Universal Design and Disability: Assessing Faculty Beliefs, Knowledge, and Confidence in Universal Design for Instruction

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Abstract

The purpose of this study was to investigate faculty belief, knowledge, and confidence in the principles of Universal Design for Instruction (UDI). Results yielded statistically significant correlations between participant's belief and knowledge of the principles of UDI. Furthermore, findings yielded statistically significant differences between faculty rank and the belief in the principles of UDI. Participants who identified as Professors showed a strong belief in the principle of Course Modification whereas Assistant Professors showed lesser belief in the same principle. Finally, all of the response means showed a statistical significance when compared to population parameters from previous research.

Keywords: Universal Design for Instruction, disability, pedagogy

Students with disabilities are attending universities at a greater rate than ever before, with an estimated 11% of the college population being comprised of individuals with disabilities (Snyder & Dillow, 2015). The data, which was collected in 2011-2012, suggests that with this significant enrollment, higher education has struggled to meet the needs of such a growing population whose diverse needs do not always mirror the needs of their peers without disabilities (Banfield-Hardaway, 2010; Black, Weinberg, & Brodwin, 2014; Pliner & Johnson, 2004). Due to the different needs of students with disabilities, professionals within higher education might struggle to integrate these students successfully. Often, students with disabilities report feeling unsupported and underserved (Burgstahler, 2009; McGuire, 2014).

One of the best examples of how higher education has struggled to meet the needs of students with disabilities in the college environment is the method of instruction faculty provide to their students (Black, Weinberg, & Brodwin, 2015; Burgstahler, 2007; Cook, Rumrill, & Tankersley, 2009; Izzo, Murray, & Novak, 2008; Lombardi, Murray, & Dallas, 2013). Many in the disability community argue that the pedagogical model used in higher education perpetuates a learning environment that does not necessarily meet the needs of a diverse and growing population of students who might not learn in "traditional" methods (e.g., oral lecture; Burgstahler, 2007; Cook et al., 2009; Gradel & Edson, 2010; Hergenrather & Rhodes, 2007; Lombardi et al., 2013; McGuire & Scott, 2006; Pliner & Johnson, 2004; Shaw, 2011; Skinner, 2007; Zeff, 2007).

Higher education has changed over the course of history, and students with disabilities have gained a higher level of access to postsecondary education through laws that recognize their rights (Dallas & Sprong, 2015). In a growing movement, disability advocates have called for truly equitable access and total immersion in higher education for students with disabilities (Lombardi & Murray, 2011; Lombardi et al., 2013).

Disability services has played an increasingly significant part in the implementation of Universal Design (UD) in postsecondary education (Gradel & Edson, 2009; Mole, 2012). Accommodations made on campus have not necessarily met the needs of students with disabilities, and some argue that the time has come to move beyond providing minimal legal requirements (Black, et al. , 2015; Mole, 2012). Instead, disability services professionals have started to call for a new way of making higher education accessible

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to students through alterations to pedagogy (Gradel & Edson, 2009; McGuire, 2014; Mole, 2012).

Universal Design originated as an architectural concept focused specifically on making physical structures accessible to individuals with disabilities (Dallas & Sprong, 2015; McGuire, 2014; Zeff, 2007). In the 1970s, Michael Bednar gave birth to the idea that physical structures should be accessible to a diverse population. A prime example of such architectural design is a sloped ramp leading to a building wherein individuals using wheel chairs can access the door where stairs are also present. Access occurs not only for the individual with a disability but also for someone pushing a cart full of items into the same building using the same ramp.

With the original intent of UD being that a physical structure should be accessible to anyone wishing to enter, much of the same intent lies behind the implementation of Universal Design for Instruction (UDI) in higher education (McGuire, Scott, & Shaw, 2003; McGuire, 2014). The intent behind UDI is to provide access for all students approaching course content, ideas, and themes, regardless of their various life experiences and backgrounds.

Universal Design in the educational setting has taken many forms (Edyburn, 2010; Rao, Ok, & Bryant, 2014). Frameworks include Universal Design for Learning (UDL) (Rose, Harbour, Johnston, Daley, & Abarbanell, 2006), Universal Design for Assessment (UDA) (Thompson, Johnstone, & Thurlow, 2002), and Universal Design for Instruction (McGuire & Scott, 2006). All structures share characteristics that seek to enhance the pedagogical approach instructors take to facilitate learning with the students they teach (Lombardi, Murray, & Gerdes, 2011; Lombardi et al., 2013; Shaw, 2011). Universal Design for Instruction (UDI) is a framework that supports use of various instructional methods that serve to reach the greatest number of students and learning styles (Rao, et al., 2014; Block, Loewen, & Kroeger, 2006). Use of UDI allows students of all abilities to have a more holistic learning experience, produces greater outcomes, and possibly decreases issues with persisting to graduation (Block et al. , 2006; Izzo et al., 2008; McGuire & Scott, 2006). We elected to utilize the UDI framework because the first author has specific training in and has worked in several disability resource centers that utilized this framework. The concept of UDI in postsecondary education is to use nine basic principles that help make academia accessible to a much wider array of students, including those of various ability levels (Lombardi & Murray, 2011; Lombardi et al., 2013; McGuire, 2014). According to Scott, McGuire, and Shaw (2003), those principles include:

1. Equitable use—making classroom material accessible to diverse learning needs and style.
2. Flexibility in use—the practice of using a variety of instructional methods.
3. Simple and intuitive use—teaching in a straightforward and predictable manner.
4. Perceptible information—ensuring that course material is accessible to students regardless of their sensory abilities.
5. Tolerance for error—building diversity of learning pace and prerequisite skills into course process.
6. Low physical effort—designing instruction to minimize physical effort so that students can attend to essential learning.
7. Size and space for approach and use—instruction is designed with consideration for appropriate size and space for approach, reach, manipulations, and use regardless of a student's body size, posture, mobility, and communication needs.
8. A community of learners—the instructional environment promotes interaction and communication among students and between students and faculty.
9. Instructional climate—instruction is designed to be welcoming and inclusive. High expectations are espoused for all students.

These principles are paramount for institutions of higher education to move forward with a pedagogical model that meets the needs of students with a diverse array of ability levels (Black, et al., 2014; Black et al., 2015; Block, et al., 2006; Lombardi & Murray, 2011). Without the principles of UDI, proponents could argue that pedagogical efforts in postsecondary education might become stagnant in a time that an increasingly diverse population of students is coming to college campuses. Furthermore, the use of the UDI principles engages all students in a more efficient way because not all students learn and process presented information in the same way (Black et al. , 2014; Pliner & Johnson, 2004).

UDI is an update to the pedagogy of postsecondary education long awaited by students, particularly

those with disabilities (Black et al. , 2015). One of the most significant reasons for the update to pedagogy is that the shift in teaching methods will not only help students with disabilities, but serve a generation of college students better who learn and process information in a fundamentally different way from their peers and past generations of college students (Black, et al., 2014; Scott, Loewen & Funckes, 2003).

Recognizing that UDI in higher education takes an extensive amount of work and does not happen overnight is important (Lombardi & Murray, 2011; Lombardi et al., 2013). To many, UDI is a way to navigate and move forward in higher education with the goal of including the greatest number of students with a greater number of varying cultures, learning styles, experiences, and ability levels. We argue more research and attention must be paid to the concept of UDI if institutions of higher education are ever to be truly accessible (Black et al. , 2015; Gradel & Edson, 2010; Scott et al., 2003; Stodden, Brown, & Roberts, 2011).

Literature

One of the most critical components to implementing UDI might be faculty attitudes toward a shift to UDI. LaRocco and Wilken (2013) discovered that faculty members (*n*=46) know the struggles students with disabilities face in the postsecondary environment, but that faculty were focused more on how pedagogical changes would affect them personally (i.e., requirements concerning effort, time commitment, and skill development). Furthermore, LaRocco and Wilken's research indicated that 46% of faculty surveyed indicated they have an understanding of the basic principles of UDI but were not implementing those principles in their pedagogy or classroom. Gawronski (2014) had similar results in that almost 44% of his faculty participants (*n*=179) believed inclusive instruction was important; yet, they either never or only sometimes implemented UCI practices in the classroom. Unlike LaRocco and Wilken's findings, Gawronski attributed this discrepancy to a possible lack of knowledge or skills for implementing such practices.

Although orientation of the principles of UDI is important, more research and further efforts to implement UDI education into faculty training is needed to create a truly student-centered learning environment (Higbee, 2009; Lombardi & Murray, 2011; Pliner & Johnson, 2004; Scott et al., 2003; Stodden et al., 2011, Black et al. , 2014; Roberts, Park, Brown, & Cook, 2011). Robinson and Hope (2013) argued that pedagogical training should begin in graduate degree programs, and with a mean of 74.40, most participants (*n*=200) agreed. Such research and education could serve to change the perspective and resulting attitudes of faculty concerning implementation of UDI.

In their research, Lombardi and Murray (2011) researched central factors that highlighted three overarching categories that determine a faculty member's attitude, willingness to implement UDI in the classroom, and disability that provides insight into how faculty members might treat students with disabilities in their class. Results yielded that faculty members in the area of education (n=289) reported a more positive attitude toward accommodating students with disabilities and an awareness of disability law. Results from a later study by Lombardi et al. (2013) were similar in that faculty participants (n=612) had positive attitudes toward accommodating students through various practices; however, faculty attitudes correlated directly with the level of training faculty had received prior to the study.

Flores and Rodriguez (2006) argued that since the passage of landmark Affirmative Action legislation, the acceptance of diversity on college campuses has increased. The increase in acceptance could be, in part, due to faculty member's realization that students of diverse populations, including students with disabilities, can be successful, or perhaps such increase in acceptance could be simply because individuals in higher education recognize that, regardless of their personal opinions, trends in the education of college students are changing (Scott et al., 2003). Regardless of whether faculty are more accepting of diversity in higher education, there is still a strong possibility that inequality in the attitudes and expectations of faculty towards individuals with disabilities exists and further presents a significant barrier that students within this population must navigate to make it to graduation (Black et al. , 2014; Flores & Rodriguez, 2006).

Exploring the correlation between a faculty member's use of UDI and their attitudes toward disability is important. Pliner and Johnson (2004) explained that a major challenge in changing the pedagogy to an UDI-friendly environment is the strong desire of faculty to maintain a long-standing status quo. Knoll (2009) and Banfield-Hardaway (2010) attributed part of the challenge of changing pedagogy in higher education to the dominance of a particular culture in higher education. Historically, such a culture has not

included individuals with disabilities or teaching in a method that seeks to meet the learning needs of a broad range of students from various life experiences or backgrounds (Banfield-Hardaway, 2010; Higbee, 2009; Pliner & Johnson, 2004; Shaw, 2011; Vega & Tayler 2005).

Vega and Tayler (2005) discussed part of the challenge in changing the understanding of pedagogy in higher education as being the way that faculty are trained and the pedagogical method that has been implemented, historically, in higher education. Although faculty members are well trained to be experts in their fields of study, traditionally, the classroom has been a place where the faculty merely transmit knowledge (Ertmer, 2005; Higbee 2009; Pliner & Johnson, 2004; Shaw, 2011; Vega & Tayler, 2005). Rose et al. (2006) proclaimed, "Typical courses in universities are dominated by two types of media: lectures and textbooks" (p. 140). The question then becomes: Are these methods effective in teaching students from various backgrounds and varying learning styles? For students with learning disabilities or for students with disabilities that affect gross and/or fine motor skills, the answer is: most likely not.

Friel et al. (2009) and Vega and Tayler (2005) argued that in a 21st century digital age, students should have access to the information faculty teach. According to King-Sears (2009), Kinney and Kinney (2008), and Vega and Tayler (2005), the role of faculty, who served previously as the only means of information dissemination to students, is no longer necessarily true given technological development and extensive use of technology of the current generation. As King-Sears noted, students have access to a myriad of information given the scope of the worldwide internet. Such advances in technology include the use of online platforms utilized by most postsecondary institutions wherein faculty have the ability to share digital content, such as lecture notes or digital copies of readings with students. The dissemination of course material in digital format gives students the flexibility to access information wherever they have access to the internet.

Outside of institution-controlled technology, the advent of technological tools, such as YouTube or Vimeo, has provided faculty the opportunity to present ideas and concepts in multimodal approaches to facilitate learning. Providing captioned videos that cover course content, demonstrate concepts, and represent ideas visually implements additional ways of aiding students' learning. The ability to comment and leave comments on the video site or platform allows for real time feedback and promotes a community of learners.

Vega and Tayler (2005) contended that the faculty member's role has shifted from solely transmitting information to acting in the capacity of a facilitator. In this role, faculty members are not necessarily responsible for ensuring a student learns the material, so much as faculty are responsible for assisting the student with interpreting the information. Advocates of UDI call for a redefinition of pedagogy that takes the focus of education away from the information that the faculty member transmits and places the focus on the way students learn and the experiences they have in the classroom (Gradel & Edson, 2010; King-Sears, 2009; McGuire & Scott, 2006; McWilliam & Dawson, 2008; Pliner & Johnson, 2004; Scott et al. , 2003; Shaw 2011; Vega & Tayler, 2005; Zeff, 2007). Pliner and Johnson (2004) explained, "UDI engages faculty in thinking more broadly about the following: what they teach; why they teach it; and, why and how they assess student learning" (p. 107). Edyburn (2010) and Orr and Hammig (2009) argued that using UDI in creating curriculum is of importance for individuals with disabilities because changing the pedagogy to reach more students could lead to the day where academic accommodations afforded under federal law are no longer needed.

The purpose of our study was to analyze the potential relationship between faculty members' knowledge, confidence, and beliefs in the principles of UDI. Specifically, we wanted to know whether faculty were knowledgeable of UDI principles, their belief in the implementation of UDI principles, and their confidence level in exercising such implementation. An additional purpose was to discover whether certain demographic factors (i.e., faculty rank; biological sex) had any influence on faculty members' beliefs, knowledge, or confidence in the principles of UDI. We modeled our study after several prior studies, all with a similar premise.

In their study, LaRocco and Wilken (2013) sought to assess the correlation between the level of concern faculty had regarding teaching students with disabilities adequately and their use of UDI. These authors used the Concerns Based Adoption Model (CBAM) which, "focuses on describing, measuring, and explaining the experiences of those attempting to implement an innovation" to collect data (p. 2). This measurement scale comprised a portion of the survey

instrument and established a faculty member's initial level of interest in implementing change within their course and overall curriculum to serve the educational needs of students with disabilities better. LaRocco and Wilken assessed and compared the faculty member's level of reported concern for students with disabilities to their use of UDI principles in creating curriculum for courses they taught. The current study complements the latter part of LaRocco and Wilken's survey instrument by assessing faculty belief of the principles of UDI. Results from LaRocco and Wilken's study showed that faculty members were most concerned with how implementing the updates to the curricula would affect them and how those updates would affect their amount of work.

In a similar study, Lombardi and Murray (2011) focused on measuring faculty willingness to accommodate students with disabilities and adopt principles of Universal Design (UD) in building their courses. Lombardi and Murray utilized the Expanding Cultural Awareness of Exceptional Learners (ExCEL) survey, a precursor to the ITSI. The ExCEL was divided into three sections: (a) demographic information, (b) questions about prior disability-focused training, and (c) questions pertaining to the perception of disability. The findings from Lombardi and Murray's study indicated that female faculty were more likely than male faculty to accommodate students with disabilities. Also, tenure-track faculty appeared to be less accommodating and less willing to implement principles of UDI in their courses than their non-tenure-track faculty peers were. Later, and utilizing the newly revised ITSI, Lombardi et al. (2013) produced research that indicated females with prior disability training had more positive attitudes than males in the subscales of accommodations, disability law and concepts, inclusive lecture strategies, and inclusive classroom, whereas males with prior disability training showed more positive attitudes in the subscales of accessible course materials, inclusive assessment, and course modifications. Finally, results from a study by Gawronski (2014) yielded findings that indicated age and ethnicity made a difference in faculty attitudes; however, results based on teaching status (i.e., full-time or part-time) indicated no significant differences between the two statuses. Gawronski did not report findings based on biological sex (i.e., male/female).

To guide the current study, we focused on four hypotheses:

H1: There is no statistically significant relationship between the faculty members' scores of the *Beliefs, Knowledge, and Confidence* subscales concerning Universal Design for Instruction practices.
H2: There are no significant differences between reported mean responses (population parameters) and the responses of study participants on the *Beliefs, Knowledge, and Confidence* subscales concerning Universal Design for Instruction practices.
H3: There are no statistically significant differences between faculty scores on the *Beliefs, Knowledge, and Confidence* subscales of Universal Design for Instruction practices based on faculty rank.
H4: There are no statistically significant differences between faculty scores on the *Beliefs, Knowledge, and Confidence* subscales of Universal Design for Instruction practices based on biological sex.

Methodology

Population

The population for this study comprised faculty and instructors at a mid-sized, mid-south public university. A participation invitation was distributed to all faculty members employed at the institution (N=653), of which 85 agreed to participate (13% response rate). Sixty (71%) participants completed the survey leaving 25 (29%) who did not finish the survey. Of the remaining 60 faculty members, 25 (41.7%) had tenure status, 12 (20%) were working toward tenure, and 23 (38.3%) were non-tenure track. Thirty-six (60%) were female, and 23 (38.3%) were male. One participant (1.6%) did not indicate biological sex.

Instrumentation

Inclusive Teaching Strategies Inventory ([ITSI]; Lombardi et al., 2013). The Inclusive Teaching Strategies Inventory (ITSI) survey consists of 41 questions grouped into eight constructs under three domains: *Beliefs*–(a) Inclusive Classroom Strategies, (b) Inclusive Lecture Strategies, (c) Accommodations, (d) Course Modifications, (e) Inclusive Assessment, and (f) Accessible Course Materials; *Confidence*–(g) Disability Law; and *Knowledge*–(h) Campus Resources (Lombardi et al., 2013). Questions in the ITSI survey solicit responses related to a faculty member's belief, knowledge, and confidence in the principles of UDI.

Lombardi and Murray (2011) conducted a field test of the ITSI's predecessor, the Expanding Cultural awareness of Exceptional Learners (ExCEL) survey, to evaluate for validity and reliability. Setting the criterion at a minimum of 0.70 for adequate reliability and a minimum of .80 for preferable reliability, Lombardi and Murray determined that the internal coefficient alphas ranged from 0.60 to 0.85 across the factors; the overall alpha coefficient was 0.88. In addition to a demographic section (e.g., gender, faculty rank, age), the ExCEL contained sections regarding prior disability-focused training experience and faculty attitudes and perceptions of disability. Lombardi and Murray developed the faculty attitudes and perceptions section based on Murray, Wren, and Keys' (2008) survey regarding faculty perceptions of students with learning disabilities. In addition, Lombardi and Murray derived items from literature related to Universal Design for Learning (Rose, et al., 2006) and Universal Design for Instruction (Scott, et al., 2003).

Lombardi, et al. (2011) amended the name of the ExCEL to ITSI during their research. This change came after both rigorous development of the instrument and multiple validation studies, including Lombardi and Murray (2011). Results from a study by Lombardi and Sala-Bars (2013) confirmed structure of the ITSI used in Lombardi et al.'s (2011) study, which contained seven factors.

Data Analysis

We were interested in determining whether there was a statistically significant correlation between a participant's beliefs, knowledge, and confidence in the various principles of UDI. In addition, we were interested in potential differences between the subscales of faculty participant belief, knowledge, and confidence in UDI and their reported professorial rank and biological sex.

To find the score scale for the beliefs, confidence, and knowledge questions of the ITSI survey, we computed the scale scores first. The Belief scale consisted of the subscales, *Accommodations, Accessible Course Materials, Course Modifications, Inclusive Lecture Strategies*, and *Inclusive Assessment*. The Confidence scale consisted of the *Campus Resources subscale*. After computing the scale score for each area pertaining to UDI, we calculated the means for each subscale.

The Pearson product-moment correlation coefficient (Pearson *r*) was used to study relationships between the subscales of the survey. Next, we applied a series of one-sample t-tests to compare the mean subscale responses to the published population parameters. Finally, we applied the ANOVA procedures to the demographic grouping variables and the sub-scales to analyze for differences among the identified group.

Results

The first action completed to test our hypotheses was to develop descriptive statistics for each of the scales and demographic metrics. The instrument scales are reported as average item responses for each scale. Frequencies are reported for the specific demographics of *professor rank* and *participant sex.*

Next, we wanted to test the hypothesis that there would be no statistically significant relationship between participant scores on the subscales of the three major ITSI scales (i.e., *Beliefs,* and *Confidence*). Correlations ranged from r = .260 for the relationship between the belief in *Accessible Course Content* and belief in *Accommodations* to *r* = .542 for the belief in *Accessible Materials* and the belief in *Inclusive Classroom Strategies*. Alternately, topics such as *Campus Resources*, which is a subscale a participant's knowledge of UDI, showed little correlation with other topics. Table 1 highlights the correlations between the subscales.

The next hypothesis involved comparing scale results to the original results reported by Lombardi and SalaBars (2013). We used one-sample t tests to compare the means to the reported parameters (Table 2). The results indicated the subscale means were significantly different from the reported statistics of the instrument.

To test the next hypothesis, we compared scaled scores across various faculty ranks (Table 3). Due to low frequency in two categories (visiting instructors and adjunct professors), we combined those categories into a new category (Visiting/Adjunct) to represent more equalized group sizes. With this adjustment, the Levene's test indicated that all variances were equal across the groups, specifying that the ANOVA statistic was sound. The results of these comparisons indicated significant differences between both full professors and associate professors and associate professors and Visiting/Adjunct instructors on the subscale of *Course Modification*. Associate professors ($\overline{x}$ =1.63) tended to rank lower than both full professors ($\overline{x}$=2.92) and Visiting/Adjunct instructors ($\overline{x}$=2.89) on that subscale.

Finally, *t*-tests were utilized in the last hypothesis by comparing scaled scores by participant sex (Table 4). The results indicated females scored higher than males in three specific subscales: *Inclusive Lecture* (x=4.41 vs. $\overline{x}$=4.04), *Inclusive Classroo*m ($\overline{x}$=4.31 vs. $\overline{x}$=3.78), and *Inclusive Assessment* ($\overline{x}$=3.58 vs. $\overline{x}$=3.11).

Overall, the results from this study supported the hypotheses partially by indicating there are significant differences on several scales when comparing our sample to the reported population statistics. In addition, faculty rank comparisons resulted in significant differences between both full professors and associate professors and associate professors and Visiting/Adjunct instructors in one subscale. Associate professors scored lower in making modifications to course content for diverse learners than did both full professors and Visiting/Adjunct instructors. In addition, participant sex comparison indicated that females scored higher in the three scales related to inclusive strategies.

Discussion

The purpose of this study was to analyze the potential relationship between a faculty member's beliefs, knowledge, and confidence of UDI. An additional purpose was to discover whether certain demographic factors (i.e., faculty rank and biological sex) had any influence on a faculty member's beliefs, knowledge, or confidence in the principles of UDI.

Numerous correlations from the data between *Beliefs* (Accommodations, Accessible Course Materials, Course Modifications, Inclusive Lecture Strategies, Inclusive Classroom, and Inclusive Assessment), *Knowledge* (Campus Resources), and *Confidence* (Disability Law) showed significance at both the p=0.05 level and the p=0.01 level (Table 1). The number of positive correlations is important because the results support the belief of several researchers that UDI is gaining momentum as a viable pedagogical approach (Higbee, 2009; LaRocco & Wilken, 2013; Lombardi et al., 2013; Scott et al., 2003; Tincani, 2004). The positive correlations found in this study among the various subscales suggest that faculty could be signaling their awareness of the needs of students and, therefore, might be more willing to consider implementing a new pedagogy that makes material more readily accessible (Higbee, 2009; Shaw 2011).

Pliner and Johnson (2004) suggested that because UDI is such a relatively new concept, experienced faculty might not have had much exposure to its concepts. This writing led us to believe that there was going to be a difference between experienced faculty (e.g., Professor) and faculty with less experience (e.g., Visiting/Adjunct instructors or Assistant Professors). Also, given King-Sears' (2009) observation about the use of technology to facilitate several of the principles of UDI, we assumed, incorrectly, that experienced faculty might not have exposure to technology. The assumption was that they might be more comfortable using low-tech strategies (e.g., lectures) to teach. The results of the present study suggest that, although there is significance between the faculty ranks in one subscale (i.e., course modification), results indicated that associate professors were less likely than professors or Visiting/Adjunct instructors in making modifications to their courses to accommodate all learners. A plausible explanation could be what Tunguz (2016) called the investment of "emotional labor" between faculty of various tenure statuses. Although not connected directly nor guaranteed by most universities necessarily, gaining both tenure and a promotion from assistant professor to associate professor occurs concurrently usually. Tunguz noted that male tenured faculty were less likely to invest emotional labor in their students than male non-tenured faculty. Tunguz noticed insignificant differences in female faculty. More research is necessary to understand whether the results of both our and Tunguz's studies indicate significance or trend.

The results in our study, when analyzed based on biological sex, are similar to those of Lombardi, et al. (2013), whose study suggested that women, overall, had greater belief, confidence, and knowledge of the principles of UDI compared to their male counterparts. The results of Lombardi, et al.'s study indicated women were more likely to engage in both inclusive classroom and inclusive lecture practices, but that men were more likely to engage in inclusive assessment practices. The results of our study supported those findings partially. The results indicated women were more likely than men to engage in all three inclusive practices. From a stereotypical standpoint, one explanation could be that women are more sensitive to the needs of those around them; however, this explanation lacks support. Unfortunately, there appeared to be a dearth of research to offer a plausible explanation of the differences found between the male and female participants.

Of the subscales, *Accessible Course Materials* had the most correlation with the other subscales. Positive statistical significance was high for a majority of the relationships with other subscales indicating that most participants who responded to *Accessible Course Materials* might believe positively in the other subscales pertaining to UDI. There was only one subscale, *Campus Resources*, where the relationship was not statistically significant. *Campus Resources* showed no correlation with any of the other subscales used to assess a faculty member's beliefs, confidence, and knowledge of the principles of UDI. A feasible conclusion is that faculty might be well informed about the resources on campus regardless of any other beliefs, knowledge, or confidence they have about UDI.

Limitations

As with any study, this research contained several limitations. Perhaps one of the most significant limitations to this research is the low response rate. Although distributed to 653 faculty members, only 85 (13%) started or partially responded to the survey. Of those 85, 60 (71%) participants completed the entire survey, thus, limiting the number of responses useable for analyzing. According to Shih and Fan (2009), a low electronic survey response rate is not uncommon when conducting research.

A second limitation is the method in which we distributed the survey. The ITSI went to all 653 faculty members at the midsized mid-south teaching institution where we conducted our study. In choosing to distribute the survey to the entire 653-person faculty, we created a potential for strong response bias in this study. The potential for bias might have occurred because distributing the survey to every faculty member allowed those with a passion for UDI or disability issues to respond to the survey while giving those opposed to the topic the opportunity to ignore the invitation to participate.

The geographical location where this research was conducted could have presented a limitation to the research. The school is a midsized teaching institution in the mid-south portion of the United States. Responses might have been different if conducting the study in a different type of institution or geographical location. Differences in environments and geographical locations were two of the explanations Gawronski (2014) attributed to discrepancy in some of his findings. Not having a strong research component to the university or in the region in which the university is located could have created a limited exposure of participants to the principles of UDI. This could have affected participant responses.

As discussed by Lombardi and Murray (2011), a limitation of the survey instrument used in this study is the potential for response bias on the part of faculty. The ITSI is a self-report survey; therefore, faculty might have chosen to misrepresent their beliefs or exaggerate their knowledge regarding the principles of UDI. Additionally, given that the instrument relies on faculty self-report of their beliefs, the results might misrepresent actual use of UDI principles in courses participants teach.

One final limitation could relate to institution type. Lombardi, et al. (2013) conducted their study at a predominately research institution. One of the factors that might have contributed to why the means collected in our study are so markedly different from the population parameter in Lombardi, et al.'s study is because the institution where we conducted our study is a predominately teaching institution. A difference in the type of institution from previous research might have affected faculty training and lead faculty in Lombardi, et al.'s study to have a higher belief, knowledge, and confidence in the principles of UDI (Scott et al., 2003; Shaw, 2011).

Recommendations for Further Research

Changing how higher education approaches the education of students seeking postsecondary instruction has, and will continue, to evolve (Mole, 2012; Evans, 2008; Higbee, 2009; Izzo et al., 2008; LaRocco & Wilken, 2013). As the pedagogy changes, UDI will allow faculty to facilitate learning with a wider array of students (Scott et al., 2003). Modifying the ITSI to assess a greater number of UDI practices and capture more participant responses on more college campuses will help solidify a research base that allows for best practices to form.

Another suggestion for further research includes assessing the ITSI survey instrument against other existing Universal Design (UD) survey instruments. For example, Black, et al. (2014) used a method of combining research instruments from various authors, such as Leyser and Greenberger (2008) and Van Laarhoven, Munk, Lynch, Bosma, and Rouse (2007), to conduct their study of assessing the attitudes of faculty members toward UDI and disability in the classroom. In comparing the survey instruments, re-

searchers can consider and add further improvements to strengthen the validity of the survey.

Another recommendation for additional research is to differentiate between Universal Design for Instruction (UDI), Universal Design (UD), and Universal Design for Learning (UDL) more accurately, if possible, and clarify the attributes of each school of thought. At present, terms and theory are often used interchangeably in postsecondary education. This might cause a significant issue for reliability and validity for the research and implementation of updates to pedagogy.

A final recommendation is the expansion of faculty education in the area of UDI. Instructional Development and Teaching Excellence Centers on college campuses could provide existing faculty with required training on UDI principles. In addition, graduate programs, whose students are training to become faculty, could implement UDI awareness and principles within their college teaching courses (Robinson & Hope, 2003). Dallas and Sprong (2015) argued for universal design principles training for rehabilitation counselors (RC) and, of course, that training could begin in the rehabilitation counseling graduate programs. Implementation of those principles into course creation could aid graduate students and faculty in making accessible courses that benefit a greater number of students. Because the principles of UDI are a relatively new concept and each principle of UDI is extensive and vitally important, Teaching Excellence Center staff could facilitate an ongoing series of courses with each session covering one principle. Such an approach would allow faculty the opportunity to understand the individual principles better and how faculty could incorporate specific practices of each principle in their course instruction. Multiple studies referenced in this article yielded results indicating that those faculty with prior disability-related training had more favorable attitudes towards student with disability and implementation of UDI practices (see Dallas & Sprong, 2015; Lombardi et al., 2013).

Campus communities would be well served by a refocusing of the Disability Support Services (DSS) office on campuses. Often times, DSS offices focus on making appropriate accommodations for students with disabilities to make higher education accessible. A shift in the theoretical approach from a service provision model to a resource model could aid DSS in being better equipped to assist in the expansion of UDI on campus. If DSS was to focus more on being a resource to faculty in implementing UDI in their courses, the office's responsibility of implementing accommodations could be reduced. Students would be served better by the pedagogical shift, and, potentially, the office could expand their mission in other ways to ensure that all areas of the university are more accessible to students with disabilities.

Conclusion

Many believe that the way students learn in the postsecondary setting has changed (Burgstahler, 2009; Cook et al., 2009; Edyburn, 2010; Ertmer, 2005; Evans, 2008; Gradel & Edson, 2010;; Higbee, 2009; King-Sears, 2009; Kolb & Kolb, 2005; McGuire & Scott, 2006; Pliner & Johnson, 2004). The departure from the school of thought that professors needed knowledge only in their discipline has been an on-going topic of debate in higher education (Major & Palmer, 2006). Meeting this change and, therefore, meeting the needs of a diverse collection of students with a wide-array of abilities is through the knowledge and implementation of UDI in course curriculum (Lombardi et al., 2013; Pliner & Johnson, 2004; Zeff, 2007).

UDI is becoming as recognized as a practice that is in no way a legal requirement, but instead the best and correct thing to do to teach what is being called a new generation of learners (Edyburn, 2010; Gradel & Edson, 2010; McWilliam & Dawson, 2008; Pace & Schwartz, 2008; Vega & Tayler, 2005). That is, students who have disabilities, as they are coming to campus in greater numbers, but also students who utilize technology to aid in their learning more so now than ever before. The new generation of learners does not replicate previous models of education in which faculty are distributers of knowledge, but, rather, facilitators of the knowledge and resources to which students have access (Block et al., 2006; Burgstahler, 2007, 2009; Cook et al., 2009; Evans, 2008; Gradel & Edson, 2010; Higbee, 2009; King-Sears, 2009; Major & Palmer, 2006; McGuire & Scott, 2006; Pace & Schwartz, 2008; Rose et al., 2006; Scott et al., 2003; Shaw, 2011).

Results to studies, such as this one, suggest that faculty members are becoming increasingly aware of UDI and the practices that make the institution of Higher Education accessible for a greater number of students (Ertmer, 2005; Gradel & Edson, 2010; Izzo et al., 2008; Lombardi et al., 2013). Such practices

are hopeful as they show the commitment of a growing number of faculty members in higher education to provide course material in a way that is accessible. With that increase, however, comes the recognition that there is still room for higher education to grow in attaining a higher level of accessibility (McGuire & Scott, 2006; Scott et al., 2003). In fact, increasing the incorporation of UDI training in faculty preparation programs could boost the accessibility of instruction significantly and reach a greater number of students with diverse learning styles and needs (McWilliam & Dawson, 2008; Pace & Schwartz, 2008). Such practices are important as they show an institutional dedication to UDI and accessibility for students from a wide array of abilities and life experiences (Black et al. , 2015; Gradel & Edson, 2010).

References

Banfield-Hardaway, S. (2010). Universal instructional design: Tools for creating an inclusive educational experience. *The Vermont Connection 31*, 21-28.

Black. R. D., Weinberg, L. A., & Brodwin, M. G. (2014). Universal design for instruction and learning: A pilot study of faculty instructional methods and attitudes related to students with disabilities in higher education. *Exceptionality Education International. 24*(1), 48-64.

Black, R. D., Weinberg, L. A., & Brodwin, M. G. (2015). Universal design for learning and instruction: Perspectives of students with disabilities in higher education. *Exceptionality Education International, 25*(2), 1-26

Block, L. S., Loewen, G., & Kroeger, S. (2006). Acknowledging and transforming disabling environments in higher education: AHEAD's role. *Journal of Postsecondary Education and Disability, 19*, 117-123.

Burgstahler, S. (2007). Who needs an accessible classroom? *Academe, 93*(3), 37-39.

Burgstahler, S. (2009). *Universal design of instruction (UDI): Definition, principles, gUDIelines, and examples: DO-IT*.

Cook, L., Rumrill, P. D., & Tankersley, M. (2009). Priorities and understanding of faculty members regarding college students with disabilities. *International Journal of Teaching and Learning in Higher Education, 21*(1), 84-96.

Dallas, B. K., & Sprong, M. E. (2015). Assessing faculty attitudes toward universal design instructional techniques. *Journal of Applied Rehabilitation Counseling, 46*(4), 18-28.

Edyburn, D. L. (2010). Would you recognize universal design for learning if you saw it? Ten propositions for new directions for the second decade of UDL. *Learning Disability Quarterly, 33*, 33-41.

Ertmer, P. A. (2005). Teacher pedagogical beliefs: The final frontier in our quest for technology integration? *Educational Technology Research and Development, 53*(4), 25-39.

Evans, N. J. (2008). Theoretical foundations of Universal Design for Instruction. In J. L. Higbee & E. Goff (Eds.), *Pedagogy and student services for institutional transformation: Implementing universal design in higher education* (pp. 11-24). Minneapolis, MN: University of Minnesota.

Flores, A., & Rodrigues, C. M. (2006). University faculty attitudes on affirmative action principles toward faculty and students. *Equity & Excellence in Education, 29*, 303-312.

Friel, T., Britten, J., Compton, B., Peak, A., Schoch, K., VanTyle, W. (2009). Using pedagogical dialogue as a vehicle to encourage faculty technology use. *Computers & Education, 53*, 300-307.

Gawronski, M.E. (2014).*Universal design for learning: Perceptions of faculty and students at a northeastern community college* (Unpublished doctoral dissertation). Colorado State University, Fort Collins, CO.

Gradel, K., & Edson, A. J. (2010). Putting universal design for learning on the higher ed agenda. *Journal of Educational Technology Systems, 38*, 111-121.

Hergenrather, K., & Rhodes, S. (2007). Exploring undergraduate student attitudes toward persons with disabilities: Application of the disability social relationship scale. *Rehabilitation Counseling Bulletin, 50*(2), 66-75.

Higbee, J. L. (2009). Implementing Universal Design for Instruction in postsecondary courses and curricula. *Journal of College Teaching & Learning, 6*(8), 65-78.

Izzo, M. V., Murray, A., & Novak, J. (2008). The faculty perspective on universal design for learning. *Journal of Postsecondary Education and Disability, 21*, 60-72.

King-Sears, M. (2009). Universal design for learning: Technology and pedagogy. *Learning Disability Quarterly, 32*, 199-201.

Kinney, D. P., & Kinney, L. S. (2008). Computer-mediated learning in mathematics and Universal Design for Instruction. In J. L. Higbee & E. Goff (Eds.), *Pedagogy and student services for institutional transformation: Implementing universal design in higher education* (pp. 155-164). Minneapolis, MN: University of Minnesota.

Knoll, K. R. (2009). Feminist disability studies pedagogy. *Feminist Teacher: A Journal of the Practices, Theories, and Scholarship of Feminist Teaching, 19*, 122-133.

Kolb, A. Y., & Kolb, D. A. (2005). Learning styles and learning spaces: Enhancing experiential learning in higher education. *Academy of Management Learning & Education, 4*, 193-212.

LaRocco, D. J., & Wilken, D. S. (2013). Universal design for learning: University faculty stages of concerns and levels of use. *Current Issues in Education, 16*(1), 1-15.

Leyser, Y., & Greenberger, L. (2008). College students with disabilities in teacher education: Faculty attitudes and practices. *European Journal of Special Needs Education, 23*, 237–251. \

Lombardi, A. R., & Murray, C. (2011). Measuring university faculty attitudes toward disability: Willingness to accommodate and adopt universal design principles. *Journal of Vocational Rehabilitation, 34,* 43-56. doi:10.3233/jvr-2010-0533

Lombardi, A., Murray, C., & Dallas, B. (2013). University faculty attitudes toward disability and inclusive instruction: Comparing two institutions. *Journal of Postsecondary Education and Disability, 26*, 221-232.

Lombardi, A., Murray, Ch., & Gerdes, H. (2011). College faculty and inclusive instruction: Self-reported attitudes and actions pertaining to universal design. *Journal of Diversity in Higher Education, 4*, 250-261.

Lombardi, A., & Sala-Bars, I. (2013, July). *An international examination of postsecondary faculty attitudes and actions toward inclusive instruction: Comparing the united states and Spain.* Paper presented at the Eighth International Conference on Higher Education and Disability., Innsbruck, Austria.

Major, C. H., & Palmer, B. (2006). Reshaping teaching and learning: The transformation of faculty pedagogical content and knowledge. *Higher Education, 51*, 619-647.

McGuire, J. M. (2014). Universally accessible instruction: Oxymoron or opportunity? *Journal of Postsecondary Education and Disability, 27,* 387-398.

McGuire, J. M., & Scott, S. S. (2006). Universal design for instruction: Extending the universal design paradigm to college instruction. *Journal of Postsecondary Education and Disability, 19*, 124-134.

McGuire, J. M., Scott, S. S., & Shaw, S. F. (2003). Universal design for instruction: The paradigm, its principles, and products for enhancing instructional access. *Journal of Postsecondary Education and Disability, 1*7, 11-21.

McWilliam, E., & Dawson, S. (2008). Teaching for creativity: Towards sustainable and replicable pedagogical practice. *Higher Education, 56*, 633-643.

Mole, H. (2012). A U.S. model for inclusion of disabled students in higher education settings: the social model of disability and Universal Design. *Widening Participation and Lifelong Learning, 14*(3), 62-86.

Murray, C., Wren, C. T., Keys, C. (2008). University faculty perceptions of students with learning disabilities: Correlates and group differences. *Learning Disability Quarterly, 3*1, 95-113.

Orr, A. C., & Hammig, S. B. (2009). Inclusive postsecondary strategies for teaching students with learning disabilities: A review of the literature. *Learning Disability Quarterly, 32*, 181-196.

Pace, D., & Schwartz, D. (2008, December). Accessibility in post secondary education: Application of UDL to college curriculum. *US-China Education Review, 5*, 20-26.

Pliner, S. M., & Johnson, J. R. (2004). Historical, theoretical, and foundational principles of universal design for instruction in higher education. *Equity and Excellence in Education, 37*, 105-113.

Rao, K., Ok, M. W., Bryant, B. R. (2014). A review of research on universal design educational models. *Remedial and Special Education, 2*0(10), 1-14.

Roberts, K., Park, H., Brown, S., & Cook, B. (2011). Universal design for instruction in postsecondary education: A systematic review of empirically based articles. *Journal of Postsecondary Education and Disability, 24*, 5-15.

Robinson, T. E., & Hope, W. C. (2013). Teaching in higher education: Is there a need for training in pedagogy in graduate degree programs? *Research in Higher Education, 21*, 1-11.

Rose, D. H., Harbour, W. S., Johnston, C. S., Daley, S. G., & Abarbanell, L. (2006). Universal design for learning in postsecondary education: Reflections on principles and their application. *Journal of Postsecondary Education and Disability, 19*, 135-151. Retrieved from http://eric.ed.gov/?id=EJ844630

Scott, S. S., Loewen, G., Funckes, C., & Kroeger, S. (2003). Implementing universal design in higher education: Moving beyond the built environment. *Journal of Postsecondary Education and disability, 16*, 78-89.

Scott, S. S., McGuire, J. M., & Shaw, S. F. (2003). Universal design for instruction: A new paradigm for adult instruction in postsecondary education. *Remedial and Special Education, 24*(6), 369-379.

Shaw, R. A. (2011). Employing universal design for instruction. *New Directions for Student Services, 134*, 21-33.

Shih, T. H., & Fan, X. (2009). Comparing response rates in e-mail and paper surveys: A meta-analysis. *Educational Research Review,* 4(1), 26-40.

Skinner, M. E. (2007). Faculty willingness to provide accommodations and course alternatives to postsecondary students with learning disabilities. *International Journal of Special Education, 22*(2), 32-45.

Snyder, T. D., & Dillow, S.A. (2015). *Digest of Educational Statistics 2013 (NCSE 2015-11).* National Center for Educational Statistics, Institute of Educational Sciences. Washington, DC.

Stodden, R. A., Brown, S. E., & Roberts, K. (2011). Disability-friendly university environments: Conducting a climate assessment. *New Directions for Higher Education, 154*, 83-92.

Thompson, S. J., Johnstone, C. J., Thurlow, M. L. (2002). *Universal design applied to large scale assessments. Syntheses report.* National Center on Educational Outcomes. Minneapolis, MN: University of Minnesota, National Center on Educational Outcomes.

Tincani, M. (2004). Improving outcomes for college students with disabilities: Ten strategies for instructors. *College Teaching, 52*(4), 128-132.

Tunguz, S. (2016). In the eye of the beholder: emotional labor in academia varies with tenure and gender. *Studies in Higher Education, 41*(1), 3-20.

Van Laarhoven, T. R., Munk, D. D., Lynch, K., Bosma, J., & Rouse, J. (2007). A model for preparing special and general education preservice teachers for inclusive education. *Journal of Teacher Education, 58*, 440–455.

Vega, Q. C., & Tayler, M. R. (2005). Incorporating course content while fostering a more learner-centered environment. *College Teaching, 53*, 83-86.

Zeff, R. (2007). Universal design across the curriculum. *New Directions for Higher Education, 137*, 27-44.

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Table 1

Correlations Among Participants Responses to UDI Subscales

	Accommo-dation	Accessible Materials	Course Modifica-tion	Inclusive Lecture	Inclusive Classroom	Inclusive Assessment	Disability Law
Accessible Materials	.260*						
Course Modifica-tion	.340**	.328*					
Inclusive Lecture	.138	.319*	.086				
Inclusive Classroom	.372**	.554**	.185	.542**			
Inclusive Assessment	.306*	.338*	.491**	.238	.328*		
Disability Law	.278*	.391*	.218	.217	.464**	.230	
Campus Resources	-.093	.200	-.197	.035	.089	-.109	.249

Note. * Correlation is significant at the .05 level (2-tailed). ** Correlation is significant at the .01 level (2-tailed).

Table 2

Comparison of Subscale Results to Norms

	Population Parameter			Sub-Scale Score				
	Mean	SD	α	Mean	SD	df	t	p
Accommodation	3.365	0.419	0.742	4.210	.575	58	7.763	0.00
Accessible Materials	3.495	0.547	0.655	3.809	.911	58	2.649	0.00
Course Modifica-tion	1.271	0.611	0.616	2.275	.944	58	8.171	0.00
Inclusive Lecture	3.795	0.429	0.429	4.275	.590	58	6.251	0.00
Inclusive Classroom	3.331	0.551	0.767	4.085	.542	58	10.867	0.00
Inclusive Assessment	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Disability Law	2.757	0.764	0.831	3.757	.832	58	9.069	0.00
Campus Resources	3.441	0.592	0.592	4.322	.614	58	11.018	0.00

Table 3

ANOVA Results for Belief, Confidence and Knowledge Subscales and Faculty Rank

	N	Accommo-dation		Accessible Materials		Course Modification		Inclusive Lecture		Inclusive Classroom		Inclusive Assessment		Disability Law		Campus Resources	
Rank		*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Professor	9	4.36	0.63	4.11	0.78	2.92	0.72	4.56	0.51	4.12	0.45	3.53	0.54	3.98	0.48	4.58	0.41
Associate Professor	16	4.02	0.59	3.41	1.03	1.63	0.50	4.05	0.55	3.90	0.66	3.20	0.78	3.25	0.86	4.30	0.48
Assistant Professor	12	4.20	0.56	4.00	0.70	1.94	0.85	4.29	0.74	4.31	0.50	3.29	0.61	4.03	0.80	4.46	0.65
Visiting	9	4.33	0.53	3.92	0.78	2.89	.095	4.28	0.48	4.14	0.47	3.53	1.03	3.96	0.67	4.11	0.87
Instructor	14	4.21	0.56	3.79	1.03	2.45	1.03	4.36	0.56	4.10	0.52	3.55	0.78	3.87	0.91	4.21	0.63

Table 4

ANOVA Results for Belief, Confidence, and Knowledge Subscales and Biological Sex

	N	Accommo-dation		Accessible Materials		Course Modification		Inclusive Lecture		Inclusive Classroom		Inclusive Assessment		Disability Law		Campus Resources	
Sex		*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Male	23	4.11	0.56	3.64	1.02	2.17	1.09	4.04	0.47	3.78	0.47	3.11	0.80	3.57	0.87	4.47	0.45
Female	36	4.29	0.58	3.89	0.84	2.33	0.86	4.41	0.61	4.31	0.49	3.58	0.80	3.90	0.80	4.24	0.69