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Learning Starts with Design: Higher Education Faculty Explore the use of Universal Design for Learning (UDL) to Address the Needs of all Students

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LEARNING STARTS WITH DESIGN: HIGHER EDUCATION FACULTY
EXPLORE THE USE OF UNIVERSAL DESIGN FOR LEARNING (UDL)
TO ADDRESS THE NEEDS OF ALL STUDENTS

A Dissertation Presented

by

Holly Buckland Parker

to

The Faculty of the Graduate College

of

The University of Vermont

In Partial Fulfillment of the Requirements
for the Degree of Doctor of Education
Specializing in Educational Leadership and Policy Studies

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Accepted by the Faculty of the Graduate College, The University of Vermont, in partial fulfillment of the requirements for the degree of Doctor of Education specializing in Educational Leadership and Policy Studies.

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Abstract

Today's college students, who are often referred to as "Millennials", are entering college with different expectations for learning than students born before 1982 (Howe & Strauss, 2000). They expect to be able to access information instantly with their smart phones or laptop computers. At the same time, increasing numbers of students entering higher education have a disability of some kind. Some of these are observable disabilities that require specific accommodations to learning materials and the learning environment, such as ramps for students using wheelchairs and interpreters for students with hearing impairment. Students with learning disabilities represent a kind of "invisible" disability in that their challenges may not be readily observable by faculty members, but must be accommodated through changes to curriculum materials and instructional approaches. One of the greatest challenges to meeting the needs of all students is the perception of negative faculty attitudes toward students with disabilities, and the subsequent choice made by many students not to disclose a hidden disability (Getzel & Wehman, 2005; Madaus, Scott, & McGuire, 2003; National Center for the Study of Postsecondary Educational Supports (NCSPES), 2000). Within the last 10 years, a new way of designing learning for K-12 students has emerged to address the needs of all the learners in the classroom. This framework for design is called Universal Design for Learning (Rose & Meyer, 2002). More recently, Universal Design for Learning (UDL) has begun to be introduced to faculty in higher education as a framework for course design that meets the needs of an increasingly diverse student body.

This mixed methods study explored the promise of the UDL at a small New England research university where a faculty professional development model was implemented to enhance the use of UDL practices among faculty members. A baseline study of faculty attitudes was conducted in the fall of 2010. One hundred ninety-two faculty members responded to the survey, yielding a 30% return. In addition, four faculty who had participated in the UDL grant consultation team model and who taught classes of 65 students or more were interviewed for the purpose of gathering information on their perceptions of the effectiveness of the model.

Results of the volunteer faculty survey revealed positive attitudes from the majority of respondents, with at least 60% indicating that they "strongly agreed" with four of the five questions related to the provision of learning accommodations for students with disabilities. In contrast, less than 30% of respondents indicated they "strongly agreed" with statements demonstrating their general knowledge of disabilities and/or knowledge of disability policy and law. Four main themes emerged from the data analysis of the faculty interviews. These themes addressed faculty members' descriptions of general course modifications made as a result of the UDL consultation team work, description of their course, reflections about the UDL consultation team model, and the processes through which faculty members chose to refer themselves for course design assistance from the UDL consultation team. Overall, results of the study suggest promising practices for professional development designed to increase use of UDL approaches in higher education. Further research is needed to determine the transferability of this model among a larger range of faculty and higher education institutions.

Dedication

I dedicate this work to my husband, Collin Jeffrey Parker, and my children, Jackson Noah Parker and Vanessa Kelly Parker. They stood by me through the whole process of working on my doctoral degree with encouraging words, hugs, and special drawings for my desk. I could not have done this without their love and smiling faces.

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CHAPTER ONE: INTRODUCTION

Many students are entering post-secondary education with a variety of learning styles and disabilities. The traditional method of faculty lecturing for the full duration of the class period while students sit quietly and take notes may not be a successful model for the increasing diversity of student learning needs. According to the Profile of Undergraduates in U.S. Postsecondary Education Institutions: 2003-04, With a Special Analysis of Community College Students:

Eleven percent of undergraduates reported having a disability in 2003-04. Among students reporting a disability, one-fourth reported an orthopedic condition, 22 percent reported a mental illness or depression, and 17 percent reported a health impairment. (United States Department of Education, 2006)

The remainder of disabilities reported included invisible disabilities like learning disabilities. “Students with both visible and invisible disabilities are also represented in the growing diversity of college students. ...The largest category of disability, however, is learning disabilities, representing 41% of college students with disabilities” (Scott & McGuire, 2005, p. 120).

In American higher education, nondiscrimination is required on behalf of students with disabilities and students from minority groups. The Individuals with Disabilities Education Act (IDEA) does not apply; rather, the legal standards are those of the Americans with Disabilities Act (ADA) and the Rehabilitation Act (504) (Bowe, 2000, p. 49).

Bowe further states that instead of a formal Individual Education Plan (IEP) created by the “IEP Team” in a public school for qualifying K-12 students, the higher education student is in charge of reporting his/her disability to the campus office of academic support programs/services.

Typically in higher education, faculty members are asked to make accommodations for a few students with a visible disability such as blindness, hearing impaired students, or persons in a wheelchair. In these cases, the accommodations are external to the course preparation of the faculty member. The campus Academic Support Services office organizes the necessary accommodations for a particular student in the class. These accommodations might include scanned course readings for a screen reader, an in-class sign language interpreter, or wheelchair-accessible classroom spaces (Bowe, 2000; Burgstahler & Cory, 2008).

The individual accommodation model in higher education only considers how one student may benefit from the method chosen for his or her specific needs. Since 2002 an emerging educational model for re-thinking the design of instruction with all learners in mind has started to build momentum from its origin in K-12 education to more implementation in some higher education settings. This redesign process is called Universal Design for Learning (UDL). “Universal Design for Learning is a researched-based set of principles that forms a practical framework for using technology to maximize learning opportunities for every student” (Rose & Meyer, 2002). UDL incorporates neuroscience research and Universal Design (UD) architectural principles to

create learning environments where all learners can be successful regardless of learning style, visible disability, or hidden disability.

Over the past decade a variety of researchers have worked to implement the original UD principles developed by Ronald L. Mace, an internationally-recognized architect, product designer, and educator, into higher education coursework and instruction to help all learners achieve to the best of their ability (Behling & Hart, 2008; Bowe, 2000; Burgstahler & Cory, 2008; McGuire, Scott, & Shaw, 2006). Mace originally coined the UD term in the 1970s in relation to architectural design (Burgstahler & Cory). In 1998 the Assistive Technology Act of 1998 defined the term Universal Design in relation to assistive technologies. “The common thread in all definitions of UD is that a diverse group of potential users can fully benefit from a product or environment in an inclusive setting” (Burgstahler & Cory, pp. 6-7; National Council on Disability, 2004). Much of the literature about the specifics of UD in architecture has come out of the Center for Universal Design at North Carolina State University (2009) founded by Ron Mace. There is a growing body of literature about the use of UD in K-12 education. This literature is dominated by research from the Center for Applied Special Technology and continues to grow because of the federal mandates for K-12 public students with disabilities (Center for Applied Special Technology, 2009).

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, UDL practices have been adopted more slowly in the higher education settings than in elementary and secondary levels of public education (Orkwis & ERIC Clearinghouse on Disabilities and Gifted Education, 1999). Third, “Given ... the influence of faculty attitude on the ability of students with Learning Disabilities to successfully complete their higher education degree, it is important to continue to examine changes in faculty views and practices” (Vogel, Leyser, Wyland, & Brulle, 1999, p. 175). Finally, 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).

The current study attempted to address some of these limitations by implementing a campus wide survey to provide a baseline of faculty attitudes regarding the needs of students with disabilities and the use of UD at a New England research university. In addition, faculty interviews were conducted for the purpose of illuminating the process of the UDL framework for course redesign using a faculty consultation team model.

Context for the Study

This study was conducted at a small research university in New England. I am a grant team member on a three-year federally-funded grant on Universal Design for Learning in Higher Education. The grant was focused on the implementation of a faculty development model called the “Consultation Model”, which started with a faculty member identifying that they were interested in working with the grant team by filling out an online questionnaire. They were then sent a consent form and, subsequently, the

self-evaluation form. The self-evaluation form was a self-report of their current teaching practice and need for support. The next step of the process was to interview the faculty member. The interview was conducted by two members of the grant consultation team (usually a faculty member and a graduate student). After the initial interview, a brainstorm meeting of the extended consultation team members (including the technology support team members) was conducted to see how UDL could most effectively be implemented in the course. A follow-up action plan meeting took place between the consultation team and the faculty member. The action plan meeting was where all members worked collaboratively to create an action plan for implementation during the current or upcoming semester. Assistance from a member of the consultation team was provided for each action step. At the conclusion of the consultation model, the faculty member took the self-assessment again as a post measurement of teaching practice and course design work.

The consultation team consisted of three faculty members, two graduate students, and two technical advisors. One of the technical advisors on the team was an undergraduate student, working for the campus Technology Collaborative Action Teams (TechCATs) program, and the other technical advisor was a staff member in the campus academic support services unit who specializes in adaptive technologies. Each faculty member who worked with the consultation team was assigned three members from this team. An individual faculty member's "team" consisted of one UDL grant faculty member, one UDL graduate student, and one UDL technical advisor. I served as a member of the UDL consultation team in the role of one of the two graduate students.

The primary purpose of this study was to describe a baseline of faculty attitudes towards students with disabilities at one small research university in New England, which was done using a well-known survey instrument in the field of higher education and student disabilities. The secondary purpose was to more closely investigate the attitudes and perceptions of faculty members who were teaching large lecture courses and working on implementing UDL in their course design as part of the UDL grant team consultation team model. This closer look was accomplished by interviewing four faculty members involved in the UDL consultation team course redesign process. The faculty members were chosen for the interviews based on the number of student enrollments in their courses. I only chose faculty from courses with student enrollments of 65 students or more in one single course section. There were five faculty members who fit these criteria and I emailed them all for participation in the study. Four faculty members responded positively to being interviewed. The fifth faculty member was overseas on sabbatical and did not reply to my inquiry.

The faculty attitude data gathered through the survey provided a basis for examining the attitudes and awareness of faculty members who teach on a college campus, including faculty members' beliefs about having students with disabilities in their courses, and their knowledge of disabilities and the associated laws. The survey also gathered data on the willingness of faculty to provide accommodations to students with disclosed disabilities and to make changes to their course design and/or course delivery. The interview data enhanced the campus-wide survey results by providing a snapshot of specific faculty who chose to focus on changing their course design and

delivery to meet the needs of all learners in their course. Interview data also illuminated how these four faculty members working with larger enrollments of students (65-298 in one course section) perceived working with the UDL consultation team to reconstruct various aspects of their courses to meet the needs of all learners. The interviews allowed faculty to provide self reported changes in their own course delivery in class as a result of the consultation team model. They also reported the perceived changes in their own attitudes towards students with disabilities, and/or student perceptions of the changes they implemented as a result of their own observations in class or conversations held during office hours.

The questions that guided my research are as follows:

(A) Questions addressed by the faculty attitudes survey:

1. What are the knowledge levels, practices, and attitudes of faculty members with respect to higher education for students with disabilities at a small New England research university?
2. To what degree are specific characteristics of faculty members (e.g., male/female, tenure/non-tenure, part-time/full-time) associated with a variation in knowledge of practices, and attitudes towards students with disabilities?
3. Are faculty members' knowledge of disabilities, practices, and attitudes related to having experience with students with disabilities in their courses?

(B) Questions addressed by the follow-up interview with faculty teaching courses with student enrollments of 65 students or more in one course section:

1. What factors contribute to a faculty member's decision to use Universal Design for Learning (UDL) in course planning and design?
2. Why does a faculty member apply for course design assistance from the UDL grant consultation team?
3. What are faculty perceptions of the UDL consultation team model?
4. What are faculty perceptions of their own changes in attitudes towards students with disabilities?
5. What are faculty perceptions of their own changes in teaching practice as a result of working with the UDL consultation team?

CHAPTER 2: LITERATURE REVIEW

Rationale for Review of the Literature

Increasing numbers of students from the Millennial generation (i.e., born in or after 1982) are entering post-secondary education with a range of disabilities, both visible and invisible/hidden, yet most faculty are not very knowledgeable about how to design instruction to meet the diverse learning needs of their students (United States Department of Education, 2006; Vogel, Holt, Sligar, & Leake, 2008; Vogel, Leyser, Burgstahler, Sligar, & Zecker, 2006; Vogel et al., 1999). “Of the students who report having disabilities, the largest and fastest growing group is students who have ‘invisible disabilities,’ such as those that affect learning and the ability to attend” (Burgstahler & Cory, 2008, p. 4).

In this literature review, I will look at seven bodies of research concerning the history of UD concepts for architecture into the K-12 education classroom, and the application of UD into higher education instruction and course design, including a review of the federal laws that apply to students with disabilities in K-12 education and higher education. In addition, I reviewed Millennial generation research which helps to illuminate the ways in which today’s undergraduate students have grown up and how this changes their preferred methods of learning new information. Recently, the newer research on neuroscience in relation to individual learners’ preferences and visible and invisible disabilities gives a strong rationale for using UDL and paying even closer attention to individual learning preferences. I also review the neuroscience literature to help explain the use and purpose of UD in Education. The “Seven Principles” are a

familiar and helpful framework for the application of UD in Higher Education and were used to create the concept of UD for Instruction (Scott, McGuire, & Shaw, 2001). I will look at the connection between the application of UD to education and the “Seven Principles”, along with the possible options for faculty professional development associated with UD and course redesign.

The following questions provide a specific focus for the literature review:

1. What are the origins of Universal Design for Learning?
2. What is currently known about faculty use of Universal Design for Learning in higher education?
3. How does neuroscience research shed light on the need for Universal Design for Learning in higher education?
4. How does Universal Design for Learning reinforce and support Chickering and Gamson’s “Seven Principles for Good Practice in Undergraduate Education” (Chickering & Gamson, 1987)?
5. What does the research on Millennial students’ learning styles say about preferred learning styles related to higher education classrooms? How does this pertain to the application of Universal Design for Learning in higher education?

The History of Universal Design Concepts in Education

The concept for UDL has its origins in several areas, one being the field of architecture. It can be argued that the building of a course in K-12 or higher education is similar to constructing the plans for a building. The designer must consider all the possible people who will be using it and, in essence, the design will pave the way for

whether or not it is successful (Rose & Meyer, 2002). UDL is also informed with conceptions drawn from the study of neuroscience and the use of technology in learning. The architectural concept of UD, coined by Ronald L. Mace, architect and eventual director of the Center for Universal Design (CUD) at North Carolina State University (NCSU), became the catalyst for the creation of UDL (Rose & Meyer). According to Mace and his co-authors, “Universal Design means simply designing all products, buildings and exterior spaces to be usable by all people to the greatest extent possible” (Mace, Hardie, & Place, 1991, p. 2). Confined to a wheelchair himself since the age of nine due to polio, Mace developed and directed the Center for Accessible Housing. The Center was established at NCSU School of Design in 1989 and later was renamed as The Center for Universal Design (CUD) in 1996.

CUD serves as a national information resource and research center on accessible and Universal Design in housing, products, and the built environment (Mace et al., 1991). According to Burgstahler and Cory (2008), “An example of Universal Design is sidewalks that have curb cuts to make it usable by people who are walking, using wheelchairs, pushing baby strollers, and rolling delivery carts. The curb cut exemplifies ‘design for all’” (p. 6). Anyone using a curb cut can benefit from the designer placing it in a position for the most people to gain access to the building or the sidewalk. In the same way, UDL is designed to help the most diverse group of students gain access to and engage with the content in a meaningful manner. While Mace was the director of the CUD, he and his colleagues developed seven Universal Design Principles:

1. Equitable Use - the design is useful and marketable to people with diverse abilities.
2. Flexibility in Use - the design accommodates a wide range of individual preferences and abilities.
3. Simple and Intuitive Use - use of the design is easy to understand, regardless of the user's experience, knowledge, language skills, or current concentration level.
4. Perceptible Information - the design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities.
5. Tolerance for Error - the design minimizes hazards and the adverse consequences of accidental or unintended actions.
6. Low Physical Effort - the design can be used efficiently and comfortably and with a minimum of fatigue.
7. Size and Space for Approach and Use - appropriate size and space is provided for approach, reach, manipulation, and use regardless of user's body size, posture, or mobility. (Center for Universal Design, 1997)

*Application of Universal Design Principles to
Higher Education Classroom Instruction*

How do these principles relate to instruction? For the purpose of this literature review, I will focus on higher education and the application of UDL in this particular setting. UDL and other variations of it have existed in the K-12 setting for nearly a decade. A number of federal mandates for K-12 education provide students with

disabilities with the right to access education, and helped to raise awareness for K-12 teachers and special education professionals. The legislation concerning K-12 education began with Section 504 of the Rehabilitation Act of 1973, an anti-discrimination law which prevented public schools and other federally funded organizations from denying access to or otherwise discriminating against individuals with disabilities (Americans with Disabilities Act of 1990, 1990). Passage of the Education for All Handicapped Children Act in 1975 guaranteed a free and appropriate public education to all students, including those with disabilities. This law, which was re-authorized in 1990 and re-named the Individuals with Disabilities Education Act or IDEA, provided students with disabilities and their families with a series of rights designed to ensure that students would have access to a free and appropriate public education (IDEA, 2004). In order to meet the needs of students with disabilities, K-12 educators are required to use a plan called an Individualized Education Program (IEP) that articulates individual goals for the student and the special education services and supports that will be provided to help the student gain access to the general education curriculum (Bowe, 2000). A student's disability is documented in the IEP along with any special learning needs. The classroom teacher and the school special education professionals record student progress on the IEP throughout the school year. Therefore, when a student enters a classroom at the beginning of a school year, the next K-12 teacher already knows the learning needs of the student and can take them into consideration when planning the curriculum and lesson plans (Bowe).

According to Bowe (2000), an IEP document will tell the teacher and the parents the following information:

1. the child's "unique needs" or "current educational performance" (how well the child is doing in different areas of study),
2. special education needs (tutoring, additional time in tests, etc.) and
3. related services (interpreters, physical therapy, et cetera). (p. 48)

Students in K-12 education who have a disability but who do not qualify for special education are eligible to receive accommodations under Section 504. These accommodations are designed to help students gain access to education. Section 504 of the Rehabilitation Act provides that:

No otherwise qualified individual with a disability...shall, solely by reason of her or his disability, be excluded from the participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance.... (Ben-Moshe & Syracuse University, 2005, p. 178)

Supports provided through Section 504 in a K-12 school might be of several different types depending on the students' needs to gain access to the learning environment and learning materials. Students with physical disabilities may need help with basic human needs such as using the bathroom, eating/feeding, and moving about the school environment. Students with sensory disabilities may require Braille materials, or audio files, or large print materials. There are also a variety of accommodations for students with learning disabilities and behavior issues. K-12 teachers might also have training to

help students with medical conditions that might require administering medicine for a bee sting or other severe allergies and conditions such as diabetes.

Once students with disabilities leave K-12 education, their rights and the types of services provided by the United States laws change in some ways. Students are still protected from discrimination through Section 504, but their entitlement to an education under IDEA (2004) ends upon graduation. Students are, however, further protected under the American with Disabilities Act (ADA) passed by the United States Federal Government in 1990 (Americans with Disabilities Act of 1990).

The ADA legislation established that qualified students with disabilities are entitled to equal access to postsecondary education, whether or not that education is received at an institution receiving federal funds. While provisions through Section 504 and ADA thus apply to all students with disabilities at post secondary education institutions, higher education faculty members are accustomed to using a case-by-case approach for student disability accommodation requests.

For example, common accommodation procedures require that a student with a disability self identify as having a disability to the class instructor within the first weeks of class, provide documentation to authorized campus disability professionals that verifies eligibility for accommodations, request specific accommodations based on the disability (e.g., extended time on tests), and wait for adjustments to be implemented (e.g., confirming and clarifying coordination with the disability services office, provision of a note taker, location of a reader, etc.). (Scott, McGuire, & Shaw, 2003, p. 370)

Some students may not have a visible disability but still have one that might have been covered under IDEA in K-12. For example, they might have a learning disability, a mental health issue, or Attention Deficit Disorder. These types of disabilities are considered “hidden” because you may not be able to tell the person is living with these disabilities by just looking at them.

When students with hidden (also called invisible) disabilities encounter faculty and peers with negative attitudes towards students with disabilities, they may decide not to disclose their disability in future postsecondary classes. This becomes problematic for these students because they are not getting the accommodation/s they really need to learn effectively (Getzel & Wehman, 2005; Madaus, Scott, & McGuire, 2003; National Center for the Study of Postsecondary Educational Supports (NCSPES), 2000). With the infusion of UDL into postsecondary education course design, faculty members consider all learners when building courses from the course goals to the assessments. The need for retro-fitting courses to meet the needs of a handful of students who must disclose the specific needs they might have for learning significantly decreases. When using the concepts of UDL to design courses in higher education, faculty members think broadly about providing options for learning, student engagement with course materials, and various types of assessments for the variety of learners.

Using Universal Design in Higher Education: Concepts and Practice

The UD research in applying UD concepts to K-12 and higher education course design and instruction in the United States refers to several main UD principles of instruction. There are five different course design concepts that I will focus on which are

used in K-12 and post-secondary education. These instructional course design concepts are referred to as Universal Design for Instruction (UDI) (Burgstahler & Cory, 2008; Scott et al., 2003), Universal Design in Education (UDE) (Bowe, 2000), Universal Design for Learning (UDL) (Rose & Meyer, 2002), Universal Course Design (UCD) (Behling, 2005-2008), and Universal Instructional Design (UID) (Silver, Bourke, & Strehorn, 1998). Each of the five concepts defines an approach to course redesign that when applied to higher education challenges educators to apply the principles of UD to the design of learning environments and instruction.

Some significant differences do exist between the five design approaches as related to education. Frank Bowe's UDE (2000) uses the seven principles of UD in Architecture (Mace et al., 1991) to directly impact instruction. Bowe includes several specific "guidelines" for educators planning their instruction for each of the seven UD principles. "The principles of Universal Design place responsibility for making curricula, materials, and environments accessible to and usable by all students upon the teacher and school" (Bowe, p. 4).

UDI (Scott et al., 2001) uses the same UD principles in Architecture (Mace et al., 1991), but also looked at the Center for Applied Special Technology's UDL principles (Rose & Meyer, 2002), and the "Seven Principles" by Chickering and Gamson (1987). They decided to create two new principles that they then added to the UD principles resulting in the creation of the term "Universal Design of Instruction" to directly relate to post-secondary education. These additional two principles are:

- Principle Eight: community of learners - the instructional environment promotes interaction and communication among students and between students and faculty.
- Principle Nine: instructional climate - instruction is designed to be welcoming and inclusive. High expectations are espoused for all students. (Scott et al., 2001)

The concept of UDL has been most broadly applied in K-12 education. More recently, UDL has been adopted as a construct for course design in higher education. “UDL requires that we not only design accessible information, but also an accessible pedagogy” (Rose, Harbour, Johnston, Daley, & Abarbanell, 2006, p. 136). UDL is different from the other concepts of UD because UDL is focused on the neuroscience of learning and the instructional supports that new and emerging technologies provide to learners in the 21st century. UDL is not as focused on the direct translation of the UD architectural principles, although they were considered in the conceptualization of UDL. According to Rose and Meyer (2002), the framework for UDL is aligned with three neural networks for learning in the brain, derived from research in cognitive neuroscience.

A small deficit in one of the three brain networks can create a barrier for learning. Using UDL, a faculty member can think about creating multiple ways for students to engage with the content, multiple ways to present the content, and multiple ways for a student to demonstrate his/her knowledge of the content using a variety of

assessment methods. These ideas are communicated in the three UDL principles developed by David Rose and Anne Meyer (2002):

- Principle 1: To support recognition learning, provide multiple, flexible methods of presentation.
- Principle 2: To support strategic learning, provide multiple, flexible methods of expression and apprenticeship.
- Principle 3: To support affective learning, provide multiple, flexible options for engagement. (p. 75)

David Rose and other members of the Center for Applied Special Technology (CAST), and the authors of UDL, work with the U.S. Department of Education to create educational legislation that ensures the integration of UDL into public education (Rose et al., 2006).

The fourth concept of including UD in education was created at the University of Massachusetts –Boston’s Equity and Excellence in Higher Education project. Using the foundations in UDI and UDL, the Equity and Excellence (E&E) project staff created the concept of Universal Course Design. The E & E staff defined UCD as the design of college course curricula, instruction, assessment, and the environment to be usable by all students to the greatest extent possible without the need for accommodations (Behling, 2005-2008; Behling & Hart, 2008). The E&E grant staff worked with more than 100 faculty members over six years at five New England institutions to implement UCD.

The fifth instructional design concept is appropriately named Universal Instructional Design and uses the principles of UD (Mace et al., 1991) and the Seven

Principles for Good Practice in Undergraduate Education (Chickering & Gamson, 1987) to create a set of principles that faculty may consider when thinking about designing their courses with a variety of learners in mind. Here are the basic principles that faculty helped create for UID:

1. Create a welcoming classroom climate
2. Determine the essential components of the course
3. Provide clear expectations and feedback
4. Explore ways to incorporate natural supports for learning
5. Use varied instructional methods
6. Provide a variety of ways for students to demonstrate knowledge
7. Use technology to enhance learning opportunities
8. Encourage faculty-student contact.

(Fox & Johnson, 2000; Silver et al., 1998)

Recognizing that these five instructional course design concepts vary in their scope and application in educational settings, I have chosen to focus on the term UDL principles that have been researched and disseminated by the CAST because of the neuroscience research component built into the foundation of UDL. The neuroscience research that David Rose and Anne Meyer use as a base for the concepts of UDL explain the story of how the brain functions when a person learns information and recalls the information at a later time. This research reinforces the need for curriculum and instruction created with all learners as the basis for the course design.

UDL is the instructional construct that our grant team at the University chose to use in our faculty development work. This study will focus on the concept of UDL and its definition as:

A framework for designing curricula that enable all individuals to gain knowledge, skills, and enthusiasm for learning. UDL provides rich supports for learning and reduces barriers to the curriculum while maintaining high achievement standards for all. (CAST, 2009)

The leader in research and legislation surrounding the application of UD to education continues to be CAST. UDL is not a common term to many higher education professionals, and CAST is helping to change this by working in collaboration with the U.S. government. Members of CAST worked with the U. S. government to add language about UDL to the Higher Education Opportunity Act of 2008. The Act passed by the U.S. federal government uses the UDL framework when talking about the new regulations for preparing pre-service teachers in higher education institutions that receive federally funds. The term UDL is included in the language of the Higher Education Opportunity Act, which requires the use of UDL in the implementation of the Teach to Reach grants for higher education. The Act uses the following language about UDL:

The development of innovative, effective, and efficient teaching methods and strategies, consistent with the principles of universal design for learning, to provide postsecondary faculty, staff, and administrators with the skills and supports necessary to teach and meet the academic and programmatic needs of

students with disabilities, in order to improve the retention of such students in, and the completion by such students of, post-secondary education.

Pre-service teachers may be aware of UDL; however, more needs to be done to introduce UDL practices and concepts to higher education administration, faculty, and students.

Neuroscience and Universal Design for Learning

As described earlier, the UDL framework has its origins in the concept of universal design in architecture, but is grounded in cognitive neuroscience. “The distinction between UDL and other domains of universal design is its focus on learning” (Rose et al., 2006, p. 136). Neuroscience was coming to the forefront of learning in late 1999. Research on how the brain learns was something that some higher education research was focusing on. According to the book *How People Learn*, “...there appear to be separate brain areas that specialize in subtasks such as hearing words (spoken language of others), seeing words (reading), speaking words (speech), and generating words (thinking with language)” (Bransford, Brown, & Cocking, 1999, p. 122). This brings up the question of what happens when someone has sustained damage to one of the areas of the brain or has a learning disability.

As described earlier, Rose and Strangman (2007) propose that there are three components of cognition in the brain: recognition networks, strategic networks, and affective networks. Each brain network has a role in the learning process, and each network can be slightly different in each individual’s brain in such a manner that it may impact his or her learning. “The activities of these networks parallel the three

prerequisites for learning described by the Russian psychologist Lev Vygotsky (1962): recognition of the information to be learned; application of strategies to process that information; and engagement with the learning task” (Rose & Meyer, 2002, p. 12).

According to Rose and Strangman, the recognition network allows people to recognize and identify familiar objects, smells, sounds, and textures. This is similar to Vygotsky’s (1978) first prerequisite for learning. “In reading, these networks are relied upon for letter recognition, decoding, and comprehension, among other things. In mathematics, they are critical for recognition of numbers, shapes, and algebraic expressions” (Rose & Strangman, p. 382).

Strategic networks are housed in the frontal lobes of the brain. They manage planning, coordinating, goal-setting and self-monitoring, and physical movements. The strategic networks in the brain help us develop and execute a plan of action and correct the plan if necessary based on other inputs. This is similar to Vygotsky’s (1978) second prerequisite for learning, which says you must apply the information in order to learn it. For example, “In the mathematics classroom strategic networks are needed to identify the goal for a particular word problem, for ignoring irrelevant stimuli in the problem text...for manipulating pencil and paper to derive the solution” (Rose & Strangman, 2007, p. 383). When thinking of the college classroom environment, how frequently is the application of content occurring for students? Is the instructor aware of this “prerequisite” for learning? It is not enough to just learn a bunch of facts or to memorize terms for a test; rather, they must be applied in some way for deeper learning to occur.

The last set of networks is called the affective networks, also known as the limbic system. This set of networks controls feelings, emotions, and biological drives such as hunger. The affective networks tell the body it is safe from danger. These networks respond to the external stimuli we receive in any environment, including the classroom. “They enable us to prioritize and persist in spite of difficulty, but they can also influence us to desist and shut down when the challenge is too great” (Rose & Strangman, 2007, p. 384). Vygotsky (1978) indicated that the final prerequisite for learning is engagement with other people and the material to be learned.

We propose that an essential feature of learning is that it creates the zone of proximal development; that is, learning awakens a variety of internal development processes that are able to operate only when the child is interacting with people in his environment and in cooperation with his peers. (Vygotsky, p. 90)

This engagement will not occur if the learner detects fear, stress, and other unpleasant feelings associated with the class or the content, as Rose and Strangman (2007) point out.

James Zull (2002) also connected brain research and neuroscience to his own teaching and research of teaching at the post-secondary level. Zull reminded us that the teacher cannot pour information into the learner’s brain. As true understanding of the content takes place, physical changes occur in the learner’s brain. These physical changes are necessary for learning to actually take place.

...If we are to learn and grow there must come a point where we change from receivers of knowledge to creators of knowledge. Instead of reproducing the

work of others, we must begin to create our own. This is where humans excel.

Our ability to create makes us the best thinkers in the world. (Zull, p. 178)

“Seven Principles for Good Practice in Undergraduate Education”

and Course Redesign with UD

In 1987 Chickering and Gamson published the “Seven Principles for Good Practice in Undergraduate Education” (Seven Principles):

According to this framework, good practice in undergraduate education:

1. Encourages contacts between students and faculty.
2. Develops reciprocity and cooperation among students.
3. Uses active learning techniques.
4. Gives prompt feedback.
5. Emphasizes time on task.
6. Communicates high expectations.
7. Respects diverse talents and ways of learning. (p. 1-6)

The Seven Principles are guidelines for faculty in higher education to use in thinking through their own course development. The Seven Principles are still very relevant to today’s Millennial generation (i.e., born in or after 1982) undergraduate students. Scott et al. (2001) considered the Seven Principles along with the UD architectural principles (Center for Universal Design, 1997) and the UDL principles, as well as the work at NCITE (1998) when creating the Principles of UDI (Getzel & Wehman, 2005, p. 123).

Chickering and Gamson’s (1987) research based on the Seven Principles is in alignment with the UDL principles and Vygotsky’s research on learning (1978). Sheryl

E. Burgstahler and Rebecca Cory (2008) created a table of possible relations of the Seven Principles to applying UD to course re-design. The Seven Principles are familiar to many higher education faculty, but the UD and UDL principles are still not widely known in Higher Education. However, linking the Seven Principles to the three principles of UDL may prove to be a way to help faculty think about this new concept of course design.

Silver et al. (1998) introduce the concepts of UD and the Seven Principles from Chickering and Gamson (1987) for their study of faculty at the University of Massachusetts Center for Teaching. The study launched to “engage university faculty members in the definition of universal instructional design from their perspective, to describe how they would implement such an approach, and to identify barriers to implementation within a university setting” (Silver et al., p. 48).

Faculty Professional Development Methods for UD Instructional Frameworks

Many of the postsecondary faculty development efforts regarding UD in course design are delivered through websites or as a long workshop or series of shorter workshops. Some postsecondary efforts to infuse UD in higher education start with consults with instructional designers about a faculty member’s syllabus as the starting point for rethinking the goals and delivery of a course. Burgstahler and her associates at the University of Washington built an extensive website for faculty to use anytime they need the information about UDI. This is called the DO-IT website and it is a result of three grants from the U.S. Office of Postsecondary Education (<http://www.washington.edu/doit/>) (Burgstahler & Cory, 2008, p. 39). McGuire, Scott, and Shaw (2006) discuss their approach to implementing a web site, Facultyware

(<http://www.facultyware.uconn.edu>), to provide resources and supports for faculty at the University of Connecticut and around the world, pertaining to UDI.

This site hosts a growing repository of high-quality instructional products submitted by college faculty from diverse academic disciplines and across the country and selected for publication on the Facultyware site through a peer review process. (p. 169)

Another approach to faculty development is to create case studies for faculty members to examine in a workshop environment. A case based approach to professional development can provide time to see how faculty in the case studies are implementing UDI and provide a time for faculty to talk to each other about the particular case and reflect upon it. Scott and McGuire (2008) explained that: “While the principles of UDI provide faculty with a framework for considering a range of inclusive practices, case studies are a complementary approach to assisting faculty in building a schema for implementing UDI” (p. 141).

Fox and Johnson (2000) created a workshop facilitator’s guide complete with suggested agendas for long or short workshops, speaker notes, and PowerPoint slides on *Helping postsecondary faculty make their classes more accessible to all students* (Report: ED481561. 88pp. 2000; retrieved June 9, 2011). This workshop guide could be used by staff in a University Disabilities Support Office or by a Center for Teaching and Learning organization to help their office staff organize workshops on this topic.

A variety of ways to engage faculty in the course redesign process can be used to facilitate the incorporation of UD principles with instruction.

Millennial Learning Styles and their Connection to Universal Design for Learning

Howe and Strauss (2000) describe the Millennial generation in their book, *Millennials Rising: The Next Great Generation*, as individuals who were born after 1982 and feel special, sheltered, confident, conventional, team-oriented, achieving, and pressured. These traits have many implications in planning for Millennial students on college campuses, from student services and student counseling to student learning in the classroom. The Millennial population is very diverse and has preferred learning methods. “As a group, Millennials are unlike any other youth generation in living memory. They are more numerous, more affluent, better educated, and more ethnically diverse” (Howe & Strauss, p. 4). Diana Oblinger (2003) describes Millennials as having distinct learning styles: teamwork, experiential activities, structure, and technology in their learning.

The use of UDL in planning higher education coursework for Millennials may prove to be in alignment with many of their learning style preferences. Zeff (2007) points out that today’s students do not recall a time when they were without instant messaging, text messaging on their cell phones, and downloadable music. Computer software and Internet resources can provide a host of avenues for learners to practice new information and use a variety of resources to support learning acquisition.

Key to UDL is leveraging the power of new technologies. In traditional curricula text is the dominant instructional medium. While effective for some students, text is a barrier to access and understanding for many other students, including those with visual deficits, learning disabilities, and certain physical disabilities. (Rose & Strangman, 2007, p. 385)

UDL and technology should go hand-in-hand in planning coursework for students. A variety of educational technologies already exist. CAST specializes in the development and use of technology to enhance learning environments. “Thus, it is possible to envision a not-so-distant day when all students have the opportunity to learn in environments that are responsive to their unique needs, preferences, and styles” (Rose & Strangman, 2007, p. 389). The concepts of UDL create a framework to design a course with the student learning in mind from the first day of the course. UDL principles help faculty design curriculum with educational supports and assessments in the course to support Millennial students’ ways of knowing.

Oblinger (2003) describes one preferred learning style of Millennials as being technology. Technology allows for implementation of the three UDL principles in many ways. Some higher education institutions lag behind K-12 schools in the implementation of technologies into their classrooms.

Herein lies the first roadblock encountered when the Millennials enter university. Students familiar with technology and teamwork and who have a background of success encounter a highly competitive academic environment, where classroom technology is tolerated rather than embraced and a premium is placed on solitary work rather than group productivity. This is a foreign world and the Millennial student may not understand why the playing field has changed. (Atkinson, 2004, para. 7)

According to Professor Kenneth Stewart (2009), “Millennial students need faculty to be patient while also expecting high standards” (p. 116).

Summary of the Literature Review

UDL is grounded in cognitive neuroscience. The field of neuroscience continues to grow and help identify more ways that people learn. A wider application of UDL in Higher Education would further support Chickering and Gamson's (1987) Seven Principles for Good Practice in Undergraduate Education, which are widely accepted as "best practice" in higher education course design and development. Many higher education faculty are familiar with the Seven Principles, and perhaps the connection of the Seven Principles to UDL may facilitate the integration of UDL into higher education. Burgstahler (2008) juxtaposes UD and the Seven Principles. It is possible to do the same with UDL, especially when UDL is specific to enhancing learning for all students.

UDL is grounded in neuroscience and what is known about how people learn. The three principles of UDL create a framework for instructors to apply to their course design and classroom instruction. Research on the application of UDL in elementary education and middle school (K-8) is ongoing at CAST. More research on the implementation of UDL at the secondary and higher education level is necessary. Application of UDL in higher education may provide additional scaffolding to support all Millennial students in large lecture college environments, including those who have disabilities. These scaffolds might be peer to peer conversations in class, additional online resources to use outside of class, such as self quizzes and further explanation of materials in the form of podcasts, or concepts maps, to name a few strategies. UDL has not been widely applied to higher education, unlike some of the other educational

concepts based on UD in architecture, such as UDI (Behling & Hart, 2008; Burgstahler & Cory, 2008; Scott et al., 2001).

The strength of the UDL application to higher education lies in its research-based methods and connection to legislation, which provides sustainability for the use of the concept.

Much work is still to be done on creating a culture on college campuses that promotes the learning-for-all model. There is no “sink or swim” mentality in the concept of UDL. All learners are welcome and can truly achieve when using the UDL model that promotes accessible pedagogy. UDL provides a researched-based framework for faculty to create excellent learning environments on college campuses for Millennial learners, non-traditional college students, and students with disabilities.

However, faculty members’ knowledge, attitudes and readiness may pose a barrier to UDL implementation. Professional development will be a necessary ingredient for faculty implementation of UDL in higher education. My study on the implementation of UDL in higher education by faculty who work with a grant team on a collaborative consultation team begins to fill the gap on UDL implementation in higher education by providing a framework for faculty development outside of the current standard of resource web pages and faculty workshops. The UDL grant consultation team model is explored as a possible model to support faculty in rethinking their course design with the UDL lens while receiving feedback, and human resources as well as curriculum resources during that process.

CHAPTER 3: RESEARCH METHODOLOGY

Mixed methods research is a flexible approach where the research design is determined by what we want to find out rather than by any predetermined epistemological position. In mixed methods research, qualitative or quantitative components can predominate or both can have equal status. (Muijs, 2004a, p. 9)

I used a mixed methods research design in this study, including a large-scale survey, to gain a campus assessment of campus climate related to faculty attitudes and knowledge about students with disabilities and faculty willingness to create modifications in curriculum for students with disabilities. The inquiry was expanded with a qualitative component of the study, interviews, to focus on faculty who chose to work with the UDL grant consultation team and who were also responsible for teaching large numbers of students in a lecture environment.

The quantitative portion of the study involved the administration of an online survey intended to capture a description of faculty attitudes towards students with disabilities across campus. This survey data also served as baseline campus-wide data for the UDL grant regarding faculty attitudes towards students with disabilities before implementation of the UDL grant consultation model on campus. For the qualitative portion of the research, I conducted four follow-up interviews with individual faculty members who worked with the UDL grant consultation team and who taught large lecture courses.

Research Questions and Related Null Hypothesis

The three research questions and their related null hypothesis for the survey portion of this study are as follows:

Research Question 1: What are the knowledge levels, practices, and attitudes of faculty members with respect to higher education for students with disabilities at a small New England research university?

Research Question 2: To what degree are specific characteristics of faculty members (e.g., male/female, tenure/non-tenure, part-time/full-time) associated with a variation in knowledge of practices and attitudes towards students with disabilities?

Hypotheses 2: There is a relationship between a faculty member's background characteristics and his or her knowledge of practices and attitudes towards students with disabilities.

Null Hypotheses 2.1: There is no statistically significant relationship between a faculty member's gender and his or her knowledge of practices and attitudes towards students with disabilities.

Null Hypotheses 2.2: There is no statistically significant relationship between a faculty member's tenure status and his or her knowledge of practices and attitudes towards students with disabilities.

Null Hypotheses 2.3: There is no statistically significant relationship between a faculty member's part-time or full-time work status and his or her knowledge of practices and attitudes towards students with disabilities.

Research Question 3: Are faculty members' knowledge of disabilities, practices and attitudes related to having experience with students with disabilities in their courses?

Hypotheses 3: There is a relationship between a faculty member's experience with having students with disabilities in their courses and their knowledge of disabilities, practices and attitudes towards students with disabilities.

Null Hypotheses 3.1: There is no statistically significant relationship between a faculty member's experience with having students with disabilities in their courses and their knowledge of disabilities.

Null Hypotheses 3.2: There is no statistically significant relationship between a faculty member's experience with having students with disabilities in their courses and their teaching practices towards students with disabilities.

Null Hypotheses 3.3: There is no statistically significant relationship between a faculty member's experience with having students with disabilities in their courses and their attitudes towards students with disabilities.

Survey Instrument and Survey Participant Sample

The survey was sent to 648 full and part time teaching faculty in September 2010 at a small research university in New England. This university is made up of seven undergraduate schools and colleges, along with a graduate college. The student body is comprised of about 10,000 undergraduates, 1,500 graduate students, and 450 medical students. The survey had been completed by 192 faculty when the survey closed in November 2010, which accounts for 30% of the total amount of faculty invited to take the survey.

The survey instrument was a copyrighted survey developed by Dr. Susan Vogel and known as the *Assessment of Campus Climate to Enhance Student Success: Disabilities in Higher Education - Faculty Questionnaire* (2010). This survey is the result of almost 20 years of research on the experiences of students with disabilities in higher education settings. Leyser (1989) was one of the first people to study the impact of increasing numbers of students with learning disabilities attending higher education and the faculty attitudes and practices towards these students. His survey focused on students with learning disabilities, and was revisited 10 years later by Leyser, Vogel, Wyland, and Brulle (1998) to see if changes had taken place in faculty attitudes (Leyser, Vogel, Wyland, & Ed, 1998; Vogel et al., 2008). The current survey was then revised again in 2001 by Vogel to include all disabilities. The current survey did not include any items about the Universal Design for Learning (UDL) concept, instead Universal Design for Instruction (UDI) was included as the instructional concept for higher education. Due to time constraints we did not change any questions on the survey or add any additional questions on the survey regarding UDL. The grant team decided that the UDI concept was a close enough concept to UDL that we could get an idea of the respondents' knowledge of UD from the items that existed on the current survey. Item-level analyses and reliability analyses were conducted on the instrument (Vogel et al.), indicating that the instrument is in fact a reliable indicator of faculty attitudes.

The survey was administered on the Association on Higher Education and Disability (AHEAD) web server. In May 2010 Dr. Vogel started an initiative to distribute the surveys on a server separate from the AHEAD organization. This transition

process was not complete until September 2010. The current survey is now administered on a Surveygizmo™ account by Dr. Vogel under the name of Campus Climate and Disabilities Questionnaires™.

The 2010 version of the faculty survey consists of 35 questions divided into five subgroups: (a) knowledge, (b) practices, (c) attitudes, (d) topics of interest, and (e) alternative methods for staff development opportunities. Cronbach's alpha reliability for four of the faculty composite variables regarding students with disabilities (knowledge, fair accommodations, fair modifications, and faculty needs and interests) was conducted. The Cronbach alpha reliability for the four constructs was well above .7 for all composites (Vogel et al., 2008).

Interview Participant Sample

During the fall 2010 semester, an email request was sent to all faculty members involved in working with the UDL grant consultation team and who also teach classes of 65+ students, which was a total sample of five faculty members. Out of our total of 18 faculty who have referred themselves to the UDL grant consultation team, only five of the faculty also met the criteria of having 65 or more students in their course enrollments of one class section. I emailed an invitation to the five faculty who were eligible to participate in the study. I got a positive response from four of the five faculty. I never heard from the fifth faculty member who was out of the country on sabbatical.

An informed consent letter was given to all the interviewees to sign. The interviews took place in the location of the interviewee's choice. All participants agreed to be audio-taped for the interview, providing me with an accurate record of their

responses to questions. The interviews lasted about one hour to one-and-a-half hours each.

Researcher Bias

As a member of the UDL grant team at the small research university being studied, I am biased about the subject matter in a positive manner. I was as objective as possible in the analysis and reporting of the interview data collected. I wrote notes after each interview in my research journal to keep a log of my thoughts. However it is possible that as the interviewer and a grant team member, I may have somehow influenced the answers the interviewees gave because of my work with them on the UDL grant or in my faculty development role at the university.

I have worked in the area of faculty development for 14 years at the small research university being studied. My background in instructional technologies and course redesign has led me to be an advocate for equitable and accessible education in the postsecondary environment. The use of various technologies can prove to enhance the availability of information to a larger student population and serve to provide multiple entry points to access the subject matter, so therefore I have a positive bias towards the faculty who chose to engage in the use of instructional technologies and course redesign.

“If more than 20 percent of the questionnaires are not returned, it is desirable to check a portion of the non-responding group even though this checking usually involves considerable effort” (Borg, 1983, p. 434-435). I repeatedly tried to obtain a non-respondent sample with follow-up phone calls until a comparison sample size could be obtained. However, I was not able to obtain a non-respondent sample and therefore can

only generalize the results to the 30% of the volunteer faculty who did respond to the survey. This is also addressed in my limitations section below.

Analysis of Survey Data

The analysis of the survey data replicated the methods by Vogel et al., (2008). Frequency tables were generated for all demographic data and all 22 questions with six-point Likert scales.

Nonparametric Independent Sample Median Tests were done for the items on the three scales of knowledge, attitudes, and practices of the faculty respondents. I used the Mann-Whitney U test. “This test is a nonparametric substitute for the t test for uncorrelated mean” (Borg & Gall, 1983, p. 378). Because of the relatively large number of comparisons and the threat of chance findings, the significance level for the Vogel study was set at .01. I used the same level of significance. The Vogel study compared data from year one and year three of a grant. This study was intended to be the baseline survey data for campus collected on behalf of the UDL grant team and this dissertation study in the fall of 2010.

Analysis of Interview Data

I used inductive analysis to analyze the interview data. Inductive analysis involves discovering patterns in the data collected as opposed to using an existing framework for data analysis. Findings emerge through the interaction of the researcher with the data (Patton, 2002). During my review of all of the transcripts from faculty interviews, I developed 11 codes that were used to sort and categorize the text of the transcribed interviews. As I read and re-read the coded data, I identified emergent

themes and sub-themes. I reviewed a total of 69 pages of interview transcriptions. I then used the NVivo software program to import the transcripts from the Word® software and transfer the coded documents into “nodes.” The nodes were labeled with my corresponding themes and sub-themes.

Limitations of this Study

This study only includes data from one small research university in New England. The response rate for the survey was 30%. The survey non-respondent sample could not be validated. I started making phone calls to validate the sample in May 2011. Most faculty who answered the phone did not want to talk to me when I explained the purpose of the call. It was toward the end of the semester, and the people I talked with said they were either too busy to do the survey on the phone or they refused to participate in the survey. In addition, the vast majority of phone calls I made were unanswered. It is possible that people were either screening calls or they were out of the office for the summer.

As a result of this failed attempt to survey the non-respondents, the survey can only be generalized to the 30% of faculty who did in fact respond. I cannot know for certain if this sample is a baseline for the entire campus. Also, the interviewees for this study already have a more favorable view of UDL as an instructional method because of their involvement in the UDL grant at the University.

CHAPTER 4: RESULTS AND ANALYSIS OF SURVEY DATA

Overview

This chapter reports the results on the campus wide survey of teaching faculty from a small New England research university. The data are reported according to the overarching research questions for this study. As mentioned in the limitations section of Chapter 3, the sample of 30% of volunteer faculty could not be validated with a non-respondent sample; therefore the results and analysis must be only generalized to the faculty who did respond. This sample cannot be generalized as a campus-wide response from faculty.

Descriptive Analysis

The survey sample of faculty was generated from a request to the institutional studies office for all current teaching faculty that had full or part time appointments, including the medical faculty. An email invitation was then sent to all 648 teaching faculty on the list. Of the 648 faculty, 192 faculty completed the survey, yielding a response rate of 30%. The respondents were comprised of 39.6% males and 57.3% females with 3.1% choosing not to disclose their gender. The majority of the respondents were in a tenure track position at the university (56.8%). Respondents indicated a generous amount of teaching experience with 47.6% reporting having 16 or more years of experience teaching in higher education and 23.6% with 11-15 years of experience. The vast majority of the respondents were also full time faculty members at the university (97.4%). The race of the respondents was primarily white (81.8%). Some chose not to answer the question about race (5.2%), some respondents identified as Asian (3.6%),

some Hispanic (1.6%), and African American (1.6%), and a small amount identified as mixed race (.5%). The remaining 5.7% selected the “prefer not to disclose” option. Given that the majority of the respondents were also experienced faculty, the age of the majority of respondents was 36 years old and above (90.7%).

Research Question One: What are the knowledge levels, practices, and attitudes of faculty members with respect to higher education for students with disabilities at a small New England research university?

This question serves to gather a baseline of faculty knowledge levels about teaching students with disabilities in higher education. Questions focused on general knowledge of disabilities, federal statutes for students with disabilities in higher education, as well as accommodation requests possibly made by students and support from campus resources, and course design techniques. Using SPSS Statistics® software version 19 for the Macintosh computer, descriptive statistics frequencies were run for all the knowledge scales (questions 4, 6, 7, 8, 9, 10, 11). Figures 1 and 2 report the valid percents calculated for all knowledge construct questions. Respondents selected from a six-point Likert response scale. The scale ranged from 1 (the low end of the scale, “Not Very Knowledgeable”) to 6 (the top end of the scale, “Very Knowledgeable”). “Not at All” was also a choice for respondents.

Knowledge about disabilities. Over one fourth (27.2%) of faculty indicated either a 1 or 2 on the Likert scale for their knowledge level of disabilities in general. One percent of respondents reported “Not at All. Almost half (47.1%) of the respondents reported a 3 or 4 on the Likert scale for “some” or “neutral” knowledge. Almost one

fourth (24.6%) of the respondents chose a 5 or a 6 on the top end of the Likert scale indicating that they were either “Knowledgeable” or “Very Knowledgeable”.

Knowledge about accommodations. A small percent (14.3%) of respondents reported a 1 or 2 on the Likert scale for their knowledge about accommodations that students with disabilities requested or may request. A larger portion (41.8%) indicated a 3 or 4 on the Likert scale. A similar amount of respondents (42.9%) indicated a 5 or 6 on the Likert scale. Only 1.1% selected “Not at All”.

Knowledge about federal statutes and/or regulations. The lower end of the Likert scale, 1 or 2, was selected by more than one fourth (38.7%) of the respondents, while slightly fewer (32.5%) of faculty chose a 3 or 4 on the Likert scale. About one fourth (25.7%) chose a 5 or 6 for being either “Knowledgeable” or “Very Knowledgeable” about the Federal statutes and regulations, while 3.1% reported a “Not at All” response.

Knowledge about the disability services office on campus. Less than one fourth (23.3%) of respondents chose a 1 or 2 on the Likert scale. A much larger percent (44.4%), responded with a 3 or 4 (“Some Knowledge” or “Neutral”) on the Likert scale. Over one fourth (30.1%) of the respondents reported a 5 or 6 on the Likert scale and 2.1% selected “Not at All” regarding the disability services on campus. Table 1 summarizes the participants’ results of the knowledge scales regarding disabilities in general, accommodations requested of faculty by students with disabilities, federal statutes, and the campus office for disability resources.

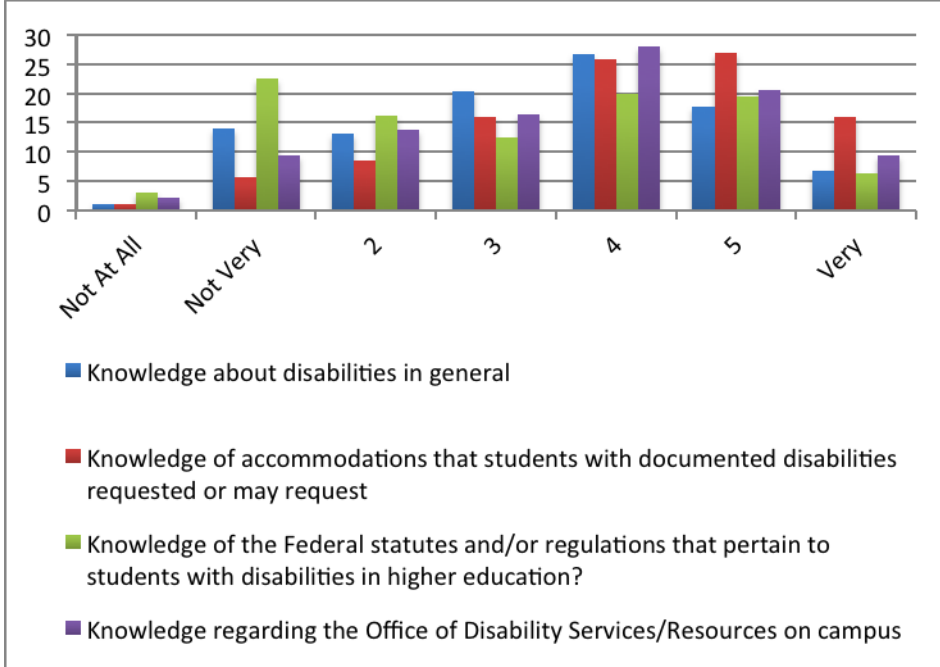


Figure one: Faculty knowledge scales – part one.

Knowledge of accessible online instructional material. A small number (6.3%) of respondents chose to reply “Not at All” to the question about knowledge of accessible online instructional materials. Close to one third (30.5%) of respondents indicated a 1 or 2 on the Likert scale, while 43.6% chose a 3 or 4 on the Likert scale. A much smaller percent (19.5%) selected a 5 or 6 on the Likert scale regarding their knowledge of accessible online instructional materials.

Knowledge of policies and procedures within your institution. As far as the policies and procedures pertaining to students with disabilities at this institution, 23.9% of respondents reported a 1 or a 2 on the Likert scale, indicating a low level of knowledge. Nearly half (48.1%) of the respondents said their knowledge level was a 3 or

4 on this topic. A bit over one fourth (26.5%) of respondents indicated a 5 or 6 for a level of either “Knowledgeable” or “Very Knowledgeable”.

Knowledge of universal design of instruction and assessment. Over one third (40.2%) of respondents indicated a 1 or 2 on the Likert scale for knowledge of course design incorporating Universal Design of Instruction and Assessment. Almost one third (31.7%) of faculty selected a 3 or 4 on the Likert scale. Finally, 15.3% of faculty indicated a 5 or 6 on the Likert scale. This question also had the largest percent (12.7%) of respondents choosing “Not at All” of all the knowledge level questions. Figure 2 displays the remaining knowledge scales’ percents from the survey respondents for questions pertaining to knowledge of making accessible instructional materials for students with disabilities, policies within the university pertaining to students with disabilities, and knowledge of UDI.

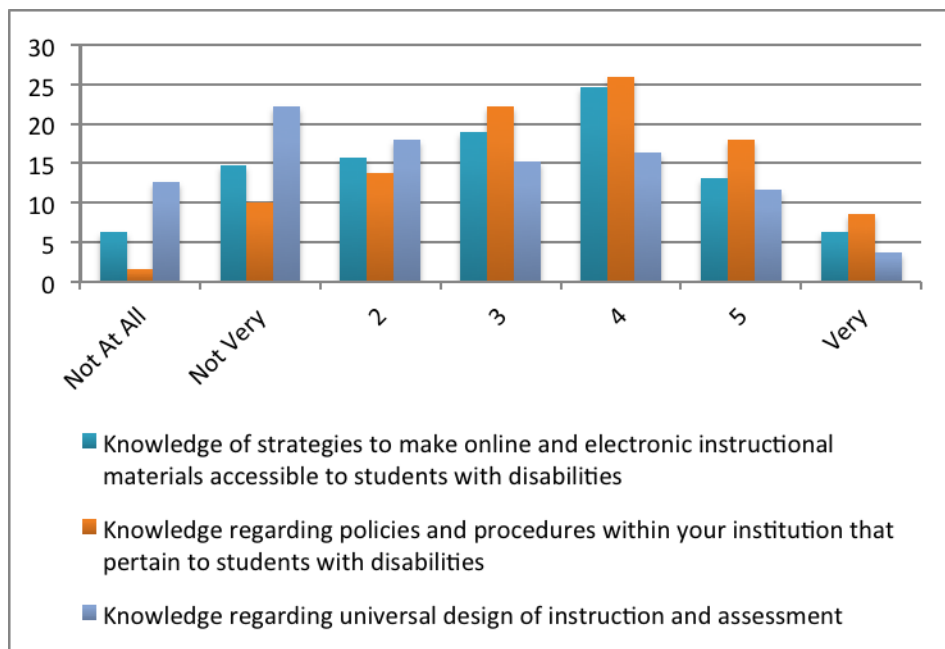


Figure 2: Faculty knowledge scales – part two.

As shown in Figures 1 and 2, many of the responses to the knowledge construct questions were distributed across the full Likert scale for most of the questions. Two questions stood out in these scales because of the higher percentage of faculty who chose to respond as “Not at All” for the questions about knowledge of electronic instructional materials (6.3%) and knowledge regarding Universal Design of Instruction and Assessment (12.7%). Also the percentage of respondents who answered 5 or 6 on these items was also very low, indicating that only (19.5%) of the participants felt knowledgeable or very knowledgeable about the accessible instructional materials question and 15.3% felt “Knowledgeable” or “Very Knowledgeable” about UDI.

Given the fact that this campus has been engaged in a grant focused on UDL since 2008, I would have expected much higher percentages of faculty reporting responses of 5 or 6 on these questions. A variety of workshops and course consultations have been made available to faculty across the university through the work of the grant. However it appears that as of late 2010, many faculty still had little knowledge of the course redesign concepts of accessible instructional materials and UDL or UDI. We were hoping that the UDI questions would be transferable to UDL; however it is also possible that the respondents did not make this transition of course design concepts.

The faculty teaching practice scales are documented with valid percents in Figures 3, 4, and 5. Several questions were asked about syllabi practices, inclusion of accessible presentation materials, online documents and web sites, as well as use of UDI and assessment in course design. The percentages reported for the “Not at All” (NAA) response were quite a bit higher in the Practice scales construct. Over one fourth (26.7%)

of respondents for the syllabus statement question chose NAA, almost one fourth (24.7%) chose NAA for the assessable materials question and over one third (34.4%) chose NAA for the inclusion of UDI and assessment.

Inclusion of a syllabus statement regarding accommodations for students with documented disabilities. Close to one half (45.5%) of the respondents chose either a 5 or 6 on the Likert scale for the question about including a statement in the syllabus regarding accommodations for students with documented disabilities. In fact, 38.7% chose “Very Frequently” for this practice. The 1 or 2 option on the Likert scale was chosen by 21.4% of respondents, which was lower than the percent that chose NAA (26.7%). In addition, only 6.3% of respondents chose a 3 or 4 on the Likert scale.

Incorporation of accessible materials for students with disabilities. Over one fourth (28%) of the respondents selected a 1 or 2 on the Likert scale, indicating that they rarely incorporate accessible materials for students with disabilities. Similarly, 28.5% of faculty chose a 3 or 4 on the Likert scale for this question about the use of accessible materials. Only 18.9% of respondents indicated a 5 or 6 (“Frequently” or “Very Frequently”) on the Likert scale for incorporation of accessible materials into their courses, while 24.7% of faculty chose NAA.

Incorporation of principles of UDI and assessment in teaching. Over one third (34.4%) of the survey respondents chose “Not at All” in response to the question about the degree to which they include UDI in their teaching. The 1 and 2 Likert scale options for either “Very Infrequently” or “Limited Frequency” were chosen by 24.2% of the respondents. Options 3 and 4 were chosen by 28% of the respondents indicating either

“Some Frequency” or “Neutral” on the Likert scale. The smallest percent (13.5%) of respondents chose the top end of the Likert scale selecting either a 5 or 6. Only 3.8% of the 13.5% of the respondents at the high end of the Likert scale chose a 6 (“Very Frequently”) for this question about UDI and assessment in their teaching and course design. Figure 3 summarizes survey responses to questions about faculty practices in relation to UDI and assessment, including a statement in their syllabus regarding learning accommodations and the preparation of accessible materials. Figure 3 shows a bimodal distribution of responses regarding a syllabus statement (blue bar) regarding accommodations for students with disabilities indicating a high peak in percentage results at the “Not at All” end of the Likert scale, as well as a higher distribution at the opposite end of the scale indicating a “6”.

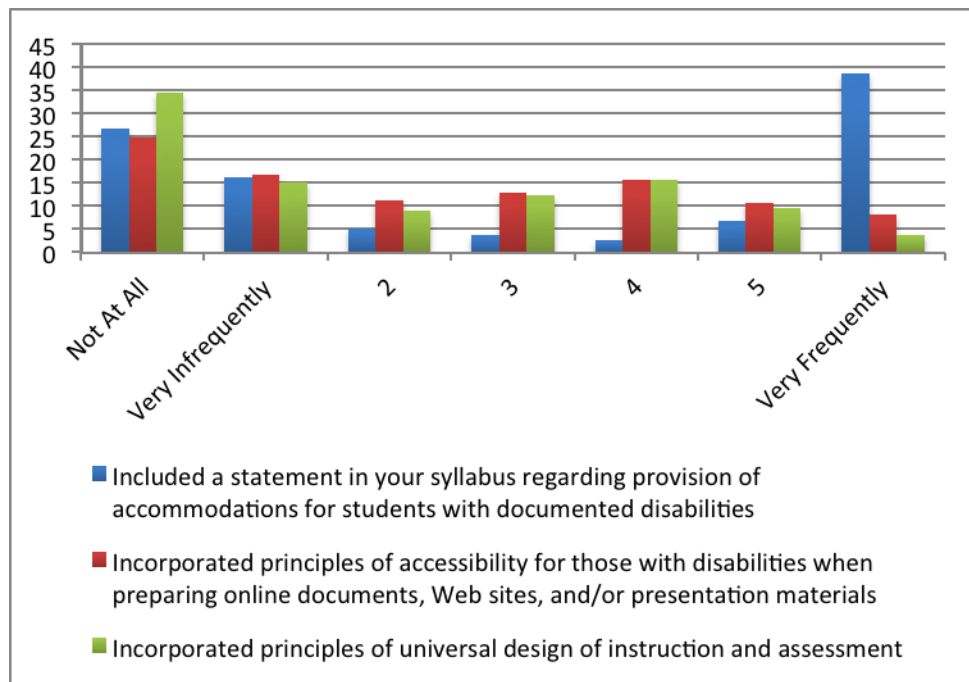


Figure 3: Faculty practice scales – part one.

Figure 4 includes the valid percent result for the remainder of the questions on the faculty practices scales. The next set of questions in Figure 4 asked respondents to rate their willingness to provide accommodations for students with documented disabilities. Figure 5 goes on to document faculty willingness to be involved in developing or revising university policy in response to Federal statutes.

Willingness to provide reasonable accommodations for students with documented disabilities. A very small percent (1.5%) of the volunteer faculty chose 1 or 2 on the Likert scale indicating that they were either “Very Unwilling” or had “Limited Willingness” to provide accommodations. 7.8% of respondents chose a 3 or 4 to indicate their willingness to provide accommodations. An overwhelming majority (90.6%) of respondents chose either a 5 or 6 on the Likert scale, meaning either “Willing” or “Very Willing”, as their response to this question of providing reasonable accommodations to students with documented disabilities. Of that 90.6%, 70.3% indicated that they were a 6 on the Likert scale, (“Very Willing” to provide accommodations).

Willingness to provide test accommodations for students with documented disabilities. Only a small percent (1.5%) of the respondents selected a 1 or 2 on the Likert scale for this item, while 3.1% of respondents chose a 3 or 4 (“Some Willingness” or “Neutral”) on the Likert scale. The largest percent of respondents (95.3%) selected a 5 or 6 on the Likert scale to say they were either “Willing” or “Very Willing” to provide or facilitate test accommodations for students with documented disabilities. Table 4 summarizes the volunteer faculty responses about their willingness to provide accommodations to instruction and testing to students with documented disabilities.

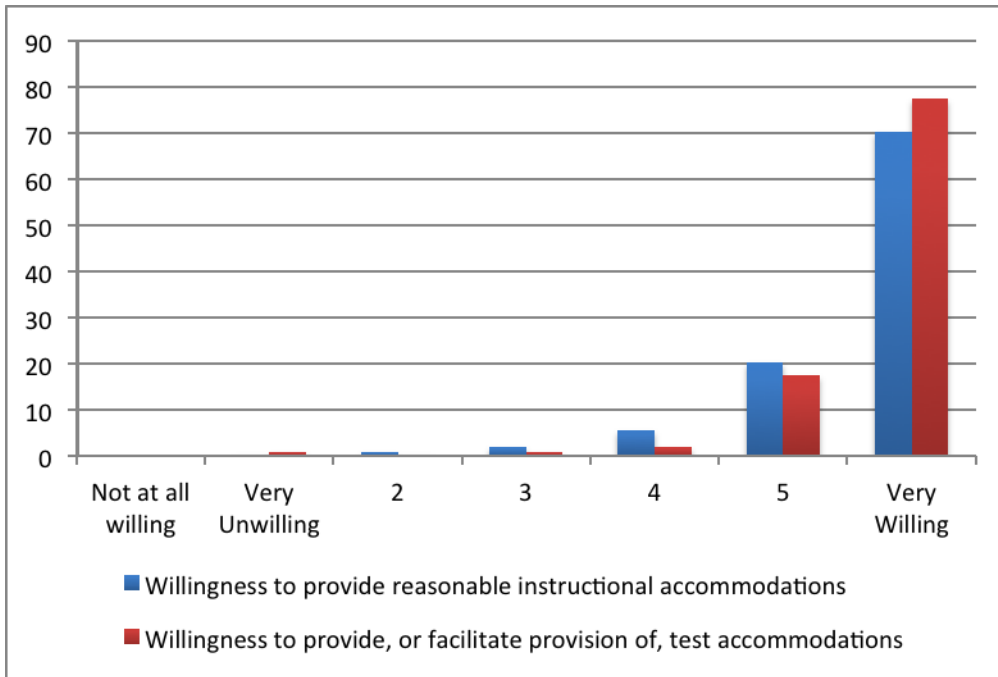


Figure 4: Faculty practice scales – part two.

Willingness to be involved in developing or revising policy or procedures in response to Federal statutes to meet the needs of students with documented disabilities.

The results for this question were varied, a small percent (9.5%) even chose “Not at All Willing” to be involved in policy development. Almost one third (31%) of the respondents chose a 1 or 2 on the Likert scale. The options of 3 or 4 on the Likert scale were selected by 36.3% of the respondents indicating either “Limited Willingness” or “Some Willingness” to work on developing or revising policy for students with documented disabilities, and not quite one fourth (23.2%) of the respondents selected a 5 or 6 on the Likert scale for this policy revision and development question. Figure 5 provides a summary of these responses.



Figure 5: Faculty practice scales – part three.

Figure 3 shows the results of what the volunteer survey respondents indicated as current practices they engage in providing for students with disabilities. Figures 4 and 5 show the responses to the level of willingness for survey respondents to provide these practices, as part of the accommodations they could be doing to students with disabilities. In Figure 3, it was striking how many respondents chose NAA for the three practices in that part of the survey. However, 38.7% of the survey respondents chose 6, “Very Frequently” for the question about including a statement in the syllabus regarding accommodation for students with documented disabilities, 26.7% chose NAA. It seems that the volunteer faculty are on a bi-modal distribution for the syllabus question.

The next two questions in Figure 3 concern practices of using accessible instructional materials and principles of UDI. Prior to administering the survey, I expected that higher percentages of respondents would indicate choices a 5 or 6 for these questions. The reason for this expectation on my part was again the fact that this campus had a UDL project present since 2008. Workshops, web site resources, and individual faculty course design consultations have taken place since the beginning of the grant to get the word out to faculty on campus about using assessable materials and the creation of those materials, as well as the use of UD in course design and instruction.

The fact that 24.7% of respondents chose “Not at All” for the question about incorporating accessibility online documents, web sites, and presentation materials for students with documented disabilities was a surprise. Is the word not getting out to faculty about the work of the grant? Clearly there is a disconnect somewhere in the work of the grant, the amount of people attending faculty development workshops, and the actual practice that survey respondents are incorporating.

Over one third (34.4%) of faculty chose NAA for the incorporation of UDI, very similar to UDL, in their own teaching. I wonder if this is because they do not know about the work of the UDL grant on campus, or are they consciously choosing not to incorporate these concepts.

On a more positive note, Figure 4 shows the volunteer survey respondents indicating a strong willingness to provide reasonable accommodations for students with documented disabilities and also willingness to facilitate or provide test accommodations. The Likert scale for these two practices had a very high percentage of respondents

choosing 6 (“Very Willing”): 70.3% chose 6 for providing accommodations, and 77.6% of faculty choose 6 for providing test accommodations. These results are encouraging for the willingness of respondents. Why hasn’t this willingness translated into the practices in Figure 3?

Finally, I believe the last practice question on policy development and revision had a number of respondents choosing NAA (9.5%), 1 (14.2%), 2 (16.3%), 3 (22.6%) and 4 (13.7%) because of the level of time commitment this type of involvement in policy could potentially entail. I was encouraged to see 23.2% of respondents would be interested in policy revision and development.

The final scales for research question one are the survey questions associated with faculty attitudes towards students with disabilities. The questions in this construct are created in the form of asking the fairness to students without disabilities if the following supports and accommodations are provided to students with disabilities. Questions are included in these scales that address modifying department/institution academic requirements, financial aid determination, department/institution graduation requirements, and giving students with documented disabilities their assignments early if requested. These questions are address in Figures 6 and 7 below.

Fairness to students without disabilities when department/institution academic requirements are modified for students with disabilities. Over one third (34.6%) of the respondents indicated a 1 (“Very Unfair) or 2 (“Unfair”) on the Likert scale for modifying department or institution academic requirements for students with documented disabilities. Close to one third (31.9%) of respondents indicated a 3 (“Somewhat

Unfair”) or a 4 (“Neutral”) for this question. Meanwhile, over one fourth (28.1%) of faculty consider this to be either a 5 (“Fair”) or a 6 (“Very Fair”).

Fairness to students without disabilities when financial aid determination policies are modified. Twenty-one percent of survey respondents selected either a 1 or 2 on the Likert scale about this question of financial aid modification fairness. Over one third of respondents (41.3%) chose the middle part of the Likert scale, 3 or 4, indicating they thought this was either “Somewhat Unfair” or “Neutral”. About one third (33.7%) thought this practice was either “Fair” or “Very Fair”. Finally, 4.3% of respondents said this practice was “Not at all Fair”.

Fairness to students without disabilities when department or institution academic graduation requirements are modified. Modifications to academic and graduation requirements seemed either “Very Unfair” or “Unfair” to 40.8% of respondents. About one third (33.1%) of the respondents thought this practice was either “Somewhat Unfair” or “Neutral”. Eighteen percent of faculty thought this was a “Fair” or “Very Fair” practice. Figure 6 displays the results to the three attitudes scales questions regarding fairness to students without disabilities when accommodations are provided to financial aid policies and department or university requirements.

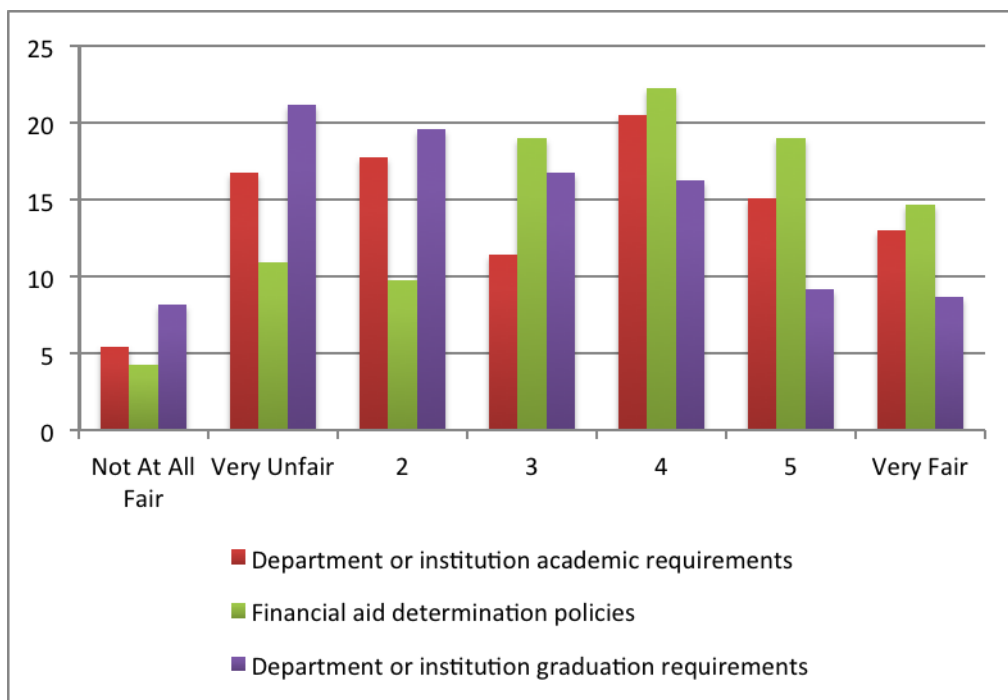


Figure 6: Faculty attitudes scales – requirements and policy questions.

Faculty should give students with documented disabilities their assignments early if requested for either class, lab or other learning experiences. The low end of the Likert scale, 1 (“Very Strongly Disagree”) or 2 (“Disagree”), was chosen by 10% of the respondents for this type of practice, while 29.1% of the respondents chose a 3 or 4 on the Likert scale, indicating either “Somewhat Disagree” or “Neutral”. Over half (60.3%) of the respondents choose a 5 (“Agree”) or 6 (“Very Strongly Agree”) on the Likert scale for this question.

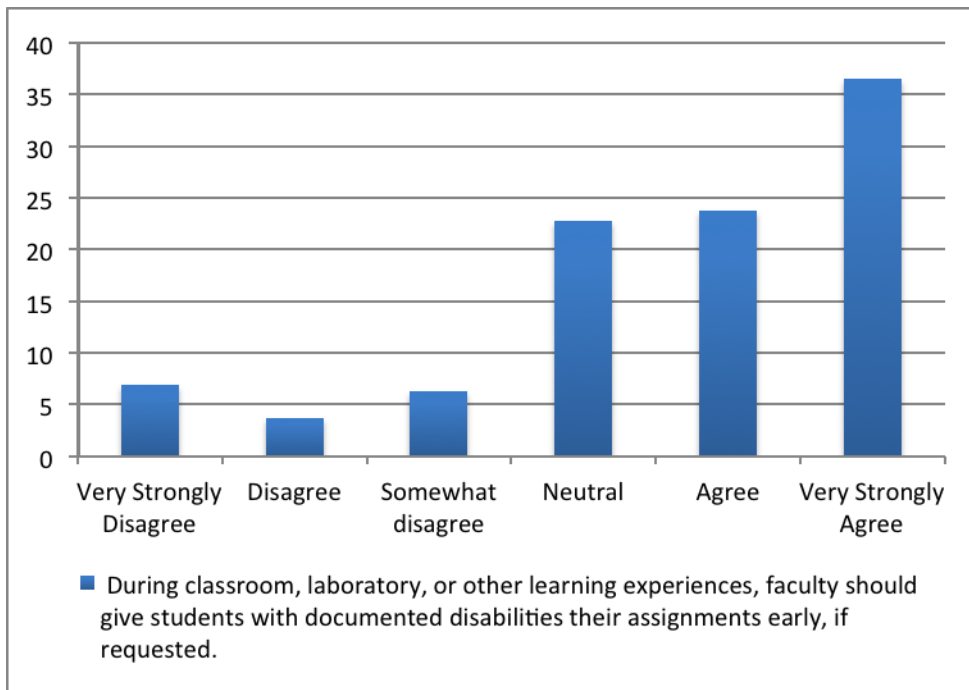


Figure 7: Faculty attitudes scales – early assignments.

The faculty attitudes scales bring up a diverse set of replies for the volunteer faculty respondents. Figure 6 shows a range of replies for the fairness towards students without disabilities when certain modifications are made for students with disabilities. Modifications to academic requirements, financial aid policy, and graduation requirements brought up a range of responses. The graduation requirements modification seemed to bring up the most controversy. The option of early assignments in Figure 7 was considered to be a positive modification, with over half of the faculty choosing a 5 or 6 in agreement to this practice.

The attitude construct survey questions go on to ask about fairness to students without disabilities when certain instructional accommodations are provided to students with documented disabilities.

Fairness to students without disabilities when the following accommodations are provided for students with documented disabilities: Course syllabus before given to students without disabilities. The low end of the Likert scale, 1 (“Very Unfair”) or 2 (“Unfair”), was chosen by 4.4% of the respondents for this accommodation, while 17.2% of the respondents chose a 3 or 4 on the Likert scale, indicating either “Somewhat Fair” or “Neutral”. Over half (77.8%) of the respondents choose a 5 (“Fair”) or 6 (“Very Fair”) on the Likert scale for this question. Only .6% of the respondents chose “Not At All Fair” for this question on the survey.

Fairness to students without disabilities when the following accommodations are provided for students with documented disabilities: Priority seating. Well over half (94.2%) of the respondents choose a 5 (“Fair”) or 6 (“Very Fair”) on the Likert scale for this question, while 4.3% of the respondents chose a 3 or 4 on the Likert scale, indicating either “Somewhat Fair” or “Neutral”. The low end of the Likert scale, 1 (“Very Unfair”) or 2 (“Unfair”), was chosen by 1.6% of the respondents for this type of practice.

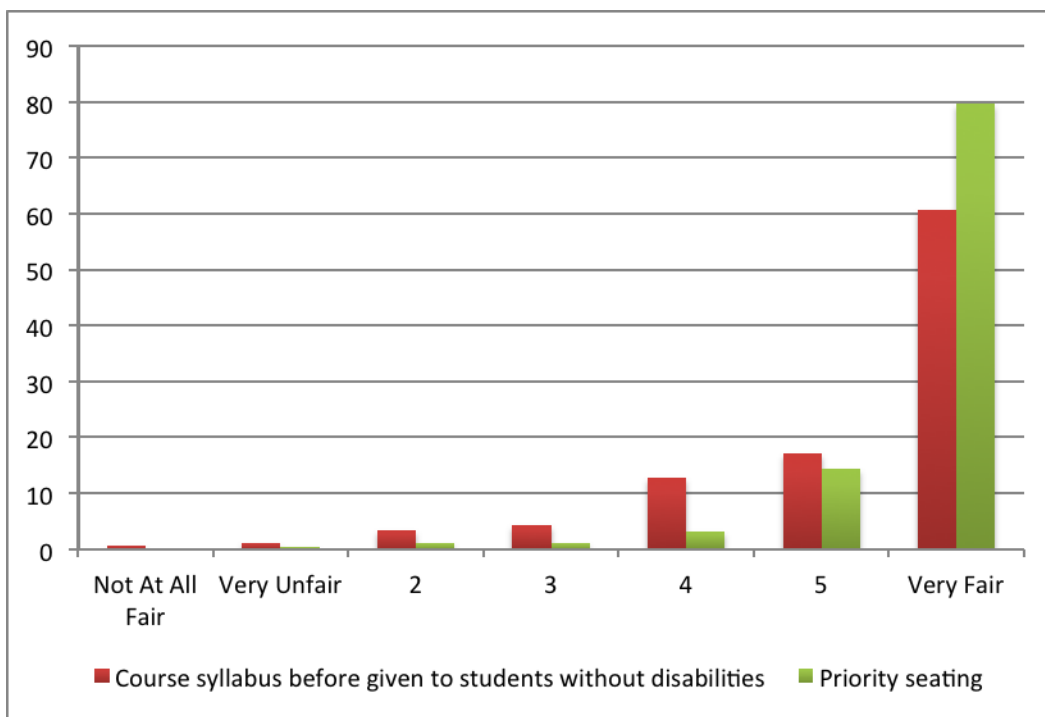


Figure 8: Faculty attitudes scales – accommodations provided part one.

Fairness to students without disabilities when the following accommodations are provided for students with documented disabilities: Extended time on exams. The low end of the Likert scale, 1 (“Very Unfair” or 2 (“Unfair”), was chosen by 3.2% of the respondents for this accommodation, while 11.7% of the respondents chose a 3 or 4 on the Likert scale, indicating either “Somewhat Fair” or “Neutral”. Over half (85.1%) of the respondents choose a 5 (“Fair”) or 6 (“Very Fair”) on the Likert scale for this question.

Fairness to students without disabilities when the following accommodations are provided for students with documented disabilities: Priority registration. In contrast to the other questions in this accommodations category, this question was not rated as high

on the fairness scale. Only 39% of the respondents choose a 5 (“Fair”) or 6 (“Very Fair”) on the Likert scale for this question, and 40.4% of the respondents chose a 3 or 4 on the Likert scale, indicating either “Somewhat fair” or “Neutral”. The low end of the Likert scale, 1 (“Very Unfair”) or 2 (“Unfair”), was chosen by 17.9% of the respondents for this type of practice. Three percent chose “Not at All Fair” to this registration question.

Fairness to students without disabilities when the following accommodations are provided for students with documented disabilities: Materials in accessible formats.

Ninety-one percent of respondents reported a 5 (“Fair”) or 6 (“Very Fair”) on the Likert scale for this question concerning the accommodation of providing materials in accessible formats. A small percent of only 7.9% of respondents chose a 3 or 4 on the Likert scale, indicating either “Somewhat Fair” or “Neutral”, while .5% of the respondents chose a 1 (“Very Unfair”) on the Likert scale.

Figure 9 shows the valid percent results for these three accommodation questions. The priority registration question was the most distributed across the Likert scale. The volunteer faculty respondents were very favorable on the extended time on exams question as well as the question of providing materials in accessible formats for students with documented disabilities.

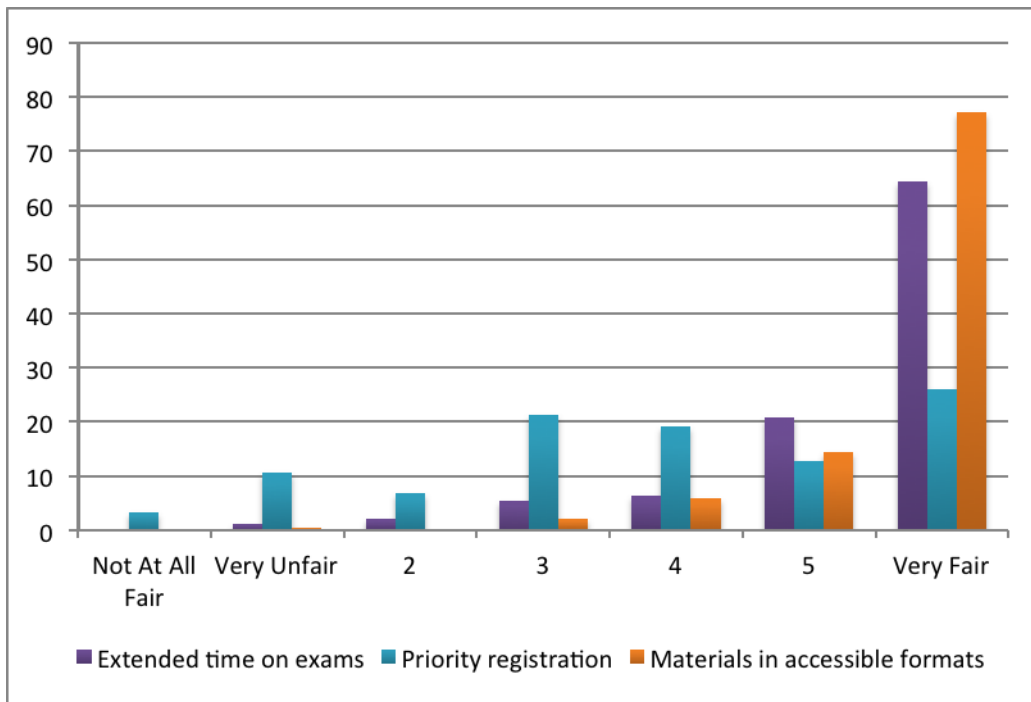


Figure 9: Faculty attitudes scales – accommodations provided part two.

Research Question 2: To what degree are specific characteristics of faculty members (e.g., male/female, tenure/non-tenure, part-time/full-time) associated with a variation in knowledge of practices and attitudes towards students with disabilities?

The volunteer faculty respondents were 40.9% males and 59.1% females. This calculation was created using the descriptive statistics function in SPSS and creating frequencies for the male and female recoded nominal variable.

Hypothesis 2: There is a relationship between a faculty member’s background characteristics and his or her knowledge of practices and attitudes towards students with disabilities. The hypothesis is rejected for all of the knowledge scales according to

gender, except for one question. After running a non-parametric test independent sample Mann-Whitney test of the knowledge scales with the grouping according to the gender variable, question 7 on the survey resulted in a .01 level of significance.

Null Hypotheses 2.1: There is no statistically significant relationship between a faculty member's gender and his or her knowledge of practices and attitudes towards students with disabilities.

As shown in Table 1, the Null Hypotheses is retained for all the knowledge scales, except for Question 7. Question 7 about knowledge of Federal mandates was statistically significant at .01, with a Mann Whitney Non-Parametric Test. When looking at the medians for the males and females on the knowledge scales in Table 1, it may be seen that there is more than a point difference in the medians on Question 7. The females have a median of 4.0 and the males a median of 2.5. Questions 4, 10 and 11 also show a point median difference in the "Female" and "Male" responses, with the higher point medians coming from the female respondents.

The Null Hypothesis 2.1 is retained for the gender variable on the practice and attitudes scales running Non-Parametric Mann-Whitney tests of the distribution and Non-Parametric Median tests.

Null Hypotheses 2.2: There is no statistically significant relationship between a faculty member's tenure status and his or her knowledge of practices and attitudes towards students with disabilities.

Using the Mann-Whitney Independent Samples Test for Medians, Null Hypotheses 2.2 is retained for all the knowledge scales. However, there is a general

direction for two of the medians to be a point higher for the Tenure Faculty on Questions 4 and 10. However, in Table 2, the Median for the Non-Tenure faculty is a point higher for Question 11 on UDI.

The Null Hypothesis 2.2 is retained for the Tenure and Non-Tenure Faculty status on the Practice scales, except for two questions. Questions 15 and 17 reject the Null Hypothesis using the Non-Parametric Mann-Whitney Test for ordinal medians. Table 3 shows the medians for both question 15 and 17. The Non-Tenure Faculty had a median of 5.00 for Question 15 about including a statement in the syllabus about learning accommodations for students with documented disabilities, while Tenure Faculty had a median of 1.00 for Question 15. Also, on Question 17 about incorporating Universal Design for Instruction and Assessment in your teaching, Non-Tenure Faculty had a median of 2.00 and Tenure Faculty a median of 1.00.

Null Hypothesis 2.2 is retained for Tenured and Non-Tenured respondents for the attitudes scales based on Independent Samples Median Tests and Independent Samples Mann-Whitney Tests with a significance level of .01

Null Hypothesis 2.3: There is no statistically significant relationship between a faculty member's part-time or full-time work status and his or her knowledge of practices and attitudes towards students with disabilities. We must retain Null Hypothesis 2.3 because there were not enough cases of part time respondents to run and statistics on this hypothesis. The amount of part time respondents was only two cases.

Table 1: Median Table on Gender of Faculty

Gender	4.) How knowledgeable are you about disabilities in general?	6.) How knowledgeable are you regarding accommodations that students with documented disabilities requested or may request?	7.) How knowledgeable are you regarding the Federal statutes and/or regulations that pertain to students with disabilities in higher education?	8.) How knowledgeable are you regarding the Office of Disability Services/ Resources on your campus?	9.) How knowledgeable are you regarding strategies to make online and electronic instructional materials accessible to students with disabilities?	10.) How knowledgeable are you regarding policies and procedures within your institution that pertain to students with disabilities?	11.) How knowledgeable are you regarding universal design of instruction and assessment?	
Male	N	76	76	76	75	75	74	76
	Median	3.00	4.00	2.50	4.00	3.00	3.00	2.00
Female	N	109	107	109	108	109	109	107
	Median	4.00	4.00	4.00	4.00	3.00	4.00	3.00
Total	N	185	183	185	183	184	183	183
	Median	4.00	4.00	3.00	4.00	3.00	4.00	2.00

Table 2: Median Table on Knowledge Scales for Tenure and Non Tenure Faculty

Tenure Status	4.) How knowledgeable are you about disabilities in general?	6.) How knowledgeable are you regarding accommodations that students with documented disabilities requested or may request?	7.) How knowledgeable are you regarding the Federal statutes and/or regulations that pertain to students with disabilities in higher education?	8.) How knowledgeable are you regarding the Office of Disability Services/Resources on your campus?	9.) How knowledgeable are you regarding strategies to make online and electronic instructional materials accessible to students with disabilities?	10.) How knowledgeable are you regarding policies and procedures within your institution that pertain to students with disabilities?	11.) How knowledgeable are you regarding universal design of instruction and assessment?
<hr/>							
Non-Tenure							
N	82	82	83	83	82	83	83
Median	3.00	4.00	3.00	4.00	3.00	3.00	3.00
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Tenured							
N	109	107	108	106	108	106	106
Median	4.00	4.00	3.00	4.00	3.00	4.00	2.00
<hr/>							
Total							
N	191	189	191	189	190	189	189
Median	4.00	4.00	3.00	4.00	3.00	4.00	2.00

Table 3: Median Table for Practice Scales of Tenured and Non-Tenured Faculty

Tenure Status	12.) How willing are you to provide reasonable instructional accommodations for students with documented disabilities?	13.) How willing are you to provide, or facilitate provision of, test accommodations for students with documented disabilities?	14.) Indicate your level of involvement or willingness to be involved in developing or revising policies or procedures in response to Federal statues and/or regulations to meet the needs of students with documented disabilities?	15.) How frequently have you included a statement in your syllabus regarding provision of accommodations for students with documented disabilities?	16.) In preparing online documents, Web sites, and/or presentation materials, how frequently have you incorporated principles of accessibility for those with disabilities?	17.) How frequently have you incorporated principles of universal design of instruction and assessment in your teaching?	
Non-Tenure	N	83	83	82	83	80	80
	Median	6.00	6.00	3.00	5.00	3.00	2.00
Tenured	N	109	109	108	108	106	106
	Median	6.00	6.00	3.00	1.00	2.00	1.00
Total	N	192	192	190	191	186	186
	Median	6.00	6.00	3.00	3.00	2.00	2.00

Research Question 3: Are faculty members' knowledge of disabilities, practices and attitudes related to having experience with students with disabilities in their courses?

Hypothesis 3: There is a relationship between a faculty member's experience with having students with disabilities in their courses and their knowledge of disabilities, practices, and attitudes towards students with disabilities.

Null Hypothesis 3.1: There is no statistically significant relationship between a faculty member's experience with having students with disabilities in their courses and their knowledge of disabilities.

The Null Hypothesis 3.1 is rejected for all the knowledge scale questions except for one. Question 11 was the only question where the Null Hypothesis could not be rejected. This was a question about knowledge of Universal Design for Instruction and Assessment.

Null Hypothesis 3.2: There is no statistically significant relationship between a faculty member's experience with having students with disabilities in their courses and their teaching practices towards students with disabilities.

The Null Hypothesis 3.2 is retained except for Question 16 on the Mann-Whitney Non Parametric Test regarding faculty with experience having students with disabilities in their classrooms. This question pertained to the preparation of accessible materials for students with documented disabilities to use (e.g., web sites, presentation materials, etc.) Table 4 shows the medians for Question 16.

Null Hypothesis 3.3: There is no statistically significant relationship between a faculty member's experience with having students with disabilities in their courses and their attitudes towards students with disabilities.

The Null Hypothesis 3.3 is retained. Question 18 about giving students with disabilities priority registration was close to being significant with a .01 on the Independent Samples Median Test. The Mann-Whitney test showed a .076 for question 18. Tables 5 and 6 show the medians for the questions in the attitude scale for faculty with experience teaching students with documented disabilities

Table 4: Medians of Practices for Faculty with Low or High Experience with Students with Documented Disabilities

Report									
Extreme Knowledge	10.) How knowledgeable are you regarding policies and procedures within your institution that pertain to students with disabilities?	11.) How knowledgeable are you regarding universal design of instruction and assessment?	12.) How willing are you to provide reasonable instructional accommodations for students with documented disabilities?	13.) How willing are you to provide, or facilitate provision of, accommodations for students with documented disabilities?	14.) Indicate your level of involvement or willingness to be involved in developing or revising policies or procedures in response to Federal statutes and/or regulations to meet the needs of students with documented disabilities?	15.) How frequently have you included a statement in your syllabus regarding provision of accommodations for students with documented disabilities?	16.) In preparing online documents, Web sites, and/or presentation materials, how frequently have you incorporated principles of accessibility for those with disabilities?	17.) How frequently have you incorporated principles of universal design of instruction and assessment in your teaching?	
LOW									
N	99	98	100	100	100	99	95	98	
Median	3.00	2.00	6.00	6.00	3.00	2.00	2.00	2.00	
HI									
N	41	41	42	42	42	42	41	40	
Median	4.00	3.00	6.00	6.00	3.50	5.00	3.00	3.50	
Total									
N	140	139	142	142	142	141	136	138	
Median	4.00	3.00	6.00	6.00	3.00	2.00	2.50	2.00	

Table 5: Medians of Attitudes Scales of Faculty Who Have Experienced Teaching Students With Documented Disabilities

Experience level	Status	18.) How fair is it to students without disabilities when the following accommodations are provided for students with documented disabilities: Course syllabus before given to students without disabilities	18.) How fair is it to students without disabilities when the following accommodations are provided for students with documented disabilities: Priority seating	18.) How fair is it to students without disabilities when the following accommodations are provided for students with documented disabilities: Extended time on exams	18.) How fair is it to students without disabilities when the following accommodations are provided for students with documented disabilities: Priority registration	18.) How fair is it to students without disabilities when the following accommodations are provided for students with documented disabilities: Materials in accessible formats	
LOW	N	100	92	97	99	98	100
	Median		6.00	6.00	6.00	4.00	6.00
HI	N	42	40	41	39	41	41
	Median		6.00	6.00	6.00	5.00	6.00
Total	N	142	132	138	138	139	141
	Median		6.00	6.00	6.00	4.00	6.00

Table 6: Medians Attitudes Scales of Faculty Who Have Experienced Teaching Students With Documented Disabilities

Experience Level	Status	19.) How fair is it to students without disabilities when the following policies/requirements are modified as an accommodation for students with documented disabilities: Department or institution academic requirements	19.) How fair is it to students without disabilities when the following policies/requirements are modified as an accommodation for students with documented disabilities: Financial aid determination policies	19.) How fair is it to students without disabilities when the following policies/requirements are modified as an accommodation for students with documented disabilities: Department or institution graduation requirements	
LOW	N	100	95	95	94
	Median		3.00	4.00	2.50
HI	N	42	41	41	41
	Median		4.00	4.00	3.00
Total	N	142	136	136	135
	Median		4.00	4.00	3.00

Summary

The survey results must be generalized to the 30% of volunteer faculty who completed the survey, as a non-respondent sample could not be obtained as a measure for bias. The responding faculty indicated a need for professional development about students with disabilities and the federal laws that pertain to higher education. Volunteer faculty respondents reported less than 30% knowledge level on all of the knowledge construct questions about students with disabilities in their courses. This data supports engaging in more professional development opportunities for these faculty to learn about federal laws and the practices that support students with disabilities in the higher education classroom, such as UDL. The willingness of the volunteer faculty respondents to engage in practices that support students with disabilities is high. Seventy-percent-or-more respondents indicated a willingness to provide reasonable instructional accommodations for students with documented disabilities and also to provide or facilitate provision of test accommodations for students with documented disabilities. The attitudes of faculty about making accommodations for students with documented disabilities are also high. Four out of the five attitude scales for making fairness for students without disabilities when certain accommodations were made for students with disabilities were rated as very fair by 60% or more on four of five accommodations listed.

As will be discussed in Chapter 6, it appears that while there is a need for professional development, the volunteer survey respondents are quite willing to engage in the professional development and teaching practices that need to occur. The question still remains as to how to engage the other 70% of faculty who did not reply to the survey or my phone calls.

CHAPTER FIVE: RESULTS OF THE QUALITATIVE DATA ANALYSIS

In this chapter I will discuss the interview results for this mixed methods study. The purpose of the interviews was to gather data on individual faculty in larger enrollment courses of 65 students or more who worked with the Universal Design for Learning Consultation Team at one small New England research university.

According to Roa's Literature Review of Faculty attitudes and students with disabilities in higher education (2004):

Faculty at institutions of higher education need to be better informed about disabilities and students with disabilities to improve their attitudes. Qualitative methods can be used to 'explore' substantive areas about which little is known or about which not much is known, to gain novel understandings. (p. 8)

Five faculty out of 15 met the requirements of having a larger enrollment course of 65 or more students. I sent each of those five faculty members an email invitation to be a part of my study. Four of the five gave a positive response; the other faculty member was out of the country on sabbatical and did not reply to the invitation. Each interviewee was asked about their course of focus for the UDL grant team consultation and what about the types of changes made to the course to create a class in which learning can take place for all students, especially given the context of a large enrollment classroom.

Four faculty across the College of Arts and Sciences, Education and Social Services, and Engineering and Mathematical Sciences participated in the interview process. This included two professional colleges and a liberal arts college. The student enrollments in the courses varied where one course was about 30 students and increased to 64 and then increased again to 78 students in the most recent semester. Increasing

course student enrollments provide a set of challenges to a faculty member such as how to run the classroom facilitation so it is not only lecture and how to manage the large volume of students in one room as far as the classroom management and the way any student collaboration may happen during class. Also the faculty member has a challenge based on the sheer amount of student work to grade and give feedback to given the larger amount of students enrolled in the course. Therefore, it becomes necessary for faculty members to rethink the course design and delivery for larger enrollment courses.

Table 7: Student Enrollment and TA Resources

Pseudonym	Beginning student enrollment	Final student enrollment	Teaching Assistant?
Amanda	298	298	Yes, 5
Dan	30	78	No
Jack	76	90	No, one grader
Edward	1000	1000	Yes, about 10

These faculty volunteered for UDL consultation in order to incorporate UDL principles in their course design to more effectively create learning opportunities for all students.

A professional transcriber transferred all of the audio files from the interviews into text transcriptions. I reviewed the transcriptions while noting specific codes for grouping similar sections of text. I ended up with 11 codes which I then grouped into broader themes and sub-themes. I uploaded the transcription text files into the NVivo 9® software program. I grouped the themes as “nodes” in NVivo 9®. I carefully went

through each transcription and highlighted all the sections of text that corresponded to “nodes”. As I completed this careful review of the transcription text, I ended up with four general themes: general course information and context (CINF), processes through which faculty members can self refer to the UDL consultation team (REF), general course modifications as a result of working with the UDL team (MOD), and feedback regarding the UDL consultation team model and the faculty members’ experience of it (UDLMOD).

Three subthemes emerged as I went over the data in even more detail. These subthemes came out of the overarching theme of general course modifications as a result of working with the UDL consultation team. The subthemes were specific course design changes as a result of the UDL consultation process (CD), changes to classroom instructional strategies (INS), and pedagogical strategies specific to large classes (STRLG). My research questions for the follow up interviews with faculty members teaching courses with student enrollments of 65 students or more in one course section and who have worked with the UDL consultation team model were as follows:

1. What factors contribute to a faculty member’s decision to use Universal Design for Learning (UDL) in course planning and design?
2. Why does a faculty member apply for course design assistance from the UDL grant consultation team?
3. What are faculty perceptions of the UDL consultation team model?
4. What are faculty perceptions of their own changes in attitudes towards students with disabilities?

5. What are faculty's perceptions of their own changes in teaching practice as a result of working with the UDL consultation team?

Before addressing all of the research questions I will describe the four themes and three subthemes that emerged from the analysis of the interview data. All of the interviewees spoke about their decision to self-refer to the UDL grant consultation team. Each faculty member described a different process for coming to the decision to refer themselves to the UDL consultation team. Each person had a different reason for their referral but these reasons were grouped into a theme of UDL Referral (REF).

Course Context and Information

A portion of each of the four interviews about the interviewees' course information was coded as well as the context of the course in the sequence of a particular program or degree. I cannot share all the specific details of the courses as it would be a breach of confidentiality; I can say that each course was required in a program or degree as part of a sequence of courses. Also, each course had enrollments of 65 or more students in a single course section. Edward taught multiple sections of the same course. The other faculty only taught one section of the particular course being used in the UDL consultation team process.

Seeking Support Through a Referral to UDL Consultation

The interviewees were looking for assistance with thinking through the planning of a larger enrollment course, including how to use the Blackboard course management system, or perhaps how to engage more students in a course with a larger enrollment and environment. Some faculty members, including Edward, were thinking about the students with disabilities in their classrooms. He indicated that:

Just given the numbers we have, we end up, number one, having 10-15 ACCESS supported students. Number two, as is typical for this slice of UVM, some of them may not want to disclose their ACCESS support status at the very start of the semester and in talking with ACCESS staff, my understanding is that sometimes what they're (the student) wanting is to sort of set aside all of the scrutiny that was so important to their education in high school because in high school everybody talks to everybody about the student and when you get to college, after they turn 18, FERPA kicks in and then ACCESS policies kick in and so anything to help those students succeed, I'm willing to try just about anything in part because it's my belief that, I believe in the tenets of Universal Design sort of from way back because and good pedagogy is good pedagogy....

In contrast to Edward, Amanda's interest in the UDL consultation was more specific to the challenges of teaching in large enrollment courses. Amanda noted that:

Well, so it's pretty hard to be in a large lecture hall and get to know your students. So, I had made this really terrible, terrible, this was part of the reason why I signed on to UDL in the first place, I had made this terrible mistake in the first year that I did...the course.... Yea, exactly, and I really wanted to get out of this kind of jam I felt I had gotten myself into for the first year.... Rigid rules and not really trying to think as much about what am I trying to accomplish for the student.

Another reason for self-referring to the UDL consultation team was provided by Jack, who described how he had been talking with someone at New Faculty Orientation

about the resources on campus. This person mentioned the option of signing on for a UDL team consultation and this consultation led to the use of UDL in Jack's course design work. Jack described how this process happened. He said:

I think I saw and met some people at orientation so this was, new faculty orientation, that was August 2009. I saw some products that I liked and I think I saw an example of a syllabus that had calendars and maps and pictures and more than what the typical syllabus I thought and then that got me to think about different aspects of teaching.

The multiple ways of representing the syllabus content appealed to Jack. This is one of the three main principles in UDL; however, Jack did not realize that at the time.

Finally, the use of technology was another avenue that led to a self-referral to the UDL consultation team. Dan recalled speaking with me initially about the idea of UDL and possibility of a consult, noting:

Well, there were sort of two elements. One had to do with the technology, although at that time I had no idea of the kind of technology that Rose and Meyer talk in their book but bringing technology into the classroom to make the classroom run more efficiently, increased access and so on and so forth was the motivation. And the other one had to do with this whole idea of equity for students who come, who have different barriers to cross. Now, some of those students are labeled for me. ACCESS will say this person needs more time for their tests or this person wants notes and that led to some changes in the class but it was about those students who don't necessarily fit for whom, they don't fit classes like a glove. In other words, they just do it and do it well. Two main reasons had

to do with technology and then the needs of students, especially students in a large class. They do become invisible and you have to work hard to get to know them. It's different when you're working with 25 students.

A common thread through all these explanations was that student learning was important to these faculty members, particularly in larger enrollment course sections, and for the ACCESS supported students. Most of the interviewees found their way to the UDL consultation team by word of mouth from a trusted source and then got the link to fill out the online form. Dan recalled speaking with me about the UDL grant process:

I think as I remember I was talking with you about using Blackboard© (the course management system), first of all, just to get to know Blackboard but also a way of organizing a large section class. While we were talking, the UDL grant came up and I remember asking you a few questions because there was a big advertisement about people interested in participating in the grant and I said I was interested, not only because of the role of technology in UDL but also, it's always been a question in my mind about, as people walk into my class, and sometimes you can tell from the first day so all right, who's going to get the A and who's going to get the B, so there's something wrong about that. And that's just maintaining distinctions that pre-exist the class. It's not necessarily how you want to teach it.

A paper invitation letter, which Dan indicates when he says "big advertisement", was sent to all teaching faculty at the university from the UDL grant co-principal investigators. Sometimes the faculty member indicated that the referral to the UDL grant team was a way they could think through working with a large group of students and not

having to implement a strict behavior plan for 100 plus students. Amanda reflected on the ways in which classroom management was an issue to her during the initial semester she taught the course. She said:

Yeah, and the students really felt like they were being treated like kindergarteners and I looked at it and I said, what the heck am I doing. That wasn't the only thing. I mean, there were other things that I did in the construction of the class but that, it didn't facilitate, in my mind it didn't facilitate any connect between me and the student so the reason I signed on to UDL was I really wanted to have a way to think through that. So anyway, almost immediately the effect was to back off that because that's what I really wanted to do and to be able to have a group of people be part of a kind of think tank to help me just not be alone in my thinking because I like to hear what other people's thoughts are. I don't work in a vacuum.

The UDL consultation model itself was something Amanda wanted to participate in and felt she could gain some insight from the team. The idea of working with a team of people seemed to be important to Edward also. He noted:

...if you can draw in a team that might help me and my teaching assistants anticipate what would be useful to those students (ACCESS students), then without a doubt, it will end up clarifying things.

When asked whether or not the appeal of the team was powerful for Edward, he replied that it was "number one!"

Course Modifications Using a UDL Lens

Course modification emerged as a main theme. Within this main overarching theme, three subthemes also came out of my analysis. One particular type of course

modification had to do with changes to the current course design. There were also changes to course instruction in the classes themselves, and particular modifications that were implemented in a larger classroom environment that were typical for smaller class sizes but worked well in the larger classes as long as they were planned well and organized. These three codes became subthemes under course modifications.

The interviewees articulated a variety of changes to their course design as well as to their own in class instruction. The faculty I interviewed used various techniques to create a more UDL friendly environment even in the larger course structure. The following course modifications were specific to but not limited to the larger lecture environment.

Large Courses that are Still Interactive and UDL Friendly

Amanda described adding additional student services and supports to the larger course environment. She said, "... I'm going to put out the student resources, the student services, and these are the opportunities that they have." A lot of students that were ACCESS students said, "You know, this is the best help I've ever had." Included in the supports Amanda built into the course was an undergraduate student teaching assistant as a note taker. Amanda described how she changed the note-taking to be part of the regular course design.

...I'm going to get some A students that I know are really good in this class, and I'm going to get them to take notes, and it worked, because I posted the notes that the students, they're undergrads almost speaking to other undergrads, so I posted—I had those students write the notes, a grad student come to the class, so I have one grad student, one undergrad student. The grad student was there

writing questions for the exam based on what I was talking about, so that's what their job was and the student who wrote the notes would forward the notes to the grad student just for review, just to make sure everything was accurate. Whoever had been in that lecture that day and then it would get posted immediately on Blackboard.

All courses at this university have a Blackboard space that automatically enrolls all the students into the course. It is up to the professor to use it or not. A technique used by Dan to organize the large class environment and increase student learning was reviewing material at the beginning of class using the interactive iClicker® device. Dan, Amanda, and Edward all mentioned using the iClicker student response systems to get students to interact with the content and each other during class time. Dan shared his modifications to his class structure through the use of PowerPoint® slides and the iClicker:

I did review all the time, always took slides from my previous PowerPoint presentations and started them off at the beginning and a lot of times that where I'd use the iClicker and so there'd be a couple of long questions there that I would ask about last time, so there would be two or three clicker questions to review and then one to set them thinking about what they'd read about or what we were going to be working on that day.

Like Dan, Amanda was also paying a lot of attention to how her lecture PowerPoint slides were created. She noted:

I definitely was still reworking the lectures to be more sensitive to the multiple learning styles of the students in a lecture environment, more hands on, more, there's always been student involvement. I have always used iClickers in that environment.

The use of technologies such as Blackboard and iClicker was mentioned by each of the interview participants. Some started using more technologies to communicate with students and offer resources for the content, others used technology to represent their own content in a more visual way, and still others used technology for student engagement with the course content and with each other during and outside class.

Despite the larger class environment, two of the four faculty participants chose to use group work as a way to engage students inside and outside of class. Dan used the group work as a means for engagement in a large course environment, both in and out of class:

They're always sitting in their groups, but that changes three times during the semester and nobody has complained about that. They said they like sitting with other people, getting to know them, but of course that's the nice thing about working in a program, is the sophomores are going to be together for the rest of their time, so they like that. They like being forced to sit with and work with other people.

Jack also used the group work in his large lecture course as a new part of his course design to do a couple things. First, like Dan, he saw group work as a way to help engage students with each other and with the course content. Second, Jack wanted to

create a “real world” environment that you might encounter in the engineering field. Jack described the group set up:

(I tried) ...to mix up people that who I knew were kind of clumped together and then exposed people that were for example transfer students or students that weren't a part of the cohort initially starting at the same time, so for the most part, people were working with people that they weren't, didn't know before, or weren't familiar before so I thought that from a realism point of view was relatively realistic.

Dan was very intentional about the groups he constructed for the class. The groups were based on topics of interest. He told me the story of one student who was having a difficult time in the first group rotation. He said:

I put her in a position in other words where she was going to have to exercise a little bit of leadership for this project to get done well because she's an outgoing person, the person (that they) complained (about.) So I played those kinds of games. Who should go with who and so the next time around, her group, the group is always going to do well between a B- and A+ range. That's the nice thing about the groups, but this person in her second group, there were no complaints, the product was fine and in the third time and there was no issue either. So, that was a change with one person anyway and I don't know if it was because she was with different people the second time around or after the first experience, everybody understood if they don't put their best foot forward in their groups, it's liable to show up on their grades, and so on....

but based on their feedback, each time I regrouped them, the groupings became fairly intentional based on their collegial abilities, collaborative abilities. That's a place where I feel I was able to control to the good for individuals. Not always successfully but

Dan spent a fair amount of time on his UDL action plan regarding group work design in a large class environment and how to do roles as well as self and group assessments. His UDL work seemed to pay off well for his students in terms of creating various challenges and supports for a variety of learners.

Amanda also worked with the UDL team to add groups to her learning environment. However, her focus was on cooperative group training for her Graduate Teaching Assistants so they could use this teaching technique in their labs of 20 undergraduate students. She indicated that this made a big difference in the lab sections:

You're a TA with two labs that have 20 students in each section, you've got roughly four to five papers per lab so that ends up being 8-10 papers and you've got to stay on top of that. Okay? So it just occurred to me that in order to help the students out I should, the grad students out, I should be working in a cooperative learning approach at the very beginning of it and it did improve things. I had far, far fewer problems in the labs this year than I have in the past years, just by adding that teaching segment.

Course Modifications that Make the Course Design More Transparent to Students

Edward felt he got a lot out of the UDL consultation around the design and accessibility of his syllabus and course schedule. He went from a very confusing course

schedule in a Word® table format to a very accessible Google Calendar file that was color-coded by assignments, quizzes, and exams. His syllabus design also became more transparent and he added office hours to the course, in order to seem more transparent and assessable as a faculty member. He noted the ways in which the redesign of the syllabus and the schedule were items on his action plan that led to positive outcomes:

I think the biggest thing, and it is a big thing, is having us both revise the schedule and the calendar but also keep that aspect of the calendar/syllabus, always, it's still not done. But it became clear after the initial consult that that was something that the team had identified as something high priority that we could do and that we really saw through....

What the student can manipulate is literally the calendar because it's a Google calendar but they can go in and so there's a separate calendar for what goes on "in class" compared to "exams" compared to "homework" compared to "quizzes."...They're all colors. And so when they click on the course menu item in Blackboard®, the default is it shows all the colors (in a Google browser window), that they can then click and change views to what they are interested in seeing for that calendar day....

This course modification was a big change for Edward and it proved very successful as a clarification to students of what was due when and what the next assignments were in the course. These relatively small changes made a huge difference based on the sheer amount of students that Edward teaches. He was able to be clearer and have students feel like things in the course were well organized and therefore easier to follow. Jack also reflected about his organization of the course:

The most positive thing was that it was a general consensus that I was really organized and so setting a timeline, even if it's a short and compressed timeline, there was a clear expectation of what I wanted from them and clear expectation of what we were going to do in each class. But that's really the main feedback that I can go with for the entire class....

Each of the interviewees commented on the degree to which clarity and organization are two components of a course that really help to make the course accessible for all students. Confusion produces barriers to accessing the content. The more the students can understand what is expected of them in a class, the better the chances of becoming successful.

Two of the interviewees ended up changing their course textbooks with the help of the UDL consultation team. Amanda and Dan both decided to include textbooks that were geared towards a larger pool of learners instead of books that were very text based. The new textbook choices had an online version in one case, as well as more images, diagrams, and links to web pages for more information. Amanda talked about her decision to change textbooks:

The other thing too is that I could see where the amount of detail that the other book was going into could be, could get a student really lost. Like if I'm studying for an exam, do I have to know all these examples? So I think that that helped.

Edward was also considering a change in textbook for the fall. He was interested in a digital textbook with more images, diagrams, and web resources as well.

Reflections about the UDL Consultation Team Model

The collaborative environment of the UDL grant consultation team model encompassed a variety of perspectives. This type of consultation seemed to appeal to people as opposed to the expert model of an individual consultant. The collaborative process of the UDL consultation team is defined by a team of people figuratively wrapping their knowledge, expertise, and perspectives around a faculty member to support them in their use of the UDL principles as a framework to redesign their course.

The UDL consultation team consisted of at least two or three other people, in addition to the faculty member. The UDL consultation team members were generally a faculty member working on the UDL grant, a graduate student working on the UDL grant, and also a technology advisor/ specialist from the UDL grant. Several interviewees indicated that they enjoyed being able to focus on their own course with several other people who also enjoyed thinking about the possibilities that exist for learners in their particular course.

Amanda particularly liked the UDL consultation team configuration and the way that it encouraged open and non-judgmental conversations. She reflected on the UDL grant consultation team model by saying:

I think the part that I liked the best, and this is just me, is that I really like to be in a place where anything can come out. Anything can come out, it's a think tank. I really like brainstorming and having people throw things out and see if it sticks and if it doesn't, that's fine, move on. It just gave me an opportunity to stop the world and get off and think and I don't always have the luxury of doing that and

because there were so many different points of view, different ways of looking at things, different age groupings....

The structure of the consultation model also proved to be a helpful component of the consultation process. The interviewees indicated enjoying the structure of the action plan document created at the beginning of the consultation by the group, and then the set meeting times with the team members for check-ins on the action plan progress. Amanda reflected further that:

The brainstorming was great but I also need the structure. I could brainstorm until I'm blue in the face, and I needed that action plan, so that was very important...And you know I really appreciated some of the technical help. I needed some of the technical help that Peter brought in, a lot. And he was especially good at kind of understanding what I was trying to do and then transferring that into something in Blackboard that I needed it to be. Design stuff, even things that I never would have thought about that just seemed, it seemed so silly to me. Like coming up with a map to show where the lab was. I mean, it never occurred to me that a student couldn't find my building for class but now that I think about past years. Nobody knows how to get there.

The UDL grant consultation team consisted of members that the faculty member might not have generally discussed the course with, including a graduate student in education, a graduate student in counseling, and a grant member who was an undergraduate student at the university employed as a technology specialist on the grant team. This mix of ages, backgrounds, and specialties in these three people, along with

the two senior level faculty members, proved to be a complementary mix of talents, ages, and perspectives. Edward refers to the mix of team members in the following reflection as we spoke in the interview:

Number one was just the structure. People believe what they do, not what they think they think and so it gets on your agenda that it fosters commitment.

Number two is fresh eyes and that is smart, really dedicated people who come to it with relatively little direct experience of the class and that's really useful. And then number three I would say almost fresh eyes like yours, which, because the thing is then to also have people on the team who do have some history with the course. I think that is a uniquely powerful combination....

Dan also commented about the usefulness of a group process for looking at course design:

Well, it's, it was a privilege to be able to sit down with a bunch of educators and tell them what you're doing and get feedback on that and put it with the framework of UDL. Okay. So I always enjoyed that, coming in and being able to talk with the group, (and) ...to be able to work with a group of peers on one's teaching around the principles of UDL is just a great learning experience, and they don't have to do it worrying about whether this is going to get back to their department chair or it's going to show up in the dean's file, so that's just— that's how it should operate. It should be mechanisms for the university to help faculty become better at something they want to get better at.

Dan also commented on the structured portions of the consultation model being a nice way of remaining accountable to the process. He noted that:

Your idea about making the check-in meetings a built-in part of it, I do like that. I said that it could be focused around a particular goal but even if they weren't, it's sort of like a syllabus. If you sign on to UDL, you've got to show up at Mann Hall once every three or four weeks and we're going to talk about what you're doing and so it becomes a commitment and that's me. I operate that way.

Jack also commented on the group process and the ways in which the consultation model provided a heightened sense of accountability among team members.

There were certain things I learned from the group like getting everyone a task, is something that I haven't done very much in other group meeting environments. Getting people to own certain things and setting dates or things that we all try to do but I think it was more obvious in this case that it was a cultural thing, that the UDL group was much more used to as the model, how to operate.

A structured group process was a key component of the mechanics of the UDL consultation team. This process helped the group stay focused and committed to the tasks on the action plan and utilized the capacity of all the members of the team.

Suggestions for the Future

The overall response by the four faculty interviewed was a very positive one. There were some suggestions made for future consultations with the team. Jack described a suggestion about the types of recommendations made to faculty working with

the UDL team, especially those faculty who are junior faculty working on tenure. Jack reflected on this point by saying:

I think more than a few times during our meetings, I would say and other people would agree, well, I think that would be great but considering all of the other things that we're talking about, it might be just icing on the cake or it might be something that you try later on so it gets a little confusing after multiple meetings of, okay, now which one am I prioritizing again. If there was some initial plan that says okay, now which one am I prioritizing again?

He went on to indicate:

It's definitely contextual, but I think that you can only do so many improvements well. If you try to make too many changes, you may get into the situation where you might not do any of them well, so balancing that with the recognition that people have limited amount of time to invest... ,maybe having something that's manageable, one or two things, and that you see results. Get more of a buy-in with the faculty for them to say, "Oh well, that was great." We worked on these two things, these two things worked like a charm.

These suggestions from Jack are very helpful when thinking through how the implementation of the UDL consultation team model might work with a larger amount of faculty, including faculty who might be resistant to participation in the model. It is possible that a chair might suggest that a faculty member participate in the consultation model as part of their professional development based on student evaluations. The organic process of building an action plan with a faculty member was very successful with the self selecting faculty we worked with on this grant; however, the more

prescriptive suggestion that Jack describes might be important for junior faculty and unwilling faculty participants. This clearly was a suggestion worth noting.

Summary

The UDL grant faculty consultation team model shows great promise as a professional development model to engage faculty in thinking about their own course design using the UDL framework. The sub-themes that emerged regarding the course design work implemented in a larger lecture environment were very interesting. The interviewees described a positive level of student engagement created by incorporating group work into the classroom despite the large lecture environment. The use of various technologies such as the Blackboard or iClicker to also engage a large number of students with each other and with the course content was also a practice worth noting as instructional strategies that worked with large groups of students, including those with documented disabilities.

Additionally, the comment that Amanda shared from her students with documented disabilities, about the best help they had ever had, is also important. Her additional documentation of the available supports on campus, as well as the additional links she provided in Blackboard for writing large research papers, clearly made an impact on her students. These suggestions can be carried over into other faculty consultation, particularly with faculty teaching larger enrollment courses.

CHAPTER 6: DISCUSSION

Overview of Study

This mixed methods study focused on the promise of implementing UDL as an instructional strategy to address the learning needs of all students, including those with disabilities. A survey was conducted to gain a broad perspective of faculty knowledge levels regarding students with disabilities, teaching practices that address students with disabilities in the classroom, and corresponding faculty attitudes regarding students with disabilities at one small New England research university. As a follow up to the survey, four faculty were interviewed in order to gain insight into their perspectives on the UDL consultation model that was made available to them through the university.

The research examined for this study showed a limited number of institutions of higher education implementing UDL as a framework for designing instruction that addresses the needs of all learners. There is a much wider knowledge base regarding the use of UDL in K-12 education environments as a result of the Federal laws in place to ensure equal access to public education. Under the Individuals with Disabilities Education Act and/or Section 504, students with disabilities have built-in supports for their particular needs in K-12 education. Once these students are in college, entitlement to services under the IDEA ends and the supports and services available through Section 504 and the Americans with Disabilities Act may feel less defined. Generally speaking, students with disabilities in higher education work with the office on campus that helps to support students. Students then use a letter from the support services office to request learning and environmental accommodations of each instructor. It is up to the individual instructor to address these requests.

Summary of Findings

The section that follows summarizes my findings through the two sets of research questions that guided the study: questions related to the faculty attitudes survey, and questions related to the interviews with faculty members who participated in the UDL consultation model. As previously stated in Chapter 3, I was not able to obtain a non-respondent sample to compare to the respondent sample and check for bias. Therefore, the results obtained from the survey correspond to what is considered a volunteer sample of 30 percent of the campus faculty. The results discussed below are from this 30 percent of the faculty respondents and cannot be generalized to the entire campus, or considered baseline data for the UDL grant.

Research Questions Regarding the Faculty Attitudes Survey

Research question 1: What are the knowledge levels, practices, and attitudes of faculty members with respect to higher education for students with disabilities at a small New England research university?

Volunteer faculty respondents reported generally low levels of knowledge regarding federal policy for students with disabilities in higher education, campus policies, and overarching knowledge about disabilities in general, with less than 30% reporting a strong level of knowledge. In Chapter 4, the results for the survey, I combined the levels of the Likert scale because most of the percentages were quite low on their own for the knowledge questions. The highest combined valid percent was on the question regarding knowledge of accommodations. About 43% of respondents responded with a 5 or a 6 on the Likert scale for this question, with 6 indicating the strongest degree of support for each question. In contrast, 40.2% of the volunteer

respondents chose a 1 or a 2 on the Likert scale for the question concerning their knowledge of Universal Design for Instruction and assessment.

UDI is different from UDL; however, the overarching concept is similar being that the instructor uses UD as a basis for designing an educational environment in which all learners can be successful. Since we could not easily change the questions due to time constraints, the grant team was hoping that the UDI concept would be transferrable knowledge to the UDL concept. However, I am not sure that this was the case given the low knowledge levels.

The volunteer respondents had a range of answers to the questions about teaching practices associated with students with disabilities and approaches to supporting students' learning needs. Three of the practice scale questions got almost one fourth or higher for the "Not At All" option on the survey. This was outside the 1-6 Likert scale. These items were about providing a syllabus statement for accommodations addressing the needs of students with disabilities, providing accessible materials, and for using UDI.

Given the volunteers' sample responses, it is possible that the awareness level of potential instructional options for higher education faculty could be a more distinct focus of faculty professional development on campus. Interestingly, almost one half of the respondents chose a 5 or a 6 on the Likert scale for providing a statement in the syllabus regarding learning accommodations for students with disabilities. It appears that when the volunteer sample of 30% of the faculty members knew about this type of statement for their syllabus, they were more likely to act on their knowledge and provide this simple change to their documents. The issue then becomes how to get the word out about

these practices so that more faculty will be informed about the options they might provide to students with disabilities and all students in their courses.

For the most part the faculty attitudes questions turned up very favorable attitudes towards students with disabilities among the volunteer sample of faculty. Most of the willingness levels were also quite favorable on the 5 or 6 range of the Likert scale. Out of the 5 questions regarding faculty attitudes about the fairness of certain accommodations to students without disabilities, the majority (77% or greater) of the volunteer respondents chose a 5 or 6 on four of the five questions.

The one question that received lower ratings on the Likert scales was about providing priority registration for students with documented disabilities. This pattern suggested that while volunteer faculty reported positive attitudes about providing accommodations, these same respondents viewed the practice of allowing priority registration as a more controversial topic. It is possible they may have had concerns about the potential for this practice to negatively affect other students who need to get into classes in order to fulfill graduation requirements.

Research question 2: To what degree are specific characteristics of faculty members (e.g., male/female, tenure/non-tenure, part-time/full-time) associated with a variation in knowledge of practices, and attitudes towards students with disabilities?

The survey results from the volunteer sample of faculty indicated that there is no direct relationship between the knowledge levels of respondents and gender or tenure status. The part time or full time question was not analyzed because there were only two part-time respondents to the survey. The only knowledge question that generated any significance on non-parametric independent sample Mann-Whitney test was the question

about Federal mandates in which the volunteer sample of females generated a .01 level of significance. The null hypotheses are retained for all the practice and attitude scales, with a directional outcome for questions 4 and 10 being a median point higher for tenured respondents. However, non-tenured faculty respondents had a point higher median result for the UDI question.

Research question 3: Are faculty members' knowledge of disabilities, practices and attitudes related to having experience with students with disabilities in their courses?

The survey results indicated a statistically significant relationship between a volunteer respondents' experience with having students in their courses with documented disabilities and their resulting knowledge level about disability Federal laws, campus policies and supports, and general disability knowledge. The only question that was not statistically significant was the knowledge question about Universal Design for Instruction and assessment.

There was not a statistically significant relationship between a respondent's level of experience pertaining to students with disabilities and their teaching practices regarding those students with documented disabilities. One question showed a relationship between experience with students with documented disabilities and teaching practices under the topic of providing accessible materials for students. This item was about incorporating principles of accessibility when preparing online documents, web sites and presentation materials for use in a course. It is possible that the volunteer respondents who have engaged with students who have disabilities in their classes might be more aware of the options available to provide accessible materials as part of their course design.

Research Questions for the Faculty Interviews

Research question 1: What factors contribute to a faculty member's decision to use Universal Design for Learning (UDL) in course planning and design?

The journey to the use of UDL in course planning and design was not a straight line for most of the interviewees. Most of them were not looking to use UDL in their course design; rather, they were just looking for some assistance thinking through the planning of a larger enrollment course, or wondering about how to best use the Blackboard course management system, or maybe considering how to engage more students in a larger course environment. UDL was not the first thing on their minds, although some interviewees were wondering about how to address the needs of the students with disabilities in their classrooms.

The process by which faculty members pursued the UDL consultation was often described as being through “word of mouth” from a trusted source. Jack, for example, described talking with someone at a new faculty orientation about the resources on campus. This person mentioned the option of signing on for a UDL team consultation and this consultation led to the use of UDL in Jack's course design work. The multiple ways of representing the syllabus content appealed to Jack. Blackboard and other technologies also provided a bridge to seeking out a UDL consult in order to make the best use of the iClicker student response system or the Blackboard learning system. These technologies created a conversation with a trusted colleague that might then lead to a suggestion about the UDL grant consultation team as a way of getting more in-depth continuous support.

Research question 2: Why does a faculty member apply for course design assistance from the UDL grant consultation team?

Word of mouth from a trusted source seemed to be the way most people found their way to filling out the online form. Although the UDL project originally approached recruitment through a formal letter of invitation, the four interview participants utilized more informal processes to access the consultation model. This outcome suggested that course design work is very personal to people and that they may prefer to discuss it with trusted colleagues. Additionally, the idea of signing on for a longer consultation process may not seem appealing until someone deconstructs what this process will entail and who is involved.

The team approach to consultation also seemed to appeal to the interviewees. Amanda wanted to participate in the UDL consultation process and saw that the team approach was one that could give her more insight into improving her course. Edward was also looking for a team of people to consult with about his large enrollment course. The UDL consultation team offered a mix of ages, backgrounds and specialties. The diverse perspectives and ideas that resulted appealed to each of the interview participants.

Research question 3: What are faculty perceptions of the UDL consultation team model?

The structure of the consultation model proved very helpful for interviewees. They indicated enjoying the structure of the group action planning. The action planning was followed by scheduled meeting times with different team members for check-ins re-visiting the action plan progress. This structured group process was a key component of the mechanics of the UDL consultation team. The process helped the group stay focused

and committed to the tasks on the action plan and utilized the capacity of all the members of the team.

Research question 4: What are faculty perceptions of their own changes in attitudes towards students with disabilities?

Analysis of the interview indicated that although faculty members' attitudes changed over time, they changed in subtle ways that were reflected in their practices in teaching and course design. Most of the faculty members who voluntarily engaged in the UDL grant consultation process began the process with a positive view towards students with disabilities and wanted them to be successful in higher education; thus, the interviewees did not report drastic changes in attitudes. At the same time, faculty members described ways in which their confidence grew in how to work with students who asked for particular accommodations through the university's support center. Moreover, they found that new skills and confidence translated to other situations. Amanda, for example, reported that in addition to developing a stronger positive feeling towards students with disabilities, her experience with the UDL consultation team positively affected her attitudes and work with the graduate students who assisted with her course and lab sections. It is possible too, that the consultation process might eventually have a positive effect on the attitudes and practices of graduate teaching assistants.

Research question 5: What are faculty's perceptions of their own changes in teaching practice as a result of working with the UDL consultation team?

The interviewees articulated a variety of changes to their course design as well as to their own class instruction. They used various techniques to create a more UDL

friendly environment even within their larger course structures. Amanda described adding additional student services and supports to the larger course environment. Dan, Amanda and Edward all mentioned using the iClicker student response system to engage students with the content and each other during class in a larger lecture environment.

Despite the larger class environment, two of the four faculty interviewees still chose to use group work as a way to engage students inside and outside of class. The group work proved to be a way to engage students with each other and with the course content in a large lecture environment. In addition, Edward felt he got a lot out of the UDL consultation around the use of the new course schedule. He indicated that the schedule was now in a Google Calendar format that students could link to from the Blackboard course management system in order to see the course assignments, quizzes and exams all color-coded. Many students already use Google Calendar to manage their schedule, so this was also an additional way to create a more accessible way to manage the elements of the course in a software program that many students were already familiar with and using daily.

In its current form, the UDL consultation team process is a very individualized professional development model. The faculty I spoke with really enjoyed the action planning process tailored to their own focus. They also found the interaction with the UDL consultation team very positive. They enjoyed the support of a group of individuals with various talents for whom the focus was using the UDL framework to improve their own course for all learners.

Conclusions

This study of volunteer respondents from 30% of the faculty surveyed confirms the research by Vogel et al. (2008) concerning their year one study of faculty attitudes, practices, and knowledge concerning students with disabilities. The current study had a slightly higher response rate of 30% (out of 648 teaching faculty, 192 responded). However, I was not able to obtain a non-respondent sample of faculty to compare to the 30% of respondents; therefore, I can only report the data as results from this particular set of respondents. The data cannot be generalized to the entire campus. Vogel et al. reported a 28% response rate in year one of the study and an 8.9% response rate in year three. The UDL grant does plan to re-administer the faculty survey during the fall of 2011. Data will be compared across both survey years as well and, if necessary, a non-respondent sample will be contacted.

The Vogel study referred to the means as a measure to report results; however, I chose to use the median measure as the variables on the Likert scale which are of an ordinal nature and not nominal. “The median is essentially the middle category of a distribution. We find that by ordering our values from low to high, and then seeing which one the middle one is” (Muijs, 2004b, p. 100). I also used the valid percent measures to report all the base line data of the faculty attitudes, knowledge and practices constructs. Vogel et al. also reports the percent of the respondents on the Likert scales in the results section of their article (2008). I used this percent data as a comparison to the baseline data from my study. I compare the low end of the Likert scale in the Table 8 below.

Table 8: Likert Scale Comparison

Question:	Vogel et al. (2008) Year One 1 or 2 on Likert scale	This study Year One 1 or 2 on Likert scale
Knowledge about disabilities	50%	27.2%
Knowledge about accommodations	19%	14.3%
Knowledge of federal statutes	58%	38.7%
Knowledge of disability services	37%	23.3%

In all cases on the knowledge scales construct, the volunteer faculty responders in my study are at a lower percentage on the low end of the scale. Although the faculty in my study did not report high percentages of knowledge levels on the higher end of the Likert scale, they appear to have a similar if not slightly higher knowledge level of the faculty in the Vogel et al. study (2008).

Vogel et al. (2006) described five characteristics from their literature review of faculty attitudes that may impact attitudes and knowledge about disabilities. These are gender, age, teaching experience, faculty status, and academic rank. I tested two of the five variables in this study and found no statistically significant difference among gender or tenure status among the respondents. Vogel and colleagues say:

Faculty at all three IHEs had an equal degree of self-reported knowledge about providing accommodations. One of the most positive findings across the three IHEs was a high degree of willingness to provide accommodations. (p. 119)

This is a very similar finding to the study I conducted where faculty reported a high level (90% and above) with a 5 or a 6 on the Likert scale for willingness to provide test accommodations and instructional accommodations within the survey practice scales. There is a lot of room for growth in the knowledge scales. I think the model of using web site resources and workshops can be very successful to address the learning needs of the faculty (Vogel et al., 2006). However, I also think based on the interviewees who participated in this study, the promise of the UDL consultation team model is not one to be ignored. Faculty seemed very interested in discussing their courses and their teaching with colleagues who were interested and had expertise to offer advice based on the UDL model of designing instruction.

The structure of the consultation model, including the action planning and the follow up scheduled visits, and including personal support and consultations in between team meetings, was also a key to the success of the UDL consultation team model. Each member of the consultation team was assigned a role for every meeting such as note taker, facilitator and timekeeper. Each person remained accountable to their role and the follow up meetings they needed to engage in to make the action plan successful. The UDL consultation team model described in this study was characterized in a very positive light; however it can also be resource intensive to support the salaries of several team members with this type of course design expertise. The UDL consultation model also required a significant amount of time on the part of the faculty member and the

consultation team members. Allocating enough time in a faculty member's schedule for consultations and follow-up work can be a barrier for some faculty who already feel overwhelmed with their current workload. However, the interviewees described a level of student engagement in their larger enrollment courses that they had not experienced before the UDL consultation course design work. This engagement was a result of the implementation of the UDL principles within the course design work. The group work that was accomplished by most of the interviewees was a great example of how UDL principle of engagement can be implemented; as well as the addition in some cases of the iClicker technology to encourage the students to actively engage with the course content.

This UDL consultation professional development model adds to the current UDL research by providing a new way to help faculty think about their course design with a team of people who can support the implementation of their ideas. The UDL principles and checkpoints provide a research-based framework for the team to use as a guide for building a course that will address the needs of all learners.

Limitations of the Study

The limitations to this study include its small sample size and location in one small New England research university. The voice of the part-time faculty who teach a lot of courses on campus was noticeably silent, with only two respondents from the entire group of respondents. Also, the sample size of my interviewees was small because I wanted to look at faculty members who had taught larger enrollment courses as well as worked with the UDL grant consultation team. This limited the possible pool to only five faculty members.

Four of the five faculty members were able to participate. My study focused on the implementation of UDL in Higher Education; however, the survey instrument did not include questions specifically about UDL. The instructional concept included in the survey was Universal Design for Instruction and assessment. Although this approach is similar to UDL in its focus on creating a more universally designed course to meet the needs of all students, the two concepts are not exactly the same and this wording might have confused the volunteer respondents.

As discussed earlier, a non-respondent sample was not obtained for this study; therefore I can only report the results of the 30% of the faculty who did respond. The data cannot be generalized to the entire campus, and it cannot be considered a baseline of data for the UDL grant team. However, much can still be learned from the 30% of faculty who did answer the survey and who seem to have a favorable attitude towards students with disabilities.

Areas for Further Research

It would be interesting to replicate this study at other similarly sized universities to see if there are any regional differences across the United States or differences according to institutions that were grantees of the federally funded 2008 grants from the Office of Postsecondary Education to improve the learning of students with disabilities in higher education as compared to non-grantees. I think the focus on larger enrollment courses was a particularly interesting challenge for faculty and one that UDL can address in a positive manner.

I would also like to see a faculty survey developed that includes questions about UDL practices, similar to our UDL grant consultation pre and post self-assessments of

faculty. In addition, I would also like to see the part-time faculty represented to a much higher degree in the respondents. I wonder how to increase this response level, maybe additional email reminders or a statement about the importance of all respondents regardless of rank or full-time status.

Another approach to studying the outcomes associated with implementation of UDL practices would be to assess student-learning occurring in the courses where faculty engaged with the UDL consultation team process. This student assessment might confirm the benefits of UDL to all the learners in the classroom. The UDL grant was focused on the professional development of faculty. I am curious to hear from the students about how they perceive the benefits and challenges to UDL implementation in higher education.

In addition, the challenges I faced with respect to the low survey response rate and inability to obtain a non-respondent sample of faculty suggest that there may be a need for more enforced faculty development by departments on campus. This enforcement might come from the department chairs as a mandate from the Office of the Provost concerning knowledge of accessible instructional materials, University and Federal mandates that pertain to students with disabilities, and a syllabus statement about learning accommodations for students. Also, the student evaluations could be expanded to include questions about students' perceptions regarding faculty willingness to provide a variety of learning supports for students. Along with increased enforcement, the university might explore incentives that would prompt faculty to address UDL in their course design. For example, it might be possible to provide faculty with a piece of technology that would help them implement UDL. Supports from student technology

assistants and professional development specialists could assist faculty with the implementation of their ideas. This would help to expedite the process of implementation and help faculty feel supported in undertaking a new set of instructional technologies. Ultimately these instructional changes have to be a part of the promotion and tenure process in order to have faculty feel that they are getting recognition for the additional work they are doing.

The 30% of volunteer faculty who responded to the survey do have a positive attitude towards students with disabilities and were willing to answer a survey about their own attitudes. However, they still lack significant knowledge and practices related to students with disabilities and UDL. I would suggest that the university develop a strategy to link the faculty promotion and tenure process to faculty participation in professional development and compliance with federal mandates. What if all faculty members had their own UDL consultation team? Would instruction improve? Would student-learning soar? It would be interesting to find out.

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