the topics that will be covered

1 2 3 4 5

52. summarize key points throughout each class session

1 2 3 4 5

53. connect key points with larger course objectives during class sessions

1 2 3 4 5

54. use technology so that my course material can be available in a variety of formats (e.g. podcast of lecture available for download, course readings available as mp3 files)

1 2 3 4 5

55. use interactive technology to facilitate class communication and participation (e.g. Discussion Board)

1 2 3 4 5

56. present course information in multiple formats (e.g. lecture, text, graphics, audio, video, hands-on exercises)

1 2 3 4 5

57. create multiple opportunities for engagement

1 2 3 4 5

58. survey my classroom in advance to anticipate any physical barriers

1 2 3 4 5

59. include a statement in my syllabus inviting students with disabilities to discuss their needs with me

1 2 3 4 5

60. make a verbal statement in class inviting students with disabilities to discuss their needs with me

1 2 3 4 5

61. use a variety of instructional formats in addition to lecture, such as small groups, peer assisted learning, and hands on activities

1 2 3 4 5

62. supplement class sessions and reading assignments with visual aids (e.g. photographs, videos, diagrams, interactive simulations)

1 2 3 4 5

63. allow students to demonstrate the knowledge and skills in ways other than traditional tests and exams (e.g. written essays, portfolios, journals)

1 2 3 4 5

64. allow students to express comprehension in multiple ways

1 2 3 4 5

65. am flexible with assignment deadlines in my course(s) for ANY student who expresses a need

1 2 3 4 5

66. allow flexible response options on exams (e.g., change from written to oral) for ANY student who expresses a need

1 2 3 4 5

Thank you for your participation! It is my hope that information from this survey will be utilized to benefit postsecondary faculty as well as diverse student learners at SUNY Orange.

To thank you for completing the entire survey, you can enter into a drawing to win a \$10.00 dollar online gift card of your choice. If you choose to enter, select a gift card and enter your email address below.

(Please note: your email address will not be linked to your data). If you win, you will get an email after the survey has closed.

- I would like the chance to win an iTunes gift card
- I would like the chance to win an Amazon.com gift card

My email address is:

APPENDIX E

Inclusive Teaching Strategies Inventory-Student (ITSI-S)

The title of this study is: Universal Design for Learning: Perceptions of Faculty and Students at a Northeastern Community College. The survey you will be taking is titled: Inclusive Teaching Strategies Inventory-Student (ITSI-S). It should take you approximately 15 minutes to complete.

The purpose of the study is to measure faculty and student perceptions regarding instructional techniques based on principles of Universal Design for Learning (UDL). UDL is a set of principles for curriculum development that give all individuals equal opportunities to learn. Inclusive teaching methods, such as posting course notes online, are becoming easier to implement with the use of technology and have potential benefits for a diverse student population. Your participation is vital in order to understand student perceptions of instructors utilizing inclusive teaching methods in the classroom.

This survey is set up with a "save and continue" option. This will allow you to save and continue the survey later. Please note: this option will only work as long as you return to the survey on the same Internet browser and computer you started the survey on. To thank you for completing the entire survey, you will have the opportunity to enter a drawing for a gift card!

This study is anonymous. For this study, we are not obtaining your name or other identifiable data from you, so nobody (not even the research team) will be able to identify you or your data.

If you have questions at any time about the study or the procedures, you may contact the principal investigator, Dr. Linda Kuk, Associate Professor, School of Education via email at: linda.kuk@colostate.edu or via phone at: 970-491-5160. Additionally, if you would like background information on the ITSI survey, a paper copy to fill out and return, or a copy of the current study results please contact the co-principal investigator via email at: michael.gawronski@sunyorange.edu or via phone at: 845-341-4284

Please answer the following questions about your background

Are you:

- Male
- Female

Please indicate your ethnic background:

- African American/Black (non-Hispanic)
- American Indian/Alaskan Native
- Asian
- Native Hawaiian/Pacific Islander
- Caucasian/White (non-Hispanic)
- Hispanic/Latino
- Multi-ethnic
- Other, please specify

Your age:

The Americans with Disabilities Act defines an individual with a disability as a person who: (1) has a physical or mental impairment that substantially limits one or more major life activities; or (2)

has a record of such an impairment; or (3) is regarded as having such an impairment.

- I am a student with a disability
- I am a student without a disability

If you are a student with a disability, indicate whether you have contacted the Office of Accessibility Services (OAS) to request services/accommodations and submitted the appropriate documentation

- Yes, I have contacted the OAS and submitted the appropriate documentation
- Yes, I have contacted the OAS but have not submitted the appropriate documentation
- No, I have not contacted the OAS

What is your diagnosed disability? Check all that apply.

- ADD, ADHD
- Chronic Health Impairment
- Deaf/Hearing Impairment
- Developmental Disability
- Learning Disability
- Physical Disability
- Psychiatric Disability
- Visual Impairment (Blind/Low Vision)
- Other:

Directions: Please rate the following statements about your beliefs (i.e., I believe it's important for my instructor to...)

(1 = strongly disagree; 2 = disagree; 3 = somewhat disagree; 4 = "I have not thought about this"; 5 = somewhat agree; 6 = agree; 7 = strongly agree)

1. allow students with documented disabilities to use technology (e.g. laptop, calculator, spell checker) to complete tests even when such technologies are not permitted for use by students without disabilities

1 2 3 4 5 6 7

2. provide copies of lecture notes or outlines to students with documented disabilities

1 2 3 4 5 6 7

3. provide copies of overhead and/or PowerPoint presentations to students with documented disabilities

1 2 3 4 5 6 7

4. allow flexible response options on exams (e.g. change from written to oral) for students with documented disabilities

1 2 3 4 5 6 7

5. allow students with documented disabilities to digitally record (audio or visual) class sessions

1 2 3 4 5 6 7

6. make individual accommodations for students who have disclosed their disability to the instructor

1 2 3 4 5 6 7

7. arrange extended time on exams for students who have documented disabilities

1 2 3 4 5 6 7

8. extend the due dates of assignments to accommodate the needs of students with documented disabilities

1 2 3 4 5 6 7

9. use a course website (e.g. Angel, Blackboard or faculty web page)

1 2 3 4 5 6 7

10. put lecture notes online for ALL students (on Angel, Blackboard or another website)

1 2 3 4 5 6 7

11. post electronic versions of course handouts

1 2 3 4 5 6 7

12. allow students flexibility in submitting assignments electronically (e.g. mail attachment, digital drop box)

1 2 3 4 5 6 7

13. allow a student with documented disability to complete extra credit assignments

1 2 3 4 5 6 7

14. reduce the overall course reading load for a student with a documented disability even when the instructor would not allow a reduced reading load for another student

1 2 3 4 5 6 7

15. reduce the course reading load for ANY student who expresses a need

1 2 3 4 5 6 7

16. allow ANY student to complete extra credit assignments

1 2 3 4 5 6 7

17. repeat a question back to the class before answering when a question is asked during a class session

1 2 3 4 5 6 7

18. begin each class session with an outline/agenda of the topics that will be covered

1 2 3 4 5 6 7

19. summarize key points throughout each class session

1 2 3 4 5 6 7

20. connect key points with larger course objectives during class sessions

1 2 3 4 5 6 7

21. use technology so that course material can be available in a variety of formats (e.g. podcast of lecture available for download, course readings available as mp3 files)

1 2 3 4 5 6 7

22. use interactive technology to facilitate class communication and participation (e.g.

Discussion Board)

1 2 3 4 5 6 7

23. present course information in multiple formats (e.g. lecture, text, graphics, audio, video, hands-on exercises)

1 2 3 4 5 6 7

24. create multiple opportunities for engagement

1 2 3 4 5 6 7

25. survey the classroom in advance to anticipate any physical barriers

1 2 3 4 5 6 7

26. include a statement in the syllabus inviting students with disabilities to discuss their needs with them

1 2 3 4 5 6 7

27. make a verbal statement in class inviting students with disabilities to discuss their needs with them

1 2 3 4 5 6 7

28. use a variety of instructional formats in addition to lecture, such as small groups, peer assisted learning, and hands on activities

1 2 3 4 5 6 7

29. supplement class sessions and reading assignments with visual aids (e.g. photographs, videos, diagrams, interactive simulations)

1 2 3 4 5 6 7

30. allow students to demonstrate the knowledge and skills in ways other than traditional tests and exams (e.g. written essays, portfolios, journals)

1 2 3 4 5 6 7

31. allow students to express knowledge in multiple ways

1 2 3 4 5 6 7

32. be flexible with assignment deadlines in my course(s) for ANY student who expresses a need

1 2 3 4 5 6 7

33. allow flexible response options on exams (e.g., change from written to oral) for ANY student who expresses a need

1 2 3 4 5 6 7

Directions: Please rate the following statements about Faculty actions in the classroom

(i.e., My instructor...)

(1 = I don't know; 2 = Never; 3 = Sometimes; 4 = Most of the time; 5 = Always)

34. allows students with documented disabilities to use technology (e.g. laptop, calculator, spell checker) to complete tests even when such technologies are not permitted for use by students without disabilities.

1 2 3 4 5

35. provides copies of his/her lecture notes or outlines to students with documented disabilities.

1 2 3 4 5

36. provides copies of his/her overhead and/or PowerPoint presentations to students with documented disabilities.

1 2 3 4 5

37. allows flexible response options on exams (e.g. change from written to oral) for students with documented disabilities.

1 2 3 4 5

38. allow students with documented disabilities to digitally record (audio or visual) class sessions.

1 2 3 4 5

39. makes individual accommodations for students who have disclosed their disability.

1 2 3 4 5

40. arranges extended time on exams for students who have documented disabilities.

1 2 3 4 5

41. extends the due dates of assignments to accommodate the needs of students with documented disabilities.

1 2 3 4 5

42. uses a course website (e.g. Angel, Blackboard or faculty web page)

1 2 3 4 5

43. puts his/her lecture notes online for ALL students (on Angel, Blackboard or another website)

1 2 3 4 5

44. posts electronic versions of course handouts

1 2 3 4 5

45. allows students flexibility in submitting assignments electronically (e.g. mail attachment, digital drop box)

1 2 3 4 5

46. allows a student with documented disability to complete extra credit assignments

1 2 3 4 5

47. reduces the overall course reading load for a student with a documented disability even when he/she would not allow a reduced reading load for another student

1 2 3 4 5

48. reduces the course reading load for ANY student who expresses a need

1 2 3 4 5

49. allows ANY student to complete extra credit assignments

1 2 3 4 5

50. repeats the question back to the class before answering when a question is asked during a class session

1 2 3 4 5

51. begins each class session with an outline/agenda of the topics that will be covered

1 2 3 4 5

52. summarizes key points throughout each class session

1 2 3 4 5

53. connects key points with larger course objectives during class sessions

1 2 3 4 5

54. uses technology so that his/her course material can be available in a variety of formats (e.g. podcast of lecture available for download, course readings available as mp3 files)

1 2 3 4 5

55. uses interactive technology to facilitate class communication and participation (e.g. Discussion Board)

1 2 3 4 5

56. presents course information in multiple formats (e.g. lecture, text, graphics, audio, video, hands-on exercises)

1 2 3 4 5

57. creates multiple opportunities for engagement

1 2 3 4 5

58. surveys his/her classroom in advance to anticipate any physical barriers

1 2 3 4 5

59. includes a statement in his/her syllabus inviting students with disabilities to discuss their needs with them

1 2 3 4 5

60. makes a verbal statement in class inviting students with disabilities to discuss their needs with them

1 2 3 4 5

61. uses a variety of instructional formats in addition to lecture, such as small groups, peer assisted learning, and hands on activities

1 2 3 4 5

62. supplements class sessions and reading assignments with visual aids (e.g. photographs, videos, diagrams, interactive simulations)

1 2 3 4 5

63. allows students to demonstrate the knowledge and skills in ways other than traditional tests and exams (e.g. written essays, portfolios, journals)

1 2 3 4 5

64. allows students to express knowledge in multiple ways

1 2 3 4 5

65. is flexible with assignment deadlines in the course(s) for ANY student who expresses a need

1 2 3 4 5

66. allows flexible response options on exams (e.g., change from written to oral) for ANY student who expresses a need

1 2 3 4 5

Thank you for your participation! It is my hope that information from this survey will be utilized to benefit postsecondary faculty as well as diverse student learners at SUNY Orange.

To thank you for completing the entire survey, you can enter into a drawing to win a \$10.00 dollar online gift card of your choice. If you choose to enter, select a gift card and enter your email address below.

(Please note: your email address will not be linked to your data). If you win, you will get an email after the survey has closed.

- I would like the chance to win an iTunes gift card
- I would like the chance to win an Amazon.com gift card

My email address is

APPENDIX F

Participant Recruitment Email – Faculty/Student

Subject line: Faculty/Student Participants Needed for Research Study

Dear [Faculty/Student],

Greetings! My name is Michael Gawronski. I work at SUNY Orange as the Associate Vice President for Health Professions. Additionally, I am a doctoral candidate in the School of Education at Colorado State University, Ft. Collins, CO.

I'd like to invite you to participate in a very important survey about faculty and student perceptions regarding instructional techniques based on principles of Universal Design for Learning (UDL). UDL is a set of principles for curriculum development that give all individuals equal opportunities to learn. This study is being conducted for my doctoral dissertation. Your input will contribute to improving teaching and learning for all students.

You were selected to be a part of this project because you are a [faculty/student] at SUNY Orange. This survey is being distributed to all faculty and students at the college. I know that this is a busy time of year for you, but I hope that you will set aside just a little time to participate in this important study.

In a few days you will receive an email with a link to the survey. Please read the email, click the survey link and complete the survey. The survey will take about 15 minutes to complete. To thank you for participating, you'll be eligible to enter a raffle to win an online gift card of your choice.

Your participation is completely voluntary, but I hope you take the time to share your opinions. Your responses are anonymous. The survey data will be stored in a secure location, and will not include any personally-identifying information. Results will be reported in summary form - in no case will it be possible to determine an individual's identity.

If you have any questions about the survey, please feel free to contact me by email michael.gawronski@sunyorange.edu or phone 845-341-4284.

If you have any questions about your rights as a research participant or the administration of this survey, please contact Janell Barker, Human Research Administrator, Colorado State University by email at janell.barker@colostate.edu or phone at 970-491-1655 or Melody Festa, Chair, Institutional Review Board, SUNY Orange by email at melody.festa@sunyorange.edu or phone at 845-341-9143.

Thank you in advance for sharing your opinions in this important study!

Best Regards,

Michael Gawronski, PhD Candidate, School of Education
Colorado State University

APPENDIX G

Survey Email With Link and Informed Consent – [Faculty/Student]

Subject line: Research Study – Online Survey Reminder

Dear [Faculty/Student],

Recently, we sent you a request to participate in an important survey about faculty and student perceptions toward inclusive teaching strategies. This research study is being conducted to satisfy requirements for my doctoral dissertation in the School of Education at Colorado State University. ***You will find a link to the survey at the end of this e-mail.*** It should take approximately 15 minutes to complete.

Please consider adding your opinions and experiences to this important research project.

The title of this study is: *Universal Design for Learning: Perceptions of Faculty and Students at a Northeastern Community College*. The survey you will be taking is titled: *Inclusive Teaching Strategies Inventory (ITSI)*. The purpose of the study is to measure faculty and student perceptions regarding instructional techniques based on principles of Universal Design for Learning (UDL). UDL is a set of principles for curriculum development that give all individuals equal opportunities to learn. Inclusive teaching methods, such as posting course notes online, are becoming easier to implement with the use of technology and have potential benefits for a diverse student population. Your participation is *vital* in order to understand faculty perceptions of utilizing certain teaching methods in the classroom.

You were selected to be a part of this project because you are a [Faculty/Student] at SUNY Orange. Your participation is completely voluntary, but I hope you take the time to share your opinions. You may refuse to take part in the research or exit the survey at any time without penalty. You will receive no direct benefits from participating in this research study. However, your responses may help us learn more about faculty and student perceptions toward inclusive teaching strategies in higher education, specifically, on a community college setting.

There are no foreseeable risks involved in participating in this study other than those encountered in day-to-day life. It is not possible to identify all potential risks in research procedures, but the researcher(s) have taken reasonable safeguards to minimize any known and potential, but unknown, risks.

The survey is set up with a "save and continue" option. This will allow you to save and continue later. Please note: this option only will work as long as you return to the survey on the same Internet browser and computer you started the survey on. **To thank you for completing the entire survey you will have the opportunity to enter a drawing for a gift card!**

Your survey answers will be sent to a link at Qualtrics.com where data will be stored in a password protected electronic format. The online host will not collect identifying information such as your email address, or IP address. Therefore, your responses will remain anonymous.

No one will be able to identify you or your answers, and no one will know whether or not you participated in the study. Results will be reported in summary form - in no case will it be possible to determine an individual's identity. If you decide to participate in the study, you may withdraw your consent and stop participation at any time without penalty.

If you have questions at any time about the study or the procedures, you may contact my research supervisor and principal investigator Dr. Linda Kuk, Associate Professor, School of Education via email at: linda.kuk@colostate.edu or via phone at: [970-491-5160](tel:970-491-5160). Additionally, please contact me anytime if you would like background information on the ITSI survey, a paper copy to fill out and return, or a copy of the current study results. I am considered the co-principal investigator and can be reached via email at: michael.gawronski@sunyorange.edu or via phone at: [845-341-4284](tel:845-341-4284)

If you have any questions about your rights as a research participant or the administration of this survey, please contact Janell Barker, Human Research Administrator, Colorado State University by email at janell.barker@colostate.edu or phone at [970-491-1655](tel:970-491-1655) or Melody Festa, Chair, Institutional Review Board, SUNY Orange by email at melody.festa@sunyorange.edu or phone at [845-341-9143](tel:845-341-9143).

By clicking "Survey Link" below you acknowledge that you have read and understand that:

- Your participation in this survey is voluntary. You may withdraw your consent and discontinue participation in the study at any time. Your refusal to participate will not result in any penalty. You have given consent to be a subject of this research.

Click here to take the survey: [Inclusive Teaching Strategies Inventory \(ITSI\)](#)

Thank you for participating in this important survey of community college faculty and students.

Sincerely,

Michael Gawronski
Ph.D. candidate
School of Education
Colorado State University
michael.gawronski@sunyorange.edu
[\(845\) 341-4284](tel:845-341-4284)

Dr. Linda Kuk
Associate Professor
School of Education
Colorado State University
linda.kuk@colostate.edu
[\(970\) 491-7243](tel:970-491-7243)

APPENDIX H

E-Mail Reminders For Non-Respondents

Subject Line: Survey Reminder

Reminder #1 [Take 10-minutes of your time to complete the ITSI survey and enter a drawing to win a gift card!]

Reminder #2 [Take 10-minutes of your time to complete the ITSI-S survey and enter a drawing to win a gift card!]

Reminder #3 [If you have not taken the survey - we really need your assistance & participation!]

Reminder #4 [If you have not taken the survey - we really need your assistance & participation!]

Greetings!

If you have already taken the survey - thank you very much for your participation!

A few weeks ago, we sent you a request to participate in an important survey about faculty and student perceptions toward inclusive teaching strategies. This research study is being conducted to satisfy requirements for my doctoral dissertation in the School of Education at Colorado State University. **You will find a link to the survey at the end of this e-mail.** It should take approximately 10 minutes to complete.

Please consider adding your opinions and experiences to this important research project.

The title of this study is: *Universal Design for Learning: Perceptions of Faculty and Students at a Northeastern Community College*. The survey you will be taking is titled: *Inclusive Teaching Strategies Inventory (ITSI)*. The purpose of the study is to measure faculty and student perceptions regarding instructional techniques based on principles of Universal Design for Learning (UDL). UDL is a set of principles for curriculum development that give all individuals equal opportunities to learn. Inclusive teaching methods, such as posting course notes online, are becoming easier to implement with the use of technology and have potential benefits for a diverse student population. Your participation is *vital* in order to understand faculty perceptions of utilizing certain teaching methods in the classroom.

You were selected to be a part of this project because you are a faculty member at SUNY Orange. Your participation is completely voluntary, but I hope you take the time to share your opinions. You may refuse to take part in the research or exit the survey at any time without penalty. You will receive no direct benefits from participating in this research study. However, your responses may help us learn more about faculty and student perceptions toward inclusive teaching strategies in higher education, specifically, on a community college setting.

There are no foreseeable risks involved in participating in this study other than those encountered in day-to-day life. It is not possible to identify all potential risks in research procedures, but the

researcher(s) have taken reasonable safeguards to minimize any known and potential, but unknown, risks.

The survey is set up with a "save and continue" option. This will allow you to save and continue later. Please note: this option only will work as long as you return to the survey on the same Internet browser and computer you started the survey on. To thank you for completing the entire survey you will have the opportunity to enter a drawing for a gift card!

Your survey answers will be sent to a link at Qualtrics.com where data will be stored in a password protected electronic format. The online host will not collect identifying information such as your email address, or IP address. Therefore, your responses will remain anonymous. No one will be able to identify you or your answers, and no one will know whether or not you participated in the study. Results will be reported in summary form - in no case will it be possible to determine an individual's identity. If you decide to participate in the study, you may withdraw your consent and stop participation at any time without penalty.

If you have questions at any time about the study or the procedures, you may contact my research supervisor and principal investigator Dr. Linda Kuk, Associate Professor, School of Education via email at: linda.kuk@colostate.edu or via phone at: [970-491-5160](tel:970-491-5160). Additionally, please contact me anytime if you would like background information on the ITSI survey, a paper copy to fill out and return, or a copy of the current study results. I am considered the co-principal investigator and can be reached via email at: michael.gawronski@sunyorange.edu or via phone at: [845-341-4284](tel:845-341-4284)

If you have any questions about your rights as a research participant or the administration of this survey, please contact Janell Barker, Human Research Administrator, Colorado State University by email at janell.barker@colostate.edu or phone at [970-491-1655](tel:970-491-1655) or Melody Festa, Chair, Institutional Review Board, SUNY Orange by email at melody.festa@sunyorange.edu or phone at [845-341-9143](tel:845-341-9143).

By clicking "Survey Link" below you acknowledge that you have read and understand that:

- Your participation in this survey is voluntary. You may withdraw your consent and discontinue participation in the study at any time. Your refusal to participate will not result in any penalty. You have given consent to be a subject of this research.

Click here to take the survey: [Inclusive Teaching Strategies Inventory \(ITSI\)](#)

Thank you for participating in this important survey of community college faculty and students.

Sincerely,

Michael Gawronski, Ph.D. candidate
School of Education
Colorado State University
michael.gawronski@sunyorange.edu
[\(845\) 341-4284](tel:845-341-4284)

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