Table of Contents
Journal of Postsecondary Education and Disability
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From the Editor 3
James Martin

Universal Design for Instruction in Postsecondary Education: 5 - 15
A Systematic Review of Empirically Based Articles
Kelly D. Roberts
Hye Jin Park
Steven Brown
Bryan Cook

Student Perceptions of Faculty Implementation of Universal Design for Learning 17 - 30
Catherine L. Schelly
Patricia L. Davies
Craig L. Spooner

Relationship Between Negative Emotion and ADHD Among 31 - 42
College Males and Females
Tori B. Kearnes
Joseph B. Ruebel

Faculty Members’ Ratings of the Effectiveness of Academic Strategies for 43 - 52
University Students with Psychiatric Disabilities
Karin F. Brockelman

Perceptions of Academic Staff Towards Accommodating Students with 53 - 59
 Disabilities in a Civil Engineering Undergraduate Program in a
University in South Africa
Nafisa Mayat
Seyi Ladele Amosun

PRACTICE BRIEF 61 - 65
“Success with ACCESS: Use of Community-Based Participatory Research for Implementation”
Carolyn Eilola
Kathryn Fishman
Arielle Greenburg
Crystal Dea Moore
Andrew Schrijver
Jamin Totino

Author Guidelines Inside Back Cover
FROM THE EDITOR
JAMES MARTIN

This is the last issue that will carry my name as editor. Starting with JPED 24, 2 David Parker will be the editor listed on this page. David has already been processing newly submitted papers, while I have finished the work of processing the papers that were submitted during my editorship tenure. It has been an honor to serve as the JPED editor the past few years, and now I pass the journal to Executive Editor David Parker.

This issue brings together six papers that examine topics important to students with disabilities in higher education programs and their educational support professionals. Two papers examine Universal Design for Learning (UDL), two papers present the findings of accommodations delivered in science and engineering, and one explores the negative emotions of college students with ADHD. The Practice Brief reports how a campus climate survey identified changes that needed to be made to provide improved support for students with disabilities. I hope you enjoy this issue.

Few empirical studies have been done to demonstrate the effectiveness of the Universal Design for Instruction concepts. The literature review by Roberts, Park, Brown, and Cook from the University of Hawaii at Manoa brings these studies together so that our field can learn what we do know about UDL, and they offer suggestions of what future research needs to examine.

Answering the call for additional research on UDL, Schelly, Davies, and Spooner from Colorado State University report on their study to determine if students noticed changes in course instruction after faculty received UDL instruction. You will need to read this study to determine if students actually noticed a change in instructional delivery or not.

Tori Kearns and Joseph Ruebel report the results of a study designed “to assess the relationship between negative emotion and ADHD within the college adult, but also the differential impact of negative emotion on adult females and males diagnosed with ADHD.” Read this well-done study to learn what they found out and the implications for applied practice.

Karin Brockelman, from the University of Medicine and Dentistry of New Jersey, examined the accommodation strategies used by STEM and non-STEM faculty. STEM stands for science, technology, engineering, and math fields of study. All faculty used a set of similar strategies, but the STEM and non-STEM faculty varied in their use of other strategies. Read this paper to learn how faculty differed in providing accommodations to their students.

Mayat and Amosun from the University of Cape Town, South Africa, examine the perceptions of academic staff about the needed accommodations of students with disabilities admitted into an undergraduate civil engineering program. Read this paper to learn about the United Nations Standard Rules of Equalization of Opportunities for People with Disabilities, the status of students with disabilities in South African higher education programs, and the results of their study.

Carolyn Eilola and her colleagues from Skidmore College provide JPED readers a Practice Brief that describes using an assessment of campus climate to identify issues impacting students with disabilities and their support services. This Practice Brief explains how a practical framework for addressing the identified issues emerges from the assessment process.
Universal Design for Instruction in Postsecondary Education: A Systematic Review of Empirically Based Articles

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Abstract
Universal Design for Instruction (UDI) in postsecondary education is a relatively new concept/framework that has generated significant support. The purpose of this literature review was to examine existing empirical research, including qualitative, quantitative, and mixed methods, on the use of UDI (and related terms) in postsecondary education. The criteria used to select articles included in this review were: (a) empirical studies in peer-reviewed journals, (b) articles published in 2000 or after, and (c) articles on the use of UDI, Universal Design for Learning (UDL), Universal Instructional Design (UID), and Universal Design (UD) in postsecondary education settings. Eight articles met the search criteria. This limited number of empirically based articles led to the conclusion that more research needs to be conducted on the use of UDI in postsecondary education. The primary recommendation for future research is to operationalize the principles of UDI and investigate its impact on the outcomes of postsecondary education students with and without disabilities.

Diversity in postsecondary education has expanded over the past two decades, creating a need for colleges and universities to reassess traditional instructional strategies to better meet the needs of all students (Newby, 2005; Scott, McGuire, & Shaw, 2003). As reported in the Chronicle of Higher Education (2008), this increase in higher education diversity includes (a) 35.35% of students being of minority status, (b) 11.3% of students reporting a disability, (c) 45.3% of students attending part-time, and (d) 21.5% of students being ages 25 to 34 with 18.4% being over age 34.

This increasingly varied student body presents diverse learning needs often not addressed through traditional instructional approaches in higher education (e.g., lecture). Many recent principles for designing instruction and instructional environments to address student diversity have been based on the principles of Universal Design (UD). This article presents the background and history of UD principles and how they became applied in postsecondary education. This is followed by a discussion of terminology, and a presentation of the method used to conduct a systematic review of the empirically based, peer-reviewed journal articles on UD for learning/instruction in postsecondary education. The article concludes with the results and discussion of the systematic review, limitations of the review, and conclusions.

Background and History of UD Principles
Universal Design began to be considered in the 1950s in Europe, Japan, and the United States and focuses on removing physical and environmental barriers (e.g., providing flat entries to buildings designed with stairways leading to the entry and lowered ATM machines reachable by individuals of various heights) that prevent access for individuals with disabilities. In the 1970s, the concept of UD evolved from one of removing physical barriers to people with disabilities to integration of all people within all environments. This evolution coincided with passage of legislation encouraging and mandating civil rights for individuals with disabilities, including the Architectural Barriers Act of 1968, the Rehabilitation Act of 1973, and the Education of the Handicapped Act of 1975 (now Individuals with Disabilities Education Improvement Act). The Rehabilitation Act of 1973, which included Section 504, the first civil rights legislation about disability, is especially important in the history of UD because...
it mandated physical access in buildings for any U.S. program receiving federal funding. With the passage of the Americans with Disabilities Act (ADA) of 1990, UD expanded to public and private facilities and no longer depended upon entities receiving federal funds. Title III of the ADA specifically emphasizes access to public facilities. The late Ron Mace, founder of the Center for Universal Design in North Carolina and an architect with a disability, identified with, defined, and popularized UD. Mace once commented that UD is a “commonsense approach to making everything we design and produce usable by everyone to the greatest extent possible” (Institute for Human Centered Design, 2008). The Center for Universal Design published seven principles applicable to environmental accessibility (Connell et al., 1997):

1. Equitable use: Design should be usable and marketable to diverse individuals. For example, a curb cut that someone riding a wheelchair, a parent pushing a stroller, a bike rider, and a delivery person can use and benefit from.

2. Flexibility in use: Design accommodates preferences and abilities. For example, scissors usable by someone who is right-hand dominant and someone who is left-hand dominant.

3. Simple and intuitive use: Easily used by individuals of diverse knowledge, literacy levels, and background experiences. For example, a menu using both language and pictures.

4. Perceptible information: Information is provided with ease of use regardless of sensory needs. For example, elevators that have buttons for each floor available at wheelchair height, in Braille, and with sound as each floor is passed.

5. Tolerance for error: Consequences or potential hazards are minimized. For example, automatically saving computer documents while in the process of writing.

6. Low physical effort: Design can be used comfortably and with minimal effort. For example, a levered door handle, as opposed to a knob.

7. Size and space in approach and use: Design accounts for users of different shapes, sizes, and agility. For example, accessing an office mailbox from a sitting or standing position with minimal reaching effort.

**UD in Postsecondary Education**

Historically, the seven UD principles promoted architectural and environmental designs to enhance accessibility and usability for as many people as possible. In the past decade, educators have expanded these principles to include educational access. This expansion is supported in recent legislation including the Reauthorization of the Higher Education Opportunity Act, 2008, where UD is referred to eighteen times. One such reference, which is found in SEC. 762 (G) – “Making postsecondary education more accessible to students with disabilities through curriculum development, consistent with the principles of universal design for learning” is indicative of the future of UD in higher education - A future that began, in part, in 2001 when Shaw, Scott, and McGuire published nine principles of UD for instruction (UDI). These nine principles applied the seven UD principles of Connell et al. (1997) to postsecondary education instruction and added two additional principles - Principle 8: A community of learners, and Principle 9: Instructional climate. Examples based on these nine principles include:

1. Equitable use: Accessing course information, such as syllabi, in a variety formats, including print, disk, and online.

2. Flexibility in use: Varying instructional methods, including lecture, discussion, and individual and group activities.

3. Simple and intuitive: Clearly describing course expectations for grading, in different formats, for example narrative and rubrics.

4. Perceptible information: Using videos that include subtitles, or captioning, for those who may not hear, for whom English is not a first language, or for those who have trouble processing verbal information.

5. Tolerance for error: Providing ongoing and continual feedback on coursework rather than at specified interim periods, such as mid-term or final exams.

6. Low physical effort: Providing lecture notes, so students who have difficulty taking notes do not need to take notes.

7. Size and space for approach and use: Making seating easily accessible, if possible, so everyone can see each other and communicate with one another directly. Circular seating may address this principle.

8. Community of learners: Creating a variety
of learning settings, for example, use of e-mail groups, social networking sites, or chat rooms.

9. Instructional climate: Including a statement in the syllabus indicating the desire to meet the instructional needs of all students and for students to convey their needs to the instructor.

In summarizing the nine principles of UDI, one can describe them as presenting multiple means of representation, engagement, and expression (Center for Applied Special Technology, 2008).

Although UDI is a relatively new framework in postsecondary education, it has generated significant support. For example, Newby (2005) suggested approaches based on UDI “bring flexibility and creativity to instructional delivery and management” (p. 600), stating the framework “allows our students to gain knowledge by taking advantage of their strengths” (p. 601). Rickerson and Deitz (2003) advocated the use of UDI principles in occupational therapy education, noting UDI is in line with the values of their profession.

In addition, organizations have recognized the importance of UDI. For example, the Association on Higher Education And Disability (AHEAD) published an entire journal (i.e., Journal of Postsecondary Education and Disability Vol. 19, Issue 2) dedicated to UD in higher education (Ofiesh & McAfee, 2006). As indicated previously, UD is written into the Higher Education Opportunity Act of 2008 where it is described as a “scientifically valid framework for guiding educational practice” SEC. 762 (G) (SEC. 103 (C)). Inclusive and accessible postsecondary education is an exciting prospect and one that UDI is purported to help obtain. This literature review is designed to provide an understanding of the research that supports this claim while providing evidence to justify the ongoing use of UDI in postsecondary education settings.

Terminology

As indicated, UD principles are being applied to educational settings. This has brought about the use of a variety of related terms, in literature, to describe these efforts. Three of the most prominent terms are UDI, UDL, and Universal Instructional Design (UID). Some researchers appear to use these terms interchangeably (e.g., Koch, Hennessey, Ingram, Rumrill & Roessler, 2006), whereas others describe distinctions among them (e.g., McGuire & Scott, 2006). Despite the different terms, each refers to the application of UD principles in the instructional environment. Accordingly, we used all three terms while conducting the literature review. However, to avoid confusion, the term UDI is used throughout this article and encompasses all similar terminology.

Method

Criteria

The criteria used for selection of articles included in this review were those articles published (a) as empirical studies in peer-reviewed journals, (b) in 2000 or after, and (c) on the use of UDL, UDI, UID, and UD in postsecondary, college, university, and higher education settings. These criteria were chosen since the intent of the systematic literature review was to identify and review research on the use of UD in postsecondary education settings. The year 2000 was established as a starting point based upon the fact that in 2001, Shaw, Scott, and McGuire published the nine principles of UDI.

Data Sources, Collection, and Analysis

To locate peer-reviewed research articles (qualitative, quantitative, and mixed methods) that met the criteria, four electronic databases, ERIC, PsychInfo, Academic Search Premier, and Social Sciences Citation Index, were searched. Each of the four terms most commonly used for UD in an educational setting (i.e., UDL, UDI, UID, and UD) in combination with “Postsecondary,” “Higher Education,” “University,” or “College,” were used to create sixteen identifiers, as shown in Table 1. The table presents the total number of articles located in the search. The number of articles initially retrieved from the electronic search is presented in the first column, “Initial.” From this pool of articles, we reviewed abstracts and screened articles to discern which ones fit the established criteria. We then reviewed each of the screened articles to determine if they were empirically based. This result is presented in the second column, “Final.” After excluding articles duplicated across the four search engines, a total of eight articles met the three criteria for inclusion in the review.
Table 1

The Number of Peer Reviewed Articles Published Since 2000 on UDL, UDI, UID, or UD in Postsecondary, College, University, or Higher Education Settings

<table>
<thead>
<tr>
<th>Peer Reviewed Empirical Articles from 2000 - 2009</th>
<th>ERIC</th>
<th>Academic Search Premier</th>
<th>Psychinfo</th>
<th>Social Sciences Citation Index</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Initial</td>
<td>Final</td>
<td>Initial</td>
<td>Final</td>
</tr>
<tr>
<td>Postsecondary</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>College</td>
<td>10</td>
<td>4</td>
<td>17</td>
<td>1</td>
</tr>
<tr>
<td>University</td>
<td>10</td>
<td>4</td>
<td>17</td>
<td>1</td>
</tr>
<tr>
<td>Higher Education</td>
<td>6</td>
<td>3</td>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>

| Postsecondary                                   | 3      | 2     | 2       | 0     | 4       | 0     | 2       | 0     |
| College                                         | 5      | 3     | 4       | 0     | 9       | 0     | 2       | 0     |
| University                                      | 5      | 3     | 4       | 0     | 10      | 0     | 0       | 0     |
| Higher Education                                | 5      | 3     | 3       | 0     | 3       | 0     | 1       | 0     |

| Postsecondary                                   | 4      | 0     | 4       | 0     | 2       | 0     | 0       | 0     |
| College                                         | 3      | 0     | 8       | 0     | 2       | 0     | 0       | 0     |
| University                                      | 3      | 0     | 8       | 0     | 7       | 0     | 1       | 0     |
| Higher Education                                | 6      | 0     | 3       | 0     | 3       | 0     | 1       | 0     |

| Postsecondary                                   | 18     | 3     | 5       | 0     | 5       | 0     | 2       | 0     |
| College                                         | 37     | 7     | 87      | 2     | 48      | 1     | 9       | 1     |
| University                                      | 37     | 7     | 87      | 2     | 240     | 1     | 22      | 1     |
| Higher Education                                | 29     | 6     | 11      | 1     | 9       | 0     | 15      | 1     |
Results

Table 2 provides a summary of the eight articles that met the search criteria and were thus included in this review. The articles were organized by research methodology: quantitative (experimental design), qualitative (focus group, action research, case study, or survey), and mixed methods.

Quantitative Using True Experimental Design

Through the extensive literature search one true experimental study was found. Spooner, Baker, Harris, Ahlgrim-Delzell, and Browder (2007) investigated the effects of a one-hour training on how to apply UDI principles to lesson plans for students with disabilities (SWDs). The subjects were 72 graduate and undergraduate students enrolled in two special education and two general education college classes. At baseline no participants had previously written a lesson plan applying UDI principles. Subjects were randomly assigned to either the intervention group or the control group. Before and after the training, both groups were asked to develop a lesson plan based on a case scenario. The lesson plans the subjects designed during the pre-test and post-test were scored using the same rubric, and the total scores, representation scores, expression scores, and engagement scores were calculated for both pre- and post-tests. Pre- and post-scores were compared by group (i.e., experimental vs. control) and class (i.e., general education vs. special education). The result of a three-factor analysis of variance with repeated measures indicated significant differences between pre-test and post-test scores for both intervention groups of special education and general education teachers. Based upon the results, the authors suggested that even a simple training could improve the ability of postsecondary students, preparing to be special and general education teachers, to develop accessible lesson plans for all students including SWDs.

Qualitative Studies Using Focus Groups, Action Research, Case Study, and Surveys

Through the literature search, six qualitative studies were found. The first qualitative study by Embry, Parker, McGuire, and Scott (2005) consisted of two focus groups with a total of 16 postsecondary disability service providers. The study was designed to assess their perceptions related to the following areas: strengths and weaknesses of the UDI framework in improving inclusive teaching, the role of faculty in promoting UDI, and supports needed from student disability services to implement UDI. Disability service providers listed several strengths and weaknesses of UDI. Strengths included the ability to interact more fully with a diverse student body. Weaknesses primarily related to the need to transition from current practice and resources to more universally designed ones. Respondents reported they had a role in the promotion of UDI on their campuses. They also reported the perception that the need for disability services would likely decrease if UDI was broadly implemented. Supports indicated as being important to the implementation of UDI included more information on UDI, support of campus leaders, and ability to influence institutional change.

McGuire and Scott (2006) conducted the second qualitative study which consisted of four focus groups with a total of 23 postsecondary students with learning disabilities. The purpose was to use focus groups as a means to explore the validity of UDI as a new construct. The focus groups sought to obtain student opinions and perceptions about the attributes of a good college course, teaching methods and strategies that promoted learning, and the challenges and barriers experienced in college courses.

Instructional methods described by the student participants that make up a “good” college course included: clear expectations, organizational materials such as course outlines and study guides, information presented in multiple formats (e.g., lecture with visuals), affirmative classroom experiences, associating information with aspects of real life, frequent formative feedback, supportive of diverse learning needs, and effective assessment strategies (e.g., well-designed exams).

Student perceptions of good teaching methods and strategies that promote learning (i.e., good instruction/good instructor) included the following as related to the instructor: (a) approachable and available, (b) focused on the subject (not tangential to the topic), (c) enthusiastic about teaching and making personal connections with students, and (d) ambitious in their expectations for student performance. The authors noted that participant reports regarding attributes of high quality college courses and instructors parallel the guiding principles of UDI.

In the third article reviewed, McGuire-Schwartz and Arndt (2007) reported on two qualitative studies; they explored how postsecondary students who enrolled in an early childhood teacher education
Table 2

*List of UDI Articles*

<table>
<thead>
<tr>
<th>Authors (Year)</th>
<th>Methodology</th>
<th>n</th>
<th>Summary of Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spooner, Baker, Harris, Ahlgrim-Delzell, &amp; Browder (2007)</td>
<td>True Experimental Study - Subjects randomly assigned to treatment or control group. Intervention was a 1-hour lecture on how to modify lesson plans for SWDs using UDL.</td>
<td>72</td>
<td>Pre- and post-test comparison on creating a lesson plan for SWDs showed a significant improvement of the treatment group, supporting the intervention effect.</td>
</tr>
<tr>
<td>Embry, Parker, McGuire, &amp; Scott (2005)</td>
<td>Focus groups - DSPs discussed perceptions and beliefs regarding (1) strengths and weaknesses of UDI, (2) their role in promoting UDI, and (3) supports needed to implement UDI.</td>
<td>16</td>
<td>(1) UDI provides the ability to interact more with a diverse student body. (2) Need for transition from current practice and resources to more UD ones. (3) DSPs have a role in the promotion of UDI on their campuses. (4) Requests for disability services would decrease if UDI was broadly implemented. (5) More information on UDI, support of campus leaders, and ability to influence institutional change are needed to support UDI.</td>
</tr>
<tr>
<td>Harper &amp; DeWaters (2008)</td>
<td>Survey - University based webmasters evaluated the accessibility of their institution’s homepage website from the perspective of UDI.</td>
<td>12</td>
<td>12 university webmasters evaluated their institutional homepages for accessibility using Watchfire® Bobby™ freeware. All but one failed to meet the total criteria for accessibility, indicating that the majority of homepages were not UD.</td>
</tr>
<tr>
<td>McGuire-Schwartz &amp; Arndt (2007)</td>
<td>Study 1: Action research - Early childhood teacher candidates implemented a UDI strategy. Study 2: Case study - Focus group, interviews, a survey, a questionnaire, lesson plan review, &amp; document analysis.</td>
<td>36</td>
<td>UDI strategies improved learning and accessibility for both struggling and non-struggling students. UDI strategies improved student learning and engagement while meeting diverse student needs and making education more inclusive and effective.</td>
</tr>
<tr>
<td>McGuire &amp; Scott (2006)</td>
<td>Focus groups - To validate UDI four focus groups investigated the perceptions of SWDs on attributes of a good college course, teaching methods and strategies that promote learning, and challenges and barriers experienced.</td>
<td>23</td>
<td>In the analysis of focus group data, the perceptions of SWD parallel the guiding principles of UDI, and the findings supported the validating efforts of the use of UDI for SWD in postsecondary education.</td>
</tr>
</tbody>
</table>

(Table 2 continued on next page)
<table>
<thead>
<tr>
<th>Authors (Year)</th>
<th>Methodology</th>
<th>Sample Size</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zhang (2005)</td>
<td>Case study – PD on UDI for college faculty, school teachers, and pre-service teachers &amp; their perceptions of the PD</td>
<td>70</td>
<td>Participants acknowledged the benefits of UDI and the need to change their teaching methods to better address the diverse needs of their students.</td>
</tr>
<tr>
<td>Parker, Robinson, &amp; Hannafin (2007-2008, Winter)</td>
<td>Case study - Documentation of the re-design of a large core course in special education for undergraduates using UDI in conjunction with adult learning theories.</td>
<td>114</td>
<td>The analysis of student online interactions and course evaluations supported the use of UDI and adult learning theories, including students’ higher satisfaction with the redesigned course than other courses offered in the department and other undergraduate courses.</td>
</tr>
<tr>
<td>Izzo, Murray, &amp; Novak (2008)</td>
<td>Study 1 (Needs Assessment) Survey – Instructional climate Faculty and teaching associates indicated they needed more information on UDI. Based upon this finding, a web-based, self-paced PD tool was developed and evaluated.</td>
<td>271</td>
<td>Faculty and teaching associates indicated they needed more information on UDI. Based upon this finding, a web-based, self-paced PD tool was developed and evaluated.</td>
</tr>
<tr>
<td></td>
<td>Focus Groups 92</td>
<td></td>
<td>Faculty and administrators assessed the PD course. In terms of UDI the PD was found effective for increasing their comfort in meeting the instructional needs of SWDs.</td>
</tr>
<tr>
<td></td>
<td>Study 2 (Field Test) Survey 98</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note.* SWDs = Students with Disabilities, PD = Professional Development, DSPs = Disability Student Service Providers, n = Sample size
program understood principles of UDI and how they implemented the principles in lesson plans, teaching, and assessment during their practicum. The first study documented how 36 teacher candidates at a private college grew as practitioners-researchers using UDI intervention strategies through action research for two semesters. During the pre-practicum semester, the participants learned UDI and action research, observed students and teachers in the classroom where they would be student teaching, identified problems, developed intervention strategies using UDI principles, and planned data collection. During the practicum semester, they implanted the UDI infused strategies, collected and analyzed data, presented their findings in a poster presentation, and wrote papers. Through the action research, the participants found the UDI strategies improved learning and accessibility for both struggling and non-struggling students.

The second study was a collection of qualitative case studies in which five teacher candidates at a public college were studied during their first practicum semester. After learning UDI, the participants observed classes, identified students’ learning styles, developed lesson plans using UDI strategies that reflected student learning styles, and implemented the lessons. While providing consultation to the participants regarding UDI, the authors conducted a focus group and individual interviews, administered a survey and a questionnaire, reviewed the participants’ lesson plans, and analyzed related documents. Outcomes included participants’ perceptions that UDI strategies improved learning and accessibility while meeting diverse student needs and making education more inclusive and effective.

Zhang (2005), in the fourth qualitative study reviewed, described a case of a year-and-a-half long teaching/learning project. The project was a collaboration between a college of education and a professional development partner school that initiated and implemented UDI for school teachers, pre-service teachers, and college professors. The project consisted of summer institutes, university workshops, preservice training, and UDI labs that served more than 70 individuals. From the analysis of participants’ feedback on the project, Zhang found that as a result of the project, the participants could acknowledge the benefits of UDI and the need to change their teaching methods to better address the diverse needs of their students.

The fifth qualitative study reviewed (Harper & DeWaters, 2008) was a survey of members of a “University Web Developers’ Mailing List.” The intent was to assess web-based accessibility. This included UDI because websites, in order to be fully accessible, must integrate several of the principles of UDI (primarily numbers 1 and 6). For example, a website with pages or documents that cannot be viewed with a screen reader would not be accessible and thus are not UD. An instructor could not use that website in a course designed with UDI in mind. In the study of Harper and DeWaters (2008), university web developers were invited to use Watchfire® BobbyTM freeware to evaluate their institutional homepage for accessibility. Twelve individuals evaluated their campus websites. All but one failed to meet the total criteria for accessibility. Even for those webmasters who understood and wanted to follow web accessibility mandates (i.e., UDI principles), the combination of presenting both an accessible and high quality website in conjunction with budget constraints prevented them from doing so. The authors concluded that further research and a better understanding of the patterns of compliance are needed which will hopefully increase web accessibility.

The sixth study, by Parker, Robinson, and Hannafin (2007-2008) documented a case of modifying a large core course in special education for undergraduates at a public university by employing UDI principles and adult learning theories. They analyzed 114 students’ on-line interaction, discussion, and course evaluations. In this study, the UDI principles were used to develop predictable and accessible instruction for individuals with diverse abilities, address their varied learning pace and prerequisite skills, minimize nonessential physical effort, stimulate student interest and attention by presenting information in different mediums, and create a welcoming and inclusive instructional environment. Student evaluations indicated the course was better than other courses offered in the department and other undergraduate courses, including their particular appreciation for making course materials available online. Based on the positive student perception of the course, the authors suggested that UDI in combination with adult learning theories could “create positive solutions for many of the challenges inherent in a large, lecture-driven ‘core’ classroom environment” (p. 63).

Mixed Methods

Izzo, Murray, and Novak (2008) discussed how to apply and use UDI from the perspectives of faculty,
teacher assistants (TAs), and administrators in two multi-year (1999-2006) studies using both qualitative and quantitative methods. The first study assessed instructional climate through a quantitative survey of 271 faculty members and TAs and 12 qualitative focus groups with 92 faculty members and TAs. From the first study, a faculty need for more professional development on UDI was found. In response to it, a curriculum including teaching modules for faculty and administrators was developed and piloted. Universal Design for Instruction was used to enhance both the format and content of this curriculum. In the second study, 63 faculty members and administrators evaluated the curriculum, through a quantitative survey and a qualitative questionnaire. The pre-post data collected from the participants who used the curriculum indicated that 31% of the respondents reported a moderate or very high degree of knowledge prior to using the UDL curriculum. This percentage increased to 83% after use of the curriculum. The findings indicated that both faculty and administrators are attuned to higher education’s increasing diversity and the need for multimodal instruction.

Discussion

The existing peer-reviewed empirical research journal articles on UDI in postsecondary education settings appear to reflect the initial stages of a nascent literature base. Although the authors of the articles reviewed promoted the use of UDI in postsecondary education for educating pre-service teachers (McGuire-Schwartz & Arndt, 2007; Spooner et al., 2007; Zhang, 2005), training faculty members (Izzo et al., 2008), improving web accessibility (Harper & DeWaters, 2008); and presented the viewpoints of students and service providers as evidence of the effectiveness of UDI use in postsecondary education (McGuire & Scott, 2006; Parker et al., 2005; Parker et al., 2007-2008), there is very little research to support its effectiveness as a means to improve postsecondary student outcomes, such as GPAs, retention rates, and graduation rates. In addition, 6 of the 8 studies employed qualitative methods, which limits generalization of the findings. Studies using experimental designs and mixed methods approaches are clearly lacking.

Another point of interest is the lack of research on the use of existing and emerging technologies that may align with the principles of UDI. Technology can be a critical tool for creating inclusive classrooms providing for great flexibility in instructional format and expanding access to resources that benefit many learners. Examples of such technologies include text-to-speech software, wikis, Facebook, screen readers, and avatars. The authors speculate that intervention/outcomes research on these types of technologies and other specific practices (e.g., the pause procedure) aligned with the principles of UDI has been conducted. However, we also speculate that these articles did not surface in the literature search because those authors did not use the terms UD, UID, UDI, or UDL in reporting their research. This leads one to conclude that more work needs to be done to operationalize the principles of UDI so that activities that are aligned with UD principles are recognized as such.

For example, the principle of equitable use can be operationalized and investigated if text (e.g., a textbook) is presented in electronic, recorded, and text based formats. A comparative study could be conducted to determine greatest effectiveness of each method of text presentation for individuals with specific disability types. Not only will this lead to a better alignment between UDI principles and UDI interventions it will also provide for more evidence-based effective and specific UDI strategies that can be used in postsecondary education settings.

Limitations

There are several limitations to this review that merit discussion. One is the possibility that we did not locate all empirical research articles related to UDI in postsecondary settings because those authors used terms other than UDI, UDL, UID, and UD to describe their research. Furthermore, researchers may have investigated aspects of UDI, UDL, UID, and UD consistent with the principles of UDI but did not refer to them as such. In addition, research that was not published in peer-reviewed journals was not included in this review.

Recommendations

Based upon the literature reviewed we have the following recommendations:

- Operationalize the principles of UDI to provide concrete constructs that can be “applied” to specific activities and thus evaluated as to
effectiveness.

- Apply the operationalized principles of UDI in intervention studies to investigate the impact on objective student outcome measures.
- Continue to investigate the use of UDI in post-secondary educational settings to determine where and how it is effective in improving student outcomes. This is particularly important as more ways of transferring knowledge (i.e., educating our students) become available (e.g., emerging technologies).

Conclusion

Universal Design for Instruction is an exciting conceptual approach that appears theoretically sound but lacks a substantial empirical research base. Development of a more extensive research base on the use of UDI in postsecondary educational settings, which moves beyond initial concerns regarding definition and theory to intervention research that examines the impact of UDI on objective measures of student outcomes, is needed. Through this type of research, the effectiveness of UDI for improving outcomes for post-secondary students, including those with disabilities, will be determined, and advocacy efforts for applying UDI will be fully justified.

References


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Student Perceptions of Faculty Implementation of Universal Design for Learning

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Abstract
The anecdotal benefits of implementing Universal Design for Learning (UDL) at postsecondary institutions are well documented. The literature suggests that UDL offers students with disabilities enhanced opportunities for engagement, expression, and academic performance. Responding to the call by educators for empirical evidence of UDL’s beneficial effects on student learning, performance, persistence, and ultimately retention, this study measured changes and/or improvements in instruction as perceived by students following UDL instructor training and subsequent course delivery modifications. This study also describes the process that was undertaken to develop and implement pre- and post-student surveys, and points the way toward further research regarding the benefits of UDL implementation to postsecondary education.

The number of students with disabilities is growing on college campuses across the nation. In the two decades between 1978 and 1998, the percentage of college freshman with a disability tripled (from 3% to 9%), according to the National Council on Disability (2003). Today an estimated 11% of undergraduates—more than two million—report having some type of disability (National Center for Education Statistics, 2008b; U.S. Government Accountability Office, 2009).

While the number of college students with disabilities has grown, the distribution of disability types has changed. Indeed, the proportions of non-apparent and apparent disabilities have reversed, with significant growth occurring in the former category and decline in the latter. For example, the percentage of undergraduates who reported having a mental, emotional, or psychiatric condition/depression increased from 17.1% in 2000 to 24.3% in 2008, while the percentage of students who reported an orthopedic or mobility impairment decreased from 29% to 15.1% during the same period. Non-apparent disability categories such as attention deficit disorder (ADD) and specific learning disabilities/dyslexia also represented a higher percentage of the total population of students with disabilities (U.S. Government Accountability Office, 2009).

Adding to the population of students with disabilities are veterans who have sustained injuries in Iraq and Afghanistan, many of whom experience what the RAND Corporation calls the “invisible wounds of war” (Tanielian, et al., 2008). It has been estimated that 20% of returning veterans suffer from post traumatic stress disorder (PTSD) or major depression, while 19% have experienced a traumatic brain injury (TBI) (Tanielian, et al., 2008). Many of these men and women will soon be enrolling in postsecondary education under the new GI Bill. (American Council on Education, 2008; Stiglitz & Bilmes, 2008).

Seen through the lens of enrollment, colleges and universities have come a long way toward meeting the equal access requirements of the law (in particular, the ADA Amendments Act of 2008 (ADAAA) and Section 504 of the Rehabilitation Act of 1973). However, when we look at the number of students with disabilities who actually complete their degree programs, the picture is less encouraging. According to deFur, Getzel, & Trossi (1996), “the likelihood of earning a degree is decreased by the presence of a disability” (p. 232). This was confirmed by Johnson and Fox (2003), who reviewed data from the 1997 National Longitudinal Study and concluded that “students with disabilities are less likely than their non-disabled peers to complete their education” (p. 7). In fact, only 6% of Americans with disabilities ages 21–64 have attained a bachelors degree (National Council on Disability, 2008), and,
coined the term Universal Design (UD) (Burgstahler, 2008). One of the
top three explanations for this problem is the growing
diversity of students on college campuses. As has been
shown by numerous studies, students today embody a
wide range of diversity in terms of age, life experiences,
academic preparation, ethnicity, native language, learn-
ing styles, abilities, and disabilities (Chronicle of Higher
Education, 2009; Higher Education Research Institute,
2007, 2008; McGuire & Scott, 2006; National Center for
Education Statistics, 2008a; Zeff, 2007).

To help improve rates of persistence, retention,
and attainment for such a diverse student body, sev-
eral instructional models have been proposed that
build on a set of principles called Universal Design (UD) (Burgstahler, 2008). According to the Center for Universal Design (2009) at North Carolina State University, “Universal design is the design of products and environments to be usable by all people, to the
greatest extent possible, without the need for adapta-
tion or specialized design.” Universal Design is an
expression of a modern view of disability—one that
focuses on the interaction of an individual with his or
her environment (Aune, 2000; Rose, Harbour, John-
ston, Daley, & Abarbanell, 2008).

Problems of access, according to this view, can often
be avoided by eliminating environmental barriers that
potentially affect a wide range of people. Manually
operated doors, sidewalks, stairs and standing-height
drinking fountains, for example, are all potential barri-
ers to someone using a wheelchair, but they also make
life difficult for anyone who is carrying a heavy load,
using crutches after an accident, or who simply isn’t tall
enough to reach a drinking fountain. The “universally
designed” solutions to these barriers—automatic doors,
curb cuts, ramps, elevators and accessible drinking foun-
tains—can be used and enjoyed by everyone. One of
the hallmarks of Universal Design is that it “proactively
builds in features to accommodate the range of human
diversity” (McGuire, Scott, & Shaw, 2006, p. 173).

Not surprisingly, educators have adopted UD as
a conceptual and philosophical foundation on which to
build a model of teaching and learning that is inclusive,
equitable, and guides the creation of accessible course
materials. Several models appear in the literature, in-
cluding Universal Design of Instruction, based on UD’s
seven original principles, and Universal Design for
Instruction, based also on the seven principles but with
two additional principles added to specifically address
issues of teaching and learning (Burgstahler, 2008).

Another UD model for education is Universal
Design for Learning (UDL), which retains UD’s spirit
of inclusion while reducing the number of principles
to just three. Universal Design for Learning has three
principles, which are tailored to the instructional en-
vironment, are based on cognitive research involving
“learning networks.” These principles are: 1) multiple
means of representation, to give learners various ways
of acquiring information and knowledge; 2) multiple
means of student action and expression, to provide
learners alternatives for demonstrating what they
know; and 3) multiple means of student engagement,
to tap into learners’ interests, challenge them appropri-
ately, and motivate them to learn (Center for Applied
Special Technology, 2009).

The ACCESS Project at Colorado State University
has adopted this three-part UDL framework to guide its
primary mission: ensuring that students with disabili-
ties receive a quality higher education. While never
losing sight of the needs of students with disabilities,
the Project has broadened its focus to include improved
learning opportunities for all students (ACCESS Proj-
et, 2007). Universal Design for Learning is promoted
as a model for good teaching generally, and as such it
is becoming an important part of a broader conversa-
tion about pedagogy. Through a partnership with the
university’s Institute for Learning and Teaching, UDL
is being addressed in “Master Teacher Seminars” and
“Teaching with Technology Workshops” that reach
hundreds of faculty and graduate teaching assistants
every semester.

The literature about UD in higher education is long
on principles and “best practices,” but short on empiri-
cal evidence of its benefits. In response to the call for
more research by scholars in this field (Burgstahler,
2008; McGuire, et al., 2006; Rose, et al., 2008, p. 138;
Spooner, Baker, Harris, Delzell, & Browder, 2007),
the ACCESS Project put in place a research agenda
to examine the effectiveness of providing training to
faculty on the principles and practices of UDL. After
reviewing the literature for guidance on possible research designs, it was determined that a study at the University of Guelph in Ontario, Canada, provided a model of how such research might be conducted (Yuval, Procter, Korabik, & Palmer, 2004). Yuval and colleagues describe their efforts to measure the “extent of UID [Universal Instructional Design] implementation, and to assess whether student academic self-efficacy and affective states improved as a result of UID implementation” (Yuval, et al., 2004, p. 1).

Similar to our colleagues at Guelph, the ACCESS team wanted to measure student perceptions following UD training. However, unlike the Guelph study, our research would focus on changes in the teaching behavior of instructors following UDL training. To accomplish this, a new questionnaire was developed based on the three principles of UDL (as opposed to the seven principles of UID). UDL training was also designed around the same three principles. It was decided that a questionnaire should be administered to students both before and after UDL training. Results from the first survey would be used to guide and fine-tune the training that would occur prior to the administration of the second survey. Finally, to cover the full range of UDL practices, the survey questions needed to measure implementation in two distinct areas: classroom instruction and course materials.

The purpose of this study was to measure the effectiveness of UDL instructor training, as indicated by student perceptions of UDL implementation. Determining the feasibility of measuring changes in faculty behaviors via student perceptions was also an important goal. The study also sought to provide data regarding the number of students who identified as having a disability, and of those, the number who had contacted the disability services office to request some type of accommodation.

**Method**

**Focus Groups**

The development of our study began with a focus group of educators. With the help of the Dean of the College of Natural Sciences, we identified instructors who teach large, undergraduate “gateway” courses. In three focus group meetings we discussed the principles of UDL and how we might train faculty to incorporate UDL strategies into courses at our university. Following these informative meetings, Introduction to Psychology, with approximately 1,600 students per semester, was targeted for our research.

**Survey Development**

The survey used in the study was developed and pilot tested one semester prior to the initiation of this study. Questions developed by the ACCESS team were based on the three principles of UDL, which were fundamental in the development of the UDL training: 1) multiple means of representation of information, 2) multiple means of students expressing their knowledge, and 3) multiple means of engaging students in the learning process. Efforts were made to develop survey questions that logically connected with these three principles. “For example, the first question on the survey in the form of a Likert statement, ‘The instructor presents information in multiple formats (e.g., lecture, text, graphics, audio, video),’ provides a classic demonstration of multiple means of representation.” To address the second UDL principle, multiple means of student expression, question 13 on the survey states, “Students in this course are allowed to express their comprehension of material in ways besides traditional tests and exams (e.g., written essays, projects, portfolios).” Similarly, questions 17 through 19—“In this course I feel interested and motivated to learn,” “I feel challenged with meaningful assignments,” and “The instructor expresses enthusiasm for topics covered in class”—correspond with the third UDL principle of student engagement. Because of the complex nature of teaching and learning, some questions capture more than one UDL principle.

The pilot survey was administered to students in five psychology courses, in which a total of 1,170 students were enrolled and 722 students completed the survey (62%). Based on the student data and feedback from the students and instructors, two questions were added to the survey and several of the questions were refined by the ACCESS team in collaboration with the instructors of the psychology courses. The final survey consisted of 27 questions: 24 of the questions pertained to UDL strategies and 3 questions concerned demographic information regarding grades and disability identification (see Appendix). Even though the process for developing and revising the survey was somewhat informal, we felt confident with the final product because of the extensive feedback we received from the students and expert instructors.
Participants
Participants in the study included five instructors (four taught two sections, and one taught one section) and students from nine sections of Introduction to Psychology. A total of 1,615 students were enrolled in the nine sections; of those, 1,362 students filled out the first survey of the semester and 1,223 students filled out the second survey. Thus, 76% percent of the students completed the second survey.

Procedures
During the first two weeks of the semester, the instructors were given directions for delivering the surveys to the students. The surveys were given to the students in class during the third week of the semester. Students were first shown a cover letter that informed them about the study procedures and requirements for their participation. They were then asked to fill out the survey during the class period and return it to their instructors before leaving class. The survey required 5 to 10 minutes to complete. During the last two weeks of the semester the students were given the opportunity to fill out the survey a second time. The procedure for administering the survey at the end of the semester was the same as at the beginning. Both surveys contained the same questions, and both were anonymous. During the ten weeks between the first and second administration of the survey, the instructors received UDL training, which is described in more detail below.

Training Procedures
The instructors of the Introduction to Psychology courses were Ph.D.-level graduate students who had been selected for teaching fellowships based on demonstration of teaching excellence. The instructors were mentored as a group by an assistant professor during weekly meetings throughout the semester. During five of those meetings, the ACCESS team provided one hour of UDL training. Training topics included techniques in each of the three UDL categories for both classroom teaching and the development of accessible course materials. The study required that the curriculum for this training would be modified, in part, after analyzing the results of the first survey. For example, if students reported feeling more engaged by the use of a classroom response system known as “clickers,” the training would be adapted to spend more time exploring the effective use of that technology to achieve the inclusive goals of UDL. In addition to this face-to-face training, ACCESS Project staff created a series of tutorials on how to create “universally designed” Word, PowerPoint, PDF, HTML, and E-Text documents. These tutorials were designed to offer clear explanations of accessibility barriers commonly found in electronic course materials, as well the benefits of UDL techniques for a wide range of users, including those employing assistive technologies. Additionally, step-by-step instructions were provided to facilitate more complex operations such as conversion from one format to another, location of menu commands and selection of dialog box options.

Training Based on Pre-Survey Results
The training for the instructors was designed to highlight the areas in which students’ average response was below four points (corresponding to “agree”) on the Likert scale for the pre-training survey (see Table 2). The items with an average of less than four points were questions 5, 8, 9, 10, and 14 (see the Appendix for the specific survey questions). To address these areas, the training included discussions regarding summarizing material at critical points across each class session (questions 5 and 10). Two of the questions that fell below the cutoff related to providing course material in electronic formats. Thus, training included information and practical tips on converting course material to a variety of electronic formats. Training also included information on presenting material in multiple formats (i.e., lecture, text, graphics, video, and audio) and engaging students in the learning process, as the instructors were interested in advancing their proficiency in those areas.

Data Analysis
Descriptive statistics were used to provide information about the percentage of students completing the surveys and details about certain demographic questions. T-tests were used to compare students’ perceptions of their instructors’ use of UDL strategies before and after UDL training. All analyses were conducted using SPSS 14.0. A family-wise alpha level of 0.05 was used to determine levels of significance. Adjustments to the family-wise alpha were made according to the Bonferroni correction—that is, dividing .05 by the number of tests conducted (0.05/24 = .002). Thus, the test-wise alpha used for the study was .002. Cohen’s d effect sizes were used for this study. Cohen
Table 1

Number of students enrolled in each section of the course and the number and percentage of students completing the pre-survey and post-survey.

<table>
<thead>
<tr>
<th>Section/Instructor</th>
<th># Students Enrolled</th>
<th>Pre-Survey</th>
<th>Post-Survey</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td># Students</td>
<td>%</td>
</tr>
<tr>
<td>PSY100 - 001 / Inst1</td>
<td>197</td>
<td>150</td>
<td>76</td>
</tr>
<tr>
<td>PSY100 - 002 / Inst1</td>
<td>182</td>
<td>175</td>
<td>96</td>
</tr>
<tr>
<td>PSY100 - 003 / Inst2</td>
<td>184</td>
<td>156</td>
<td>85</td>
</tr>
<tr>
<td>PSY100 - 004 / Inst2</td>
<td>182</td>
<td>155</td>
<td>85</td>
</tr>
<tr>
<td>PSY100 - 005 / Inst3</td>
<td>122</td>
<td>102</td>
<td>84</td>
</tr>
<tr>
<td>PSY100 - 006 / Inst4</td>
<td>184</td>
<td>140</td>
<td>76</td>
</tr>
<tr>
<td>PSY100 - 007 / Inst4</td>
<td>200</td>
<td>136</td>
<td>68</td>
</tr>
<tr>
<td>PSY100 - 008 / Inst5</td>
<td>182</td>
<td>178</td>
<td>98</td>
</tr>
<tr>
<td>PSY100 - 009 / Inst5</td>
<td>182</td>
<td>170</td>
<td>93</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>1615</strong></td>
<td><strong>1362</strong></td>
<td><strong>84</strong></td>
</tr>
</tbody>
</table>
Table 2

The differences in student responses on the pre-survey and post-survey (t-tests) for the 24 questions related to UDL strategies.

<table>
<thead>
<tr>
<th>Question</th>
<th>Pre-Survey</th>
<th>Post-Survey</th>
<th>t</th>
<th>p</th>
<th>95% CI</th>
<th>Cohen’s d</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
<td></td>
<td>LL</td>
</tr>
<tr>
<td>Q1</td>
<td>4.49</td>
<td>0.66</td>
<td>4.73</td>
<td>0.54</td>
<td>10.09</td>
<td>&lt;.0005</td>
</tr>
<tr>
<td>Q2</td>
<td>4.34</td>
<td>0.69</td>
<td>4.48</td>
<td>0.69</td>
<td>5.22</td>
<td>&lt;.0005</td>
</tr>
<tr>
<td>Q3</td>
<td>4.23</td>
<td>0.72</td>
<td>4.36</td>
<td>0.72</td>
<td>4.45</td>
<td>&lt;.0005</td>
</tr>
<tr>
<td>Q4</td>
<td>1.66</td>
<td>0.82</td>
<td>1.66</td>
<td>0.89</td>
<td>0.09</td>
<td>.927</td>
</tr>
<tr>
<td>Q5</td>
<td>3.21</td>
<td>1.14</td>
<td>3.37</td>
<td>1.09</td>
<td>3.50</td>
<td>&lt;.0005</td>
</tr>
<tr>
<td>Q6</td>
<td>4.14</td>
<td>0.75</td>
<td>4.17</td>
<td>0.77</td>
<td>0.99</td>
<td>.320</td>
</tr>
<tr>
<td>Q7</td>
<td>3.66</td>
<td>0.70</td>
<td>3.91</td>
<td>1.04</td>
<td>6.13</td>
<td>&lt;.0005</td>
</tr>
<tr>
<td>Q8</td>
<td>3.38</td>
<td>1.00</td>
<td>3.75</td>
<td>1.08</td>
<td>8.74</td>
<td>&lt;.0005</td>
</tr>
<tr>
<td>Q9</td>
<td>3.96</td>
<td>0.82</td>
<td>4.27</td>
<td>0.78</td>
<td>9.62</td>
<td>&lt;.0005</td>
</tr>
<tr>
<td>Q10</td>
<td>4.63</td>
<td>0.61</td>
<td>4.63</td>
<td>0.57</td>
<td>0.28</td>
<td>.780</td>
</tr>
<tr>
<td>Q11</td>
<td>3.99</td>
<td>0.79</td>
<td>4.12</td>
<td>0.81</td>
<td>4.09</td>
<td>&lt;.0005</td>
</tr>
<tr>
<td>Q12</td>
<td>4.08</td>
<td>0.74</td>
<td>4.15</td>
<td>0.84</td>
<td>1.97</td>
<td>.049</td>
</tr>
<tr>
<td>Q13</td>
<td>3.50</td>
<td>0.91</td>
<td>3.80</td>
<td>0.94</td>
<td>8.14</td>
<td>&lt;.0005</td>
</tr>
<tr>
<td>Q14</td>
<td>4.12</td>
<td>0.72</td>
<td>4.14</td>
<td>0.76</td>
<td>0.53</td>
<td>.600</td>
</tr>
<tr>
<td>Q15</td>
<td>4.38</td>
<td>0.86</td>
<td>4.37</td>
<td>0.95</td>
<td>0.30</td>
<td>.764</td>
</tr>
<tr>
<td>Q16</td>
<td>4.22</td>
<td>0.80</td>
<td>4.24</td>
<td>0.91</td>
<td>0.66</td>
<td>.507</td>
</tr>
<tr>
<td>Q17</td>
<td>3.99</td>
<td>0.84</td>
<td>4.05</td>
<td>0.92</td>
<td>1.56</td>
<td>.008</td>
</tr>
<tr>
<td>Q18</td>
<td>44.54</td>
<td>0.63</td>
<td>4.59</td>
<td>0.63</td>
<td>1.69</td>
<td>.090</td>
</tr>
<tr>
<td>Q19</td>
<td>4.12</td>
<td>0.83</td>
<td>4.20</td>
<td>0.83</td>
<td>2.46</td>
<td>.014</td>
</tr>
<tr>
<td>Q20</td>
<td>4.31</td>
<td>0.71</td>
<td>4.40</td>
<td>0.71</td>
<td>3.19</td>
<td>.001</td>
</tr>
<tr>
<td>Q21</td>
<td>4.35</td>
<td>0.69</td>
<td>4.46</td>
<td>0.68</td>
<td>4.02</td>
<td>&lt;.0005</td>
</tr>
<tr>
<td>Q22</td>
<td>4.14</td>
<td>0.84</td>
<td>4.28</td>
<td>0.83</td>
<td>4.14</td>
<td>&lt;.0005</td>
</tr>
<tr>
<td>Q23</td>
<td>4.23</td>
<td>0.72</td>
<td>4.37</td>
<td>0.70</td>
<td>5.14</td>
<td>&lt;.0005</td>
</tr>
</tbody>
</table>

Note: CI = confidence interval of the Difference; LL = lower limit; UL = upper limit. Cohen’s $d$: .10 to .30 = small effect; .40 to .70 = medium effect; .80 to 1.0 = large effect (Cohen, 1988).
defines .10 to .30 as small effect sizes, .40 to .70 as medium effect sizes, and .80 to 1.00 as large effect sizes (Cohen, 1988).

Results

Descriptive Information about the Participants
The nine sections of Introduction of Psychology had a total of 1,615 students enrolled. The pre-survey at the beginning of the semester was completed by 1,362 students (84%) and the post-survey at the end of the semester was completed by 1,223 students (76%). The percentage of students who completed the surveys in the different sections varied from 68% to 98% for the pre-survey, and from 51% to 93% for the post-survey (see Table 1).

Of the students who completed the pre-survey, 1,330 answered the question about disability identification, with 106 reporting that they had a disability (approximately 8%). Only 23 of those students (22%) had contacted the university’s student disability services office to seek accommodations for their disabilities. Among students who completed the post-survey, 1,195 answered the question about disability identification, and only 98 reported they had a disability (again, approximately 8%). Twenty of the 98 students who reported a disability had contacted the disability services office (20%).

Differences on the Survey Following Training
Students reported a significant increase in the use of UDL strategies by their instructors after the UDL training on 14 of the 24 questions pertaining to UDL principles, based on the adjusted test-wise alpha level of .002 (see Table 2). Importantly, of those 14 questions, 6 had effect sizes that suggest the improvement was meaningful (Cohen, 1988). Students reported that their instructors presented information in multiple formats (question 1) significantly more after the training ($M = 4.79, SD = .54$) when compared to before training ($M = 4.49, SD .66$), $t_{(2559)} = 10.09, p <.0005, d = .40$. The student responses on question 8, regarding instructors providing electronic equivalents of paper handouts, indicated that the instructors did
provide significantly more of the course materials in electronic format after training \((M = 3.91, SD = 1.04)\) when compared to the student responses before training \((M = 3.66, SD = 1.02)\), \(t_{(2504)} = 6.13, p < .0005, d = .24\). Students reported that their instructors made significantly more reading assignments available online (question 9) after the UDL training \((M = 3.75, SD = 1.08)\) than students reported before the training \((M = 3.38, SD = 1.00)\), \(t_{(2393)} = 8.74, p < .0005, d = .36\). Student responses on question 10 demonstrate that the instructors made the key points in videos significantly more apparent to the students after the UDL training (instructors made the key points in videos significantly more apparent to the students after the UDL training \((M = 3.80, SD = .94)\) compared to before the training \((M = 3.50, SD = .91)\), \(t_{(2515)} = 8.14, p < .0005, d = .33\). The students also reported that the instructors supplemented significantly more of the lecture and reading materials with visual aids following the UDL training \((M = 4.37, SD = .70)\) compared to before the training \((M = 4.23, SD = .72)\), \(t_{(2550)} = 5.14, p = < .0005, d = .20\).

### Discussion

The results of this study demonstrate that UDL training for higher education instructors may increase their implementation of UDL principles in university classrooms as perceived by their students. Student responses on a questionnaire administered before and after instructor UDL training indicated that the students perceived that the instructors used significantly more UDL strategies following the UDL training compared to the student responses before training. The findings of this study demonstrate significant and meaningful changes on at least six items on the 24 item UDL questionnaire that was developed for this study.

In addition to comparative data regarding instructor implementation of UDL, this study also provides demographic information about students enrolled in multiple sections of a “gateway” course at a major university. Over 1,600 students were enrolled in the nine sections of Introduction of Psychology. Consistent with previous research (National Center for Education Statistics, 2008b; National Council on Disability, 2003; U.S. Government Accountability Office, 2009), 8% of the students enrolled in this course reported that they had a disability. However, only about 20% of students who reported a disability had contacted the disability services office regarding accommodations or services. Previous research suggested that nearly 60% of students with disabilities choose not to disclose their disabilities (Wagner, Newman, Cameto, Garza, & Levine, 2005). Our data demonstrated that nearly 80% of students who indicated they had a disability did not choose to report their disabilities to the university. One explanation for this disparity may relate to the fact that our research data were collected in the fall semester, which would have been the first semester of college for many of the students surveyed. Although an increase in the number of students seeking accommodations did not occur during the semester of study, (22% reported contacting the office at the beginning of the semester and 20% at the end of the semester), it is possible that after the first semester more students may have sought assistance from the disability services office.

The survey developed for this research project provided a mechanism for our team to begin evaluating the effects of training instructors in the use of UDL principles in higher education courses. The remarkable response rate for the survey (84% for pre-survey and 76% for the post-survey) provided the power necessary to demonstrate that students perceived a significant change in their instructors’ teaching behaviors following structured training on UDL principles and techniques for their implementation. This significant change held true even when the statistical tests were adjusted for multiple analyses. However, it should be noted that with such a large number of participants it was easier to reach rigorous significant levels and that the meaningfulness of these changes needs to be interpreted with caution.

Based on effect sizes, these differences before and after UDL training were meaningful in several ways. First, many of the questions that demonstrated small to moderate effect sizes related to the topics addressed in the training. The items that the students perceived as being implemented relatively less than other items at the beginning of the semester were emphasized in training, along with other UDL principles. See “Training Based on Pre-Survey Results” in the Method section for details about the specific items that were identified in the pre-survey results for inclusion in the training. The significant changes reflect practical changes because the changes related to the actual training. For example, after instructors received the UDL training,
students reported that their instructors provided more course materials in multiple formats and representations, making the material more accessible for all students (i.e., questions 1, 8, 9, and 24). According to the students, instructors also provided a better summary of the key points from instructional videos after they had received the training (i.e., question 10). Providing a summary of course content is an important aspect of several UDL principles. Summarizing information and concepts—at the beginning of class, following a segment of presented content such as a video, and at the end of each class session—provides students with a variety of representations of the concepts being taught. The summary of material can also be presented in such a way that it engages students in the learning process, another important aspect of UDL. Secondly, several reputable sources have emphasized that effect sizes are often small in social science and educational research. However, these small effects may be meaningful (Cohen, 1988; Wolf, 1986).

The results of this study indicate that UDL training for instructors appears to change students’ perceptions about how their instructors present ideas and information, engage students, and allow students to express their comprehension of course content. Two areas of the training appeared to have the most impact on changing instructors’ behavior. The first was the importance of presenting concepts in multiple ways and offering course materials in a variety of formats. The second was the need to summarize key concepts before, during and immediately following instruction. The instructors were able to incorporate these UDL strategies into their teaching almost immediately following the training sessions. Discussion during the sessions allowed the instructors to share ideas regarding the techniques they had tried and their success in implementing them. This made implementation of the new strategies less difficult.

**Limitations and Recommendations for Future Research**

This research did not include a control or comparison course, in which instructors would have received no training, to confirm that the changes reported were due exclusively to the UDL intervention. It is possible that even without the instructor training, students would have reported differences in teaching strategies between the beginning and the end of the semester. Adding comparison classrooms in which instructors teach similar content would help control for factors such as changes in teaching strategies in response to student performance over the course of a semester. In addition, the instructors who participated in UDL training and implementation were Psychology Teaching Fellows, selected because of their UDL training and demonstrated talent as instructors. Because they were already capable instructors before participating in UDL training, it is possible that student perceptions of their teaching skills would have been quite positive, even without UDL training, due to these instructors’ proficiency in addressing the learning needs of their students. In spite of these limitations, the changes that demonstrated significant and meaningful effects were consistent with the content of the training that was provided in this study, supporting the interpretation that training did impact those changes.

Another limitation of this research is that the Likert scale survey questions did not highlight which strategies were perceived by the students as engaging. Engagement is a critical UDL principle and teaching strategy. Much of the training provided to the instructors in this study addressed strategies and activities to increase student engagement. However, the Likert scale questions on the survey did not capture the richness of this aspect of the training. Thus, we were not able to evaluate how the instructor UDL training impacted students’ perceptions of their own engagement in the learning process. Future research should be designed to evaluate this aspect of the UDL implementation.

Several other limitations related to the construction of the survey. First, the survey format resulted in some ceiling effects, meaning that many students selected the “agree” or “strongly agree” responses. This ceiling effect resulted in the survey being less sensitive to change, especially for instructors who already employed some UDL principles. Finally, because the survey consisted of only Likert scale questions and had no open-ended questions, we were not able to identify the teaching strategies students recognized as most beneficial to their learning.

Others in this field have called upon institutions of higher education to conduct research that validates the use of UDL strategies in producing better learning outcomes for all students (Izzo, Murray, & Novak, 2008). Research regarding the most effective and efficient means of training instructors is also needed (Izzo et al., 2008). This study begins to address these issues by showing that training instructors in the use
of UDL principles does impact students’ perceptions of their learning experiences. However, more research is needed to evaluate which intervention strategies are most effective. The use of surveys that are designed with some open-ended questions will be important to include in future research to capture the teaching/learning strategies that are perceived as most effective. The use of surveys that are more sensitive to change would also be important to implement in future research. Surveys that include more questions would allow for an increased number of principle features of UDL to be addressed, but a longer survey may not be feasible to administer during class sessions because of the student time involved in completion—time that may interfere with course instruction. Thus, delivering the surveys electronically so they can be completed outside of class time should be considered in future research. Finally, future research should also include the validation of the survey instruments.

Conclusions

The results of this research are promising and indicate that providing higher education instructors with information about UDL principles, along with strategies for implementing those principles in their courses, may enhance the learning experiences of all students, including those with disabilities. The results of this study further indicate that recognizable changes in instructor behavior can result from just a few hours of training. These changes, as observed by the students, correspond to widely-acknowledged best teaching practices (Burgstahler, 2008; Higbee, 2008; McGuire & Scott, 2006; Zeff, 2007). With the increasing diversity of the postsecondary student population (Izzo, et al., 2008; McGuire & Scott, 2006) and the fact that a great percentage of students do not report disabilities to the university, the use of UDL strategies should become a standard component of postsecondary instruction.

References


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**About the Authors**

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Craig Spooner received his M.A. in education from the University of New Mexico. His experience includes working as department head and classroom instructor at the University of New Mexico, Gallup Campus, and as instructional designer and trainer at the Institute for Learning and Teaching at Colorado State University (CSU). He is currently coordinator of CSU’s ACCESS Project. His research interests include measuring the impact of UDL implementation on student performance. Craig can be reached by email at craig.spooner@colostate.edu
Appendix

Universal Design for Learning – Student Survey

Important Instructions:

1. **This survey is double-sided. Please make sure to answer the questions on both sides.**
2. Fill in answers ONLY on the answer form provided.
3. Use only a #2 pencil.
4. DO NOT fill in your name or ID number on the answer sheet.

Note: All information will be used for aggregate purposes only. No individual student will be identified and all results will remain anonymous.

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<tr>
<td>Strongly Agree</td>
<td>Agree</td>
<td>Neutral or Undecided</td>
<td>Disagree</td>
<td>Strongly Disagree</td>
</tr>
</tbody>
</table>

If the question is Not Applicable (N/A) do not fill in a bubble for that question.

1. The instructor presents information in multiple formats (e.g., lecture, text, graphics, audio, video).
2. The instructor’s expectations are consistent with the learning objectives stated on the course syllabus or on the study guides.
3. During lecture, the instructor ties the most important points to the larger objectives of the course.
4. The instructor often speaks while facing the board/screen or looking down at his/her notes, laptop, or overhead transparency.
5. The instructor begins each lecture with an outline of what will be covered.
6. The instructor summarizes key points throughout the lecture.
7. The course syllabus clearly describes the content and expectations of this course, specifically or in broad terms.
8. The instructor provides electronic equivalents (e.g., HTML, Word, PDF) of all paper handouts.
9. Required reading assignments (other than the textbook) are available online.
10. I am able to grasp the key points from instructional videos for this class.
11. The instructor uses instructional technologies (e.g., clickers, RamCT) to enhance learning.
12. Course materials (other than the textbook) are accessible, clearly organized, and easy to use.
13. Students in this course are allowed to express their comprehension of material in ways besides traditional tests and exams (e.g., written essays, projects, portfolios).
14. I receive prompt and instructive feedback on all assignments.
15. This course employs technology to facilitate communication among students and between students and the instructor.
16. Assignments for this course can be submitted electronically.
17. In this course I feel interested and motivated to learn.
18. I feel challenged with meaningful assignments.
19. The instructor expresses enthusiasm for the topics covered in class.
20. The instructor offers contact with students outside of class time in flexible formats (e.g., face-to-face, email, online chat, telephone).
21. The instructor explains the real-world importance of the topics taught in this course.
22. The instructor creates a class climate in which student diversity is respected.
23. The instructor is highly approachable and available to students.
24. This course supplements lecture and reading assignments with visual aids (e.g., charts, diagrams, interactive simulations).
Please answer the following questions. No individual student will be identified, and all results will remain anonymous.

25. What grade do you think you will get in this course?
   (Answer “A” for an A, “B” for a B, etc. If you think you will receive an F, answer “E.”)

26. I am a student with a disability (for example, a learning disability, ADHD, a physical disability):
   True (mark the “A” bubble)        False (mark the “B” bubble)

27. If so, I have contacted the Resources for Disabled Students office (RDS) to request accommodation services:    True (mark the “A” bubble)    False (mark the “B” bubble)
Relationship Between Negative Emotion and ADHD Among College Males and Females

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Abstract
This study extends a body of research indicating a relationship between negative emotion and Attention Deficit-Hyperactivity Disorder (ADHD). Gender differences in the self-reporting of negative emotion among college students with ADHD were examined. Sixty-four college students (39 male, 25 female), with a diagnosis of ADHD, and 109 college students (37 male, 72 female), who were evaluated yet received no ADHD diagnosis, completed self-report measures of negative emotion. Results suggest that regardless of gender, students with an ADHD, Combined Type diagnosis reported significantly more negative emotion compared to students with no diagnosis. Gender differences were evident within both the ADHD, Combined Type and No Diagnosis groups, with females scoring significantly higher than males. This pattern continued to distinguish students with an ADHD, Combined Type diagnosis from those with no diagnosis within each gender.

Prevalence rates for Attention Deficit-Hyperactivity Disorder (ADHD) have varied across studies, but it is likely that between 3-7% of school-age children legitimately meet the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition – Text Revision (DSM-IV-TR) criteria for ADHD (American Psychiatric Association, 2000). Although ADHD is more frequently identified and diagnosed in males, actual gender ratios have varied widely across studies. Estimates from studies with children referred for an ADHD evaluation range from a low of 2:1 (males: females) to a high of 10:1, with an average ratio of 6:1 (Barkley, 1998). Quinn and Wigal (2004) postulate that the difference in prevalence rates is a result of referral bias (stemming from the overt and disruptive aggressive and antisocial behaviors observed more often among males). Faigel (1995) hypothesized that ADHD may be less noticeable and harder to diagnose in females because females are typically socialized to be quieter and less protesting than males.

Males and females with ADHD may also differ in the expression of symptoms associated with the disorder. Brown, Abramowitz, Dadan-Swain, Eckstrand, and Dulcan (as cited in Barkley, 1998) reported that among clinic-referred children with ADHD, females were more socially withdrawn and were more likely to be anxious and depressed. Shea (1996) found that boys with clinically significant impulsivity ratings showed more negative and variable affect than a comparison group. Negative and variable mood in girls was associated with teacher ratings of ADHD but not necessarily with the predominantly hyperactive-impulsive version of ADHD. Studies with children identified as hyperactive at school have reported that girls tend to be rated by teachers as having fewer behavioral and conduct problems, but do not show fewer symptoms when measured in the laboratory (Barkley, 1998). Finally, in a comparison of 130 girls ages 6-17 with an ADHD diagnosis to 120 girls with no ADHD diagnosis, it was found that rates of major depression (17%), anxiety disorder (32%), and bipolar disorder (10%) were elevated among girls with the ADHD diagnosis (Biederman as cited in Barkley, 1998). Furthermore, while rates of negative emotion were comparable to rates reported for boys with ADHD in earlier studies, girls were nevertheless rated as less oppositional and as showing fewer conduct problems than the boys with ADHD.

In their meta-analytic review of research on gender differences in ADHD symptomatology, Gaub and
Carlson (1997) concluded that there were no significant gender differences on measures of impulsiveness, academic performance, or social functioning, yet girls were typically rated by observers as less hyperactive than boys and as expressing fewer “externalizing” symptoms, (such as aggression and conduct problems). Nadeau (2004) noted that girls with ADHD tend to be more hypersensitive to criticism. She described many adolescent girls with ADHD as compliant and seeking to conform to others’ expectations and not draw attention to themselves. She also proposed that hormonal fluctuations in females with ADHD may exacerbate symptoms of ADHD and contribute to dramatic mood swings, irritability, and emotional overreaction.

Quinn and Wigal (2004) conducted an online survey examining attitudes related to gender and ADHD. Their sample included adults in the general public, parents of children aged 6-17 years with ADHD, teachers with experience teaching a child with ADHD, and children aged 12-17 years with an ADHD diagnosis. A majority of the general public (58%) and teachers (82%) responded that ADHD is more common in boys. Comparatively, among teachers, 85% believed that girls are more likely to go undiagnosed, due primarily to the fact that girls do not “act out” (92%). A majority of both the general public and teachers reported that boys with ADHD struggle the most with behavioral and classroom problems, while girls suffer academic problems, inattention, and feelings of depression.

Far less is known about the prevalence of the disorder among adult males and females or how symptomatology may evolve and adjust with maturity. Results of one survey measuring symptoms of 720 adults against the DSM-IV ADHD criteria indicated an overall prevalence rate of 4.7% (Murphy & Barkley, 1996). Of those adults meeting DSM-IV criteria for ADHD, 2.5% were classified as Predominantly Hyperactive/Impulsive Type, 1.3% as Predominantly Inattentive Type, and 0.9% Combined Type. These results were quite similar to those reported by DuPaul, Weyandt, Schaugency, and Ota in their 1997 study with 700 college students (as cited in Barkley, 1998). Using DSM-IV criteria, results indicated that 2.5% of the college students classified themselves as Predominantly Inattentive Type, 0.9% as Combined Type, and 0.9% as Predominantly Hyperactive/Impulsive Type. Based upon these results, Barkley (1998) estimates that ADHD may be the second most common disability affecting college students and young adults, with prevalence rates between 3 and 5%.

Anywhere from 30-80% of children diagnosed with ADHD are likely to continue to display significant, age-inappropriate symptoms into adolescence (August, Stewart, & Holmes, as cited in Barkley, 1997; Barkley, Fischer, Edelbrock, & Smallish, 1991). Following a large-scale longitudinal study, Weiss and Hechtmann (as cited in Javorsky & Gussin, 1994) determined that approximately 66% of these children continued to display significant impairment related to symptoms of ADHD into adulthood. In addition, research suggests that the symptoms reported by adults diagnosed with ADHD are similar to those described by children and adolescents and their parents and teachers (Barkley, 1997). Barkley (1998) has proposed that the traditional DSM-IV criteria for ADHD may become increasingly less sensitive to the presence of dysfunction as clients age. This possibility reinforced a need to re-examine the ADHD criteria across the lifespan as well as the traditional view among professionals and the public that most children “grow out of” ADHD by adulthood. It is clear that this is not always the case, and there is a continued need in the research literature to document the difficulties associated with ADHD among adults.

**Emotional Regulation**

Research on the relationship between symptoms of ADHD and poor emotional regulation (Barkley, 1997, 1998; Martel, 2009; Ramirez et al., 1997) is growing. Children diagnosed with ADHD are frequently described as irritable, hostile, excitable, and generally emotionally hyper-responsive. Biederman, Faraone, Mick, Moore, and Lelon (1996) found that children with ADHD, as a group, were rated by researchers as having more symptoms of anxiety, depression/dysthymia, and low self-esteem.

Barkley (1997) discovered a link between a diminished ability to mentally represent and sustain internal information from prior event-emotion relationships (or contingencies) to problems with “reawakening” these emotional states when confronted with a particular situation. For example, when confronted with a stressful event, a person diagnosed with ADHD may not be able to recall his or her past efforts towards molding negative emotions into more positive ones. Barkley postulates that negative affective states including anger, frustration, sadness, anxiety, and guilt are more problematic for individuals diagnosed with ADHD because it is harder for them to create positive states through self-comforting, self-directed speech, and visual im-
agery. Without being able to engage in covert emotion regulation, there is very little to no delay between an event and the emotional response. In essence, Barkley is stating that the affective response to an event is less likely to undergo a period of contemplation, modification, and reframing in the individual with ADHD. This results in decreased affective self-control and an increase in the expression of negative affect. Wender (as cited in Ramirez et al., 1997) reported that there exists an emotional instability component in childhood ADHD, often noted as labile mood that usually continues into adulthood.

There are numerous studies which suggest that individuals diagnosed with ADHD in childhood are typically diagnosed with an accompanying, long-standing psychiatric condition. For instance, research by Szatmari, Offord, and Boyle (as cited in Barkley, 1998) suggests that up to 44% of children diagnosed with ADHD may have at least one other psychiatric diagnosis. In their review of epidemiologic studies of children with ADHD, Biederman, Newcorn, and Sprich (1991) concluded that approximately 25% also had an anxiety disorder, and that 15-75% had a mood disorder. Likewise, Lahey, Pelham, Schauhency, et al. (as cited in Biederman et al., 1991) found that children meeting DSM-III criteria for ADHD, Predominantly Inattentive Type reported higher rates of anxiety compared to children with ADHD, Combined Type. Biederman’s studies at Massachusetts General Hospital suggest that between 20-30% of children diagnosed with ADHD have a major affective disorder (Barkley, 1997). While Jensen, Shervette, Xenakis, and Richters (as cited in Barkley, 1998) reported that nearly 49% of the children diagnosed with ADHD in their study had an anxiety or depressive disorder, or both. Barkley (1998) concluded that between 13-30% of children with ADHD also have a comorbid anxiety or mood disorder and 25% may develop major depression. Major Depression may be particularly high for individuals diagnosed with ADHD - Combined Type (Faraone, Biderman, Weber, and Russell, 1998).

Research examining the relationship between negative affect and symptoms of ADHD in adults is growing, but is still rather limited. From Barkley’s Milwaukee follow-up study it was learned that young adults diagnosed with ADHD had higher rates of Major Depression (28% v. 12%) compared to a control group (Murphy & Barkley, 1996). 19-37% of clinic-referred adults diagnosed with ADHD noted prominent dysthymia. Barkley (1998) reported that approximately 24-43% of adults diagnosed with ADHD have also been diagnosed with Generalized Anxiety Disorder (GAD) and that 52% reported a history of being “overanxious.” Several studies have established a link between Major Depression and ADHD, with comorbidity estimates ranging from 16-31% in the ADHD adult population (Biederman et al., 1996; Murphy & Barkley, 1996). Robin, Tzelepis, Bedway, Gilroy, and Sprague (1997) reported that adults diagnosed with ADHD, compared to adults with no ADHD diagnosis, were more pessimistic, emotional, withdrawn, and self-demeaning. The authors concluded that the adults with ADHD in their study had more difficulties regulating their emotions and managing behaviors related to those emotions.

Purpose of Study

A body of research exists demonstrating a relationship between poor emotional regulation (or impaired ability to create positive states through self-comforting, self-directed speech, and visual imagery) and ADHD in children; however, similar research among adults is sparse. Given that ADHD is recognized as a valid disorder among adults, and an increasing number of adults diagnosed with ADHD are pursuing a college education, it is becoming increasingly important to extend the body of research to this population. An area of growing interest is the impact of emotional factors on global functioning among adults with ADHD. For instance, it is known that individuals diagnosed with ADHD struggle more, on average, with meeting the demands of a high school curriculum (Barkley, 1998). One might infer that negative emotional factors associated with ADHD (operationally defined in the present study as a clinically significant score on either the College Adjustment Scales Anxiety scale and/or Depression scale, or the Attention-Deficit Scales for Adults Emotive scale) would continue to impact adults who further their education at the post-secondary level. Also, based on studies demonstrating gender differences in the expression of negative emotion in ADHD, it might also be inferred that college females with an ADHD diagnosis will be more affected by negative emotion. Thus, this study was not only designed to assess the relationship between negative emotion and ADHD within the college adult, but also the differential impact of negative emotion on adult females and males diagnosed with ADHD.
Study Questions
The following questions were addressed in the study:

1. Are self-reported levels of negative emotion different among groups of individuals who have ADHD, Combined Type, ADHD Predominantly Inattentive Type, or no diagnosis?
2. Are there significant gender differences with regard to negative emotion within each diagnostic group?
3. Does negative emotion continue to distinguish individuals with ADHD from those with no diagnosis within each gender?

Method
Participants
Data from ADHD evaluations conducted at the Regents Center for Learning Disorders at Georgia Southern University (RCLD at Georgia Southern) were used in the study. The study sample was comprised of 173 students (97 female and 76 male) evaluated at the Center between the years of 1999 and 2004. The students were accepted to either two-year or four-year institutions of higher learning within the University System of Georgia. Sixty-four students (25 female and 39 male) were diagnosed with ADHD (all subtypes) and 109 students (72 female and 37 male) received no diagnosis. Participant ages ranged from 18 to 55 years old with a mean of 22.5 (SD = 6.5). There was no significant difference in mean age across diagnosis categories, F (2, 170) = .05, p < .05. Of those students receiving ADHD diagnoses, 31 (12 female and 19 male) were classified as having the Predominantly Inattentive Type, while 33 (13 female and 20 male) were classified as having the Combined Type. None of the students in the current study were given a diagnosis of ADHD, Predominantly Hyperactive-Impulsive Type.

Setting
The Board of Regents of the University System of Georgia established three regional centers in 1993 that provide assessment, resources, and research related to students with learning disorders in the University System. The Centers are housed at Georgia Southern University, The University of Georgia, and Georgia State University. Each Center is responsible for serving designated colleges and universities within geographic regions. The RCLD at Georgia Southern professional staff consists of two educational psychologists, a learning disabilities specialist, a liaison, a licensed psychologist, and a director.

Instruments
The measures featured in the current study are typically used to screen adults for symptoms of depression, anxiety, emotional over-reactivity, agitation, and lability. They were chosen to provide an estimate of negative emotion among the subjects in the study.

College Adjustment Scales (CAS). The CAS is a self-report inventory for use with college students ages 17 through 65 years old. It provides measures of psychological distress, relationship conflict, low self-esteem, and school/career decision-making difficulties using 108 statements answered on a four-point scale. Two of the nine CAS scales were targeted for analysis of negative emotion in the current study. The Anxiety scale is a measure of common affective, cognitive, and physiological symptoms associated with clinical anxiety. It includes statements such as, “Sometimes I am so worried that my heart beats uncontrollably.” The Depression scale is a measure of common symptoms associated with clinical depression. It includes statements like, “Lately, I have a hard time taking an interest in anything.”

Attention-Deficit Scales for Adults (ADSA). The ADSA is a self-report measure that assesses current ADHD symptoms in adults ages 17 years and older. The scale is divided into two sets of subscales, Primary and Secondary. There are 54 items to be rated on a five-point scale ranging from “Never” to “Always.” One of the secondary subscales, Emotive, was used as a measure of negative emotion in the current study. The Emotive scale assesses moodiness, tendency toward depression, and feelings of being easily overwhelmed by demands in life. It contains statements such as, “I get angry very easily.”

Procedures
All participants completed packets of information containing screening instruments for academic and attentional problems, a case history, and consent forms allowing for the use of their test data for future research. Students also obtained vision and hearing screenings and supplied a copy of their most recent college academic transcript, a sample of their best writing effort, and copies of any past evaluations or pertinent
medical records. Upon completion and submission of their packets, students were scheduled for an initial interview (with the RCLD licensed psychologist) and the ADHD assessment. Following this initial day of testing, the participants’ results were reviewed in a pre-staffing with the RCLD professional staff to determine what additional psychoeducational testing would be most appropriate. Some participants were given an ADHD diagnosis at this point while others received a diagnosis upon completion of psychoeducational testing. Students receiving no diagnosis completed the same testing process. All participants received a report of their psychoeducational evaluation results and were given the opportunity to participate in a feedback session to review the results with RCLD professional staff. To arrive at a diagnosis of ADHD, the RCLD utilized the following criteria:

1. Evidence of a history of symptoms of inattention and/or hyperactivity/impulsivity from at least two independent sources (parents, teachers, physicians, clinicians) across multiple settings (school, home, work);
2. Documentation of current symptoms that meet at least six of nine of the DSM-IV-TR Inattention and/or Hyperactivity/Impulsivity criteria;
3. Evidence of both childhood and adult significant symptoms;
4. Clear evidence of interference with developmentally appropriate academic and/or social functioning;
5. Differential diagnosis with other disorders that may cause problems with inattention and/or hyperactivity (i.e. depression, anxiety, etc.).

The diagnostic instruments used in the ADHD assessment process included the Barkley ADHD Behavior Checklist for Adults (Murphy & Barkley, 1996), the Brown ADD Scales, the Integrated Visual and Auditory Continuous Performance Test (IVA), the Conner’s Continuous Performance Test, the Wisconsin Card Sorting Task; Computer Version 4, and an interview with a licensed psychologist. A consensus regarding the diagnosis was reached in a meeting with the RCLD professional staff.

Results

To determine if gender was evenly distributed within each diagnostic group, a chi-square test was conducted. Results indicated that gender was not evenly distributed across the three groups of participants, $\chi^2 (2, N = 173) = 11.93, p < .01, \varphi^2 = .26$ (small effect). Visual inspection of the contingency table clearly indicated that there were approximately twice as many females as males in the No Diagnosis group (72 females compared to 37 males). The gender distribution was more even in the ADHD, Predominantly Inattentive Type (12 female and 19 male) and ADHD, Combined Type (13 female and 20 male) groups. Thus it appears that female participants in this study were less likely than males to receive an ADHD diagnosis; however, among those receiving an ADHD diagnosis, there were no significant gender differences related to the diagnostic category.

To determine if the self-report of negative emotion among college students diagnosed with ADHD differed significantly from that of college students without an ADHD diagnosis, a 3 x 3 analysis of variance (ANOVA) with the three measures of negative emotion and three diagnostic groups was conducted. Table 1 presents the means and standard deviations for the three measures of negative emotion for each of the diagnostic groups. Results indicated a significant effect for the ADSA Emotive scale, $F (2, 170) = 7.29, p < .01, \eta^2 = .07$ (medium effect). Tukey post hoc comparisons showed that the mean ADSA Emotive score for the ADHD, Combined Type group ($M = 66.6, SD = 11.32$) was significantly higher than the mean score for the No Diagnosis group ($M = 57.9, SD = 11.60$). The mean ADSA Emotive score for the ADHD, Combined Type group was not significantly different from the mean of the ADHD, Predominantly Inattentive Type group ($M = 60.6, SD = 11.54$).

To examine gender differences in negative emotion within each diagnosis, three 3 x 2 (negative emotion measures x gender) analyses of variance were conducted, one for each of the three diagnosis groups. Table 2 presents the mean scores for the three measures of negative emotion among participants in each group, separated by gender. Within the ADHD, Predominantly Inattentive Type group, no significant gender differences were found for the three measures of negative emotion. For the ADHD, Combined Type group, females scored significantly higher than males.
on both the ADSA Emotive scale, $F(1, 31) = 5.30, p < .05, \eta^2_p = .14$ (large effect) and CAS Anxiety scale, $F(1, 31) = 4.71, p < .05, \eta^2_p = .13$ (medium effect). Likewise, for the No Diagnosis group, females scored significantly higher than males on both the ADSA Emotive scale, $F(1, 107) = 8.38, p < .01, \eta^2_p = .07$ (medium effect), and CAS Anxiety scale, $F(1, 107) = 8.19, p < .01, \eta^2_p = .07$ (medium effect).

Mean scores on measures of negative emotion across diagnosis groups within each gender are presented in Table 3. For female participants, a significant effect for the ADSA Emotive scale was found, $F(2, 94) = 7.33, p < .01, \eta^2_p = .13$ (medium effect). Post hoc Tukey tests indicated that females with an ADHD, Combined Type diagnosis scored significantly higher on the ADSA Emotive scale as compared to females with no diagnosis. For males, a significant effect was also found for the ADSA Emotive scale, $F(2, 73) = 4.21, p < .05, \eta^2_p = .10$ (medium effect). Post hoc Tukey tests indicated that, as with females, males with an ADHD, Combined Type diagnosis scored significantly higher on the ADSA Emotive scale than males with no diagnosis.

Table 1

*Measures of Negative Emotion across Diagnosis Groups*

<table>
<thead>
<tr>
<th>Measure</th>
<th>ADHD Predominantly Inattentive Type</th>
<th>Diagnosis Group ADHD, Combined Type</th>
<th>No Diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADSA Emotive</td>
<td>Mean (SD)</td>
<td>Mean (SD)</td>
<td>Mean (SD)</td>
</tr>
<tr>
<td>60.58 (11.54)</td>
<td>66.64* (11.32)</td>
<td>57.91* (11.60)</td>
<td></td>
</tr>
<tr>
<td>CAS Anxiety</td>
<td>54.00 (9.07)</td>
<td>54.79 (9.67)</td>
<td>53.80 (8.43)</td>
</tr>
<tr>
<td>CAS Depression</td>
<td>51.61 (8.33)</td>
<td>53.70 (8.78)</td>
<td>51.36 (8.37)</td>
</tr>
</tbody>
</table>

Means with the same superscript letter are significantly different, $p < .05$. 


Table 2

*Gender Differences on Measures of Negative Emotion within Groups*

<table>
<thead>
<tr>
<th>Group</th>
<th>ADSA Emotive Mean (SD)</th>
<th>CAS Anxiety Mean (SD)</th>
<th>CAS Depression Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ADHD, Inattentive</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Females</td>
<td>63.25 (9.99)</td>
<td>56.58 (8.39)</td>
<td>54.75 (7.55)</td>
</tr>
<tr>
<td>Males</td>
<td>58.89 (12.37)</td>
<td>52.37 (9.31)</td>
<td>53.92 (7.68)</td>
</tr>
<tr>
<td>ADHD, Combined</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Females</td>
<td>71.92a (10.36)</td>
<td>59.08b (8.24)</td>
<td>53.92 (7.68)</td>
</tr>
<tr>
<td>Males</td>
<td>63.20a (10.80)</td>
<td>52.00b (9.68)</td>
<td>53.55 (9.63)</td>
</tr>
<tr>
<td>No Diagnosis</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Females</td>
<td>60.14c (10.30)</td>
<td>55.40d (7.79)</td>
<td>52.31 (8.33)</td>
</tr>
<tr>
<td>Males</td>
<td>53.57c (12.84)</td>
<td>50.68d (8.85)</td>
<td>49.51 (8.25)</td>
</tr>
</tbody>
</table>

Means with the same superscript letter are significantly different, \( p < .05 \).
Table 3

*Measures of Negative Emotion across Diagnosis x Gender*

<table>
<thead>
<tr>
<th>Gender</th>
<th>ADSA Emotive Mean (SD)</th>
<th>CAS Anxiety Mean (SD)</th>
<th>CAS Depression Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Females</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ADHD, Inattentive</td>
<td>63.25 (9.99)</td>
<td>56.58 (8.39)</td>
<td>54.75 (7.55)</td>
</tr>
<tr>
<td>ADHD, Combined</td>
<td>71.92 (10.36)</td>
<td>59.08 (8.24)</td>
<td>53.92 (7.68)</td>
</tr>
<tr>
<td>No Diagnosis</td>
<td>60.14 (10.30)</td>
<td>55.40 (7.79)</td>
<td>52.31 (8.33)</td>
</tr>
<tr>
<td><strong>Males</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ADHD, Inattentive</td>
<td>58.89 (12.37)</td>
<td>52.37 (9.31)</td>
<td>49.63 (8.37)</td>
</tr>
<tr>
<td>ADHD, Combined</td>
<td>63.20 (10.80)</td>
<td>52.00 (9.68)</td>
<td>53.55 (9.63)</td>
</tr>
<tr>
<td>No Diagnosis</td>
<td>53.57 (12.84)</td>
<td>50.68 (8.85)</td>
<td>49.51 (8.25)</td>
</tr>
</tbody>
</table>

Means with the same superscript letter are significantly different, $p < .05$. 
Discussion

The current exploratory study was conducted to extend the body of research indicating a relationship between negative emotion and ADHD among children and youth to the adult ADHD population. It was also designed to examine differences in negative emotion between adult females and males with an ADHD (any type) diagnosis. A primary goal of the study was to generate useful information that could ultimately be applied to a model of comprehensive treatment and services, at the college level, for adults with ADHD.

Using a large sample of college students tested at a regional learning disorders center, several notable outcomes were observed. Those outcomes were namely that: (a) adults (male and female) with an ADHD, Combined Type diagnosis showed higher self-reported levels of emotionality (based on the ADSA Emotive scale) compared to adults in a No Diagnosis group; however, adults with an ADHD, Predominantly Inattentive Type diagnosis were virtually indistinguishable from the aforementioned groups based on the factor of negative emotion alone; (b) females self-reported higher levels of emotionality (ADSA Emotive) and anxiety (CAS Anxiety) than males in both the ADHD, Combined Type and No Diagnosis groups; yet, there were no gender differences on these measures of negative emotion within the ADHD, Predominantly Inattentive Type group, and; (c) female participants in the ADHD Combined Type group rated themselves significantly higher on emotionality (ADSA Emotive) than females in the No Diagnosis group; whereas, females in the ADHD, Predominantly Inattentive group had ratings of emotionality (ADSA Emotive) that fell between those of the aforementioned groups, and were not significantly different from either group. Male participants showed a similar pattern to females. Males in the ADHD, Combined Type group rated themselves significantly higher in emotionality (ADSA Emotive) than males in the No Diagnosis group.

The first and third findings, considered together, indicate that regardless of gender, the adults with an ADHD, Combined Type diagnosis rated themselves significantly higher on emotionality (ADSA Emotive) than adults receiving no diagnosis. This finding is supported by prior research suggesting that ADHD symptoms are associated with decreased affective self-control, thereby causing increased expression of negative emotion (Barkley, 1997, 1998; Ramirez et al., 1997). Yet, the results of the current study place a new twist on this idea. The individuals with an ADHD, Predominantly Inattentive Type diagnosis were not found to be significantly different from individuals receiving no diagnosis on the variable of emotionality (ADSA Emotive). Thus, in terms of negative emotion, a distinction needs to be made between adults with an ADHD, Combined Type and ADHD, Predominantly Inattentive Type diagnosis. The latter group appears to be less affected by emotionality and less distinguishable from a non-ADHD population on the factor of negative emotion. One might question whether this is attributable to a decreased awareness of emotionally charged stimuli in the environment among individuals in the ADHD, Predominantly Inattentive group. Or, perhaps, these individuals have under-aroused emotional centers in the brain, leading to less emotional expression. These differences, and their causes, should be further investigated in future research.

The second finding shows clear gender differences on two factors of negative emotion, namely emotionality and anxiety. Females in the ADHD, Combined Type and No Diagnosis groups rated themselves higher on both domains, than males in the ADHD, Combined Type and No Diagnosis groups, respectively. This finding lends support to reports that emotional symptoms associated with ADHD are exacerbated by social and physiological factors for females (Nadeau, 2004). Nadeau further speculates that societal expectations that females will be the nurturers and supporters leaves them devoid of much needed nurturing and support for their own issues. Emotional stress coupled with an inadequate support system might be said to result in a decreased sense of control over one’s problems and an increased expression of emotionality or anxiety.

An explanation for the lack of gender difference on measures of negative emotion in the ADHD, Predominantly Inattentive Type group is not readily apparent. One might surmise that an emotional pattern characterized by under-arousal and introversion, which is more commonly associated with this group, is manifested similarly in males and females. In other words, females in the ADHD, Predominantly Inattentive Type group are no more likely to express negative emotion than males because they are, by the nature of their disorder, less given to impulsive reactionary behaviors. It might be further posited that both males and females in the Predominantly Inattentive Type group have symptoms of the disorder which are less noticeable by others and
perhaps even by them. For instance, an individual may be more likely to self-report hyper-emotionality if they frequently get into fights rather than if they frequently withdraw from uncomfortable situations.

When comparing females across all diagnostic groups, those in the ADHD, Combined Type group reported significantly higher emotionality on the ADSA Emotive scale than the No Diagnosis group of females. No other indicators of negative emotion were found to be significantly different among female groups. The same pattern was found for males across diagnostic groups. Based on these results, it might be concluded that both males and females in the ADHD, Combined Type groups exhibited higher levels of emotionality than males and females without a diagnosis, but not higher levels of anxiety or depression. Once again, the peculiarity in this investigation is the ADHD, Predominantly Inattentive group. Females who were predominantly inattentive were not found to differ significantly on any indicator of negative emotion from females in the other two groups. The same was true for males in the ADHD, Predominantly Inattentive Type group who did not differ significantly on measures of negative emotion from the males in the other two groups.

**Conclusion**

There appears to be something central to having both inattentive and hyperactive-impulsive symptoms that makes the expression of negative emotion more salient than just having inattentive symptoms alone or no ADHD symptoms at all. To understand this finding, one might return to the view that individuals with an ADHD diagnosis tend to exhibit greater difficulty with emotional regulation as a function of a weak ability to create positive states of mind (Barkley, 1997, 1998; Ramirez et al., 1997). It follows logically, that the group exhibiting the most extensive ADHD symptoms, the ADHD, Combined Type group, would exhibit the most problems with emotional regulation, and have the highest ratings of emotionality (ADSA Emotive). Members of the ADHD, Predominantly Inattentive Type group had the second highest ratings of emotionality; however, this was not significantly different from individuals with both hyperactive-impulsive and inattentive symptoms or from individuals with no diagnosis at all. As might have been predicted *a priori*, individuals with no diagnosis had the lowest ratings of emotionality.

It is difficult to rule out the impact of underlying psychiatric factors as contributing to symptoms consistent with ADHD. For example, could retrospective ratings of ADHD symptoms be under-reported, especially for females? Consistent with prior research, boys are typically rated as exhibiting more problematic behaviors and symptoms that are consistent with ADHD. This could then lead to widespread under-diagnosis of ADHD in adult females, since evidence of an early history of symptoms in childhood is an important criterion. Certainly, in the sample used in the current study, a notable difference between numbers of females and males receiving no diagnosis was evident. The No Diagnosis group included approximately twice as many females as males. This suggests the possibility of a bias in diagnostic procedures. These procedures may need to be revised to increase sensitivity to ADHD symptoms that may be more commonly seen with females. It also suggests that adults may need to become better educated about the manifestation of common ADHD symptoms in young females (e.g. inattention, withdrawal) to ensure that females with the disorder do not fall through the cracks and miss the services they may need to succeed academically.

The study results suggest that postsecondary disability service providers should pay particular attention to accommodations and treatment recommendations for individuals with a diagnosis of ADHD-Combined Type. Although such decisions must be based on individual need, the greater risk of impaired emotion regulation for members of this group indicate that direct instruction in creating positive states (e.g. ways of self-comforting, reframing through self-directed speech, and use of visual imagery to cope with intense emotional stress) may be of critical importance. In addition to negotiating appropriate accommodations for inattention and impulsivity for the classroom and test taking, encouraging utilization of tutoring services, and academic counseling that incorporates direct instruction in creating positive emotional states, a DSP might also consider recommending participation in a stress management counseling group.

The study further suggests that within the ADHD-Combined Type group and among students reporting ADHD symptoms but receiving no diagnosis, females are more apt than males to report greater levels of emotionality and anxiety. Thus, whether conducting an assessment in-house or referring to an appropriately licensed examiner, a rule out of co-morbid anxiety
symptoms should be made. Also, because of factors that might cause symptoms that mimic the inattention, poor concentration, and focus associated with ADHD (e.g. stress from childcare or other caregiver responsibilities, poor academic preparation, or poor health, etc.), other psychiatric, social, and health conditions should be explored. In the current study, females overwhelmingly received no diagnosis after reporting ADHD symptoms and academic problems. Based on this noticeable difference, it may prove useful to have a counseling group targeted specifically to women experiencing inattention, poor concentration, and/or impulsivity.

Also suggested by the current study results is the need to use more extensive measures of negative emotion in future research. The CAS Depression scale did not significantly differentiate any of the groups despite empirical evidence that individuals with ADHD often have symptoms consistent with a depressive disorder as well. Similarly, the CAS Anxiety scale no longer differentiated individuals with ADHD, Combined Type from those with no diagnosis when differences within each gender (e.g. female vs. female) were examined. While there was a statistically significant difference detected between males and females, the data likely had limited clinical significance. When a closer look was taken at the data, it was clear that the CAS Anxiety scores that were found to be significantly different between diagnostic categories (and between males and females) did not even meet the threshold considered to be “borderline” significant as established in the CAS manual (T-score of 60). Thus, although the scores are statistically different, neither would qualify as even “mild” anxiety.

Lastly, none of the 173 individuals included in the sample received a diagnosis of ADHD, Predominantly Hyperactive-Impulsive Type. Nevertheless, it is possible that students with predominantly hyperactive and impulsive symptoms are less likely to seek testing at the regional center since poor academic performance among adult students with ADHD may be more aptly attributed to problems with inattention rather than activity level. It would be interesting to examine the relationship between negative emotion and individuals exhibiting mostly hyperactive-impulsive ADHD symptoms. For instance, would individuals who are predominantly hyperactive and impulsive rate themselves higher on measures of negative emotion than individuals with both hyperactive-impulsive and inattentive symptoms? Would they rate themselves significantly higher on measures of emotionality (e.g. ADSA Emotive scale) than individuals with an ADHD, Predominantly Inattentive Type diagnosis? The current study shows that the expression of negative emotion appears to vary by the specific type of ADHD diagnosis, and extending this research to include adult individuals with an ADHD, Predominantly Hyperactive-Impulsive Type diagnosis would more broadly define the relationship between negative emotion and ADHD in adults.

References


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**About the Authors**

Tori Kearns received her BA degree in psychology from Swarthmore College and Ph.D. from the University of South Carolina. Her experience includes serving as the liaison for The Regents Center for Learning Disorders at Georgia Southern University. She is currently an assistant professor of psychology and counselor for East Georgia College. Her research interests include postsecondary LD assessment and the identification of African American students with learning disorders. She can be reached by email at: tkearns@ega.edu

Jay Ruebel received his BA degree in psychology from The University of Texas at Austin and Psy.D. from Indiana State University in Terre Haute, Indiana. His experience includes working as a professor at Georgia Southern University and serving as the Psychologist for the RCLD at Georgia Southern. Dr. Ruebel currently maintains a thriving private practice in Fort Worth, Texas where he sees children, adolescents, and adults. His treatment interests include ADHD, anxiety disorders (particularly Obsessive-Compulsive Disorder), and depression. He can be reached by email at: drjay@kellerpsych.com
Faculty Members’ Ratings of the Effectiveness of Academic Strategies for University Students with Psychiatric Disabilities

Karin F. Brockelman, Ph.D.
University of Medicine & Dentistry of New Jersey

Abstract
University faculty members were surveyed regarding which academic strategies they used to accommodate students living with psychiatric disabilities and the effectiveness of these strategies. Differences were found between Engineering and faculty in fields other than science, technology, engineering, and math (non-STEM) with regard to the academic strategies they use to accommodate students living with psychiatric disabilities; five of the strategies were used more frequently by Engineering faculty than non-STEM faculty and four of the strategies were used more frequently by non-STEM faculty. One strategy, providing extra time on an exam, was rated as significantly more effective by Engineering faculty than non-STEM faculty.

Barriers to higher education for individuals living with psychiatric disabilities have been examined and identified. Such barriers include symptoms of mental illness (e.g. depression, anxiety, poor concentration), side effects of medications (e.g. fatigue, dry mouth requiring the student to bring liquids to class), and perceptions of faculty and peers (e.g. the disability is not visible so it does not exist, people who have mental illnesses are dangerous and should not be on college campuses) (Collins & Mowbray, 2005; Megivern, Peletito, & Mowbray, 2003; Rickerson, Sourna, & Burgstahler, 2004; Sharpe, Bruinininks, Blacklock, Benson, & Johnson, 2004; Weiner & Weiner, 1996). Many of these barriers are ameliorated with effective support strategies and/or accommodations. The reasonableness and effectiveness of an accommodation in the workplace depends on many factors; the reasonableness and effectiveness of academic strategies and accommodations logically depend on many factors as well. As we seek to identify strategies and accommodations that are effective for postsecondary students living with psychiatric disabilities, it is important to explore differences in the effectiveness of an accommodation between different academic settings or disciplines.

Bourke, Strehorn and Silver (2000) surveyed faculty at one university regarding the provision of instructional accommodations to students with learning disabilities. An important finding of this study was that faculty beliefs in the importance of and efficacy of accommodations were positively related to provision of accommodations to students. Perceiving that university disability services were providing a lot of support to students with disabilities was positively related to belief in the importance and efficacy of accommodations. Additionally, faculty who perceived their own departments as supporting them with resources were more likely to provide accommodations to students with learning disabilities. One key difference between departments was that non-STEM faculty reported that is was easier to provide an alternate form of an exam than STEM faculty.

Vasek (2005) surveyed faculty at a 4-year college to assess their willingness to provide accommodations to students with all types of disabilities, including mobility, sensory, cognitive, and psychiatric disabilities. Vasek (2005) reported one significant difference between disciplines; Education faculty and Natural Sciences faculty were the most willing to accommodate students and Business faculty were least willing. The author reported that a large percentage of the participants were highly unwilling to allow certain accommodations, especially extended time on exams.

Szymanski, Hewitt, Watson, and Swett (1999) conducted a similar study in the late 1990s. These researchers found that 16% of faculty in any field never dealt with strategies for students with disabilities. Faculty reported that they wanted to accommodate
students but relied on the disability services office to tell them what to do, especially with regard to students with hidden disabilities.

Becker, Martin, Wajeeh, Ward, and Shern (2002) indicated that faculty commonly used accommodations including extending deadlines and giving extra time on exams. Vasek (2005) reported similarly that the accommodations faculty provided most often for students with any disability were: (a) allowing extended time on exams, (b) making general exam accommodations, and (c) allowing extra time to complete assignments.

Becker et al. (2002) reported that the younger a faculty member was, the more likely he or she was to consult the counseling center about a student. Faculty who consulted the counseling center were more likely to refer their students for services. Discomfort and fear of working with students who have mental illnesses were associated with making fewer accommodations and referrals. Greater confidence in one’s ability to help students was associated with use of more accommodations and referrals. Scales measuring faculty perceptions of their ability to help, and fear of students with mental illnesses were inversely related. Additionally, faculty in health sciences made fewer accommodations and referrals than faculty in other disciplines.

GlenMaye and Bolin (2007) surveyed social work baccalaureate program directors in one state regarding accommodation of students with psychiatric disabilities in their programs. The authors found a positive correlation between the number of accommodations used by faculty and their ratings of the effectiveness of the accommodations. There was a positive correlation between effectiveness ratings and perceptions of the employability of students living with a psychiatric disability in the field of social work. Feeling knowledgeable about psychiatric disability was also positively correlated with the faculty effectiveness ratings of accommodations. The most frequently used accommodations were in exam taking, adjustments to the length of time in which one is required to complete the program, and adjustment in course assignments.

The purpose of this study was to examine the perspectives of faculty members regarding the effectiveness of specific accommodations. The perspectives of STEM and non-STEM faculty were compared with the assumption that the ways in which students’ knowledge is assessed differs between STEM and non-STEM fields. The research questions addressed in this paper were:

a. What strategies have faculty employed to support students with psychiatric disabilities, and how effective were those strategies?
b. Do STEM faculty use different strategies than faculty in non-STEM fields?
c. Do STEM and non-STEM faculty rate the effectiveness of strategies differently?

Methods

Participants and Setting

All faculty: Participants were 107 full-time faculty members at a large Midwestern university who held tenure-line positions. Sixty-two percent were male. The racial and ethnic breakdown of the respondents was as follows: 89% Caucasian, 6% Asian, 3% Latino, 1% African American, and 1% from other backgrounds. Most of the faculty, 68%, taught both graduate and undergraduate students. Twenty percent primarily taught graduate students, and 10% instructed only undergrads.
**STEM and non-STEM faculty.** Faculty were asked to report their college rather than departmental affiliation. Several colleges within the university included STEM and non-STEM departments. For example, the college of Liberal Arts and Sciences included departments such as East Asian Languages and Cultures as well as Physics and Biology. Comparisons were made between engineering faculty and those from colleges that did not include any STEM departments; these two groups comprised a subset of the total participants with an n=50. The college affiliations of the survey participants are listed in Table 1; participants listed in the STEM and non-STEM columns of this table constitute the subset of 50 whose data were included in the comparison analyses. Two colleges, Engineering and Veterinary Medicine, had only STEM departments. All 27 STEM faculty participants were in the college of Engineering; no faculty in Veterinary Medicine participated in the survey. The non-STEM faculty reported the following college affiliations: 9 in Education, 9 in Fine & Applied Arts, and 5 in Communications.

Engineering faculty held their positions for a mean of 16.00 years and a SD of 10.73 years; their mean age was 48.44 years with a SD of 11.11 years. Faculty in non-STEM fields had been working full-time in tenure line positions for a mean of 14.68 years with a SD of 9.77 years; their mean age was 48.39 years with a SD of 9.60 years. The non-STEM faculty were divided nearly evenly between men and women while more than 77% of the engineering faculty were men. The percentages of the engineering and non-STEM faculty who reported a race or ethnicity other than Caucasian were 19% and 4% respectively.

**Instrument**

**Questionnaire.** The questionnaire was comprised of 5 sections. It was adapted from the Mental Health and Illness Awareness Survey (MHIAS) developed by Becker et al. (2002). Sections I and II pertained to faculty members’ comfort and confidence in working with students with psychiatric disabilities as well as the types of personal and professional experience they had with these students.

Section III asked about faculty use of strategies for students with psychiatric disabilities and their perceptions of the effectiveness of these strategies. First, participants were asked which strategies they used. If they used the strategy, participants were then asked to rate its effectiveness. A 3-point scale from “very effective” (2), “effective” (1), to “not effective” (0) was used for responses.

**Pilot.** A pilot questionnaire was sent to five faculty members at the university. All completed the questionnaire in less than 12 minutes and reported that that format was user-friendly. Several revisions were made to Section III based on feedback from the pilot participants. An additional sentence was added to the instructions on Section III stating, “You may have used these strategies to accommodate students with other disabilities, but we would like you to focus only on your experiences with students with psychiatric disabilities when responding.” A column for an “N/A” option was added. Lastly, the following strategy was included, “allowed a student to miss a class because of a problem related to his/her disability.”

**Procedures**

Questionnaires and consent letters were sent to 561 faculty at a large Midwestern university via campus mail. A self-addressed sticker was enclosed. Three weeks after the first mailing, the questionnaire was sent a second time to faculty members who had not yet responded. Participants voluntarily self-selected to be in the study by completing and returning the questionnaire.

In order to ensure a large enough number of faculty who knew that they taught students with psychiatric disabilities, the disability services office was contacted. The three colleges suggested by disability services were Engineering, Business, and Veterinary Medicine because many students who identified as living with psychiatric disabilities were majoring in these fields. Oversampling the targeted academic units was expected to increase the probability of finding faculty participants who knew they taught students with psychiatric disabilities.

From alphabetical listings of faculty in each college, every third person was selected. The colleges of Engineering, Business, and Veterinary Medicine were over-sampled by selecting every tenth person remaining on the list. A total of 115 questionnaires were returned from the 561, yielding a response rate of 20.5%, which is within the typical range of 10-50% for mail questionnaires (Weisberg, Krosnick, & Bowen, 1996). Of the 115 returned questionnaires, 107 were included in the analyses. A minimum of 46 items were completed out of 58 on the questionnaires.
Table 1

*College Affiliations of Participants*

<table>
<thead>
<tr>
<th></th>
<th>Surveys Completed</th>
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<td><strong>27</strong></td>
<td><strong>23</strong></td>
<td><strong>57</strong></td>
</tr>
</tbody>
</table>

*Note.* No faculty members from the colleges of Business, Labor & Industrial Relations, Law, Social Work, or Veterinary Medicine returned completed surveys.
On the eight discarded questionnaires, four items or fewer were completed.

Although the non-response rate was not consistent across colleges, no apparent pattern emerged with regard to which colleges’ faculty were likely to respond. The percentage of non-responders within a college ranged from 54% in Applied Life Sciences to 100% in the colleges of Law and Social Work. Communications had the second smallest percentage of non-responders with 55%, followed by Education with 72%.

Results

Sections I and II of the survey examined the relationship between sources of information about mental illness and perceptions of working with students with psychiatric disabilities among university faculty members. Information sources included professional training, mass media, personal relationships with individuals, former students, and one’s own experience of psychiatric disability. Faculty who had a student or a friend with a psychiatric disability had more positive perceptions of working with students with psychiatric disabilities than faculty who did not have one of these experiences. Data from sections I and II were reported in a previous article (see Brockelman, Chadsey, & Loeb, 2006).

Strategies Used by All Faculty

Table 2 lists the descriptive statistics for the effectiveness ratings of the strategies in order of mean rating. Three sets of descriptive statistics are listed for (a) engineering faculty, (b) non-STEM faculty, and (c) the whole sample. The most widely used strategies were (a) discussed the problem with the student (58%), (b) extended a deadline for a student (56%), (c) gave a student extra time to complete an exam (50%), (d) allowed a student to miss a class because of a problem related to his/her disability (46%), and (e) allowed a student to use a private testing room or test center (39%). Rearrangement of seating, planning of additional breaks, and use of an alternate test format were all used by fewer than 9% of the participants. A definition of psychiatric disability was requested by 11 participants. Additionally, 10 or more participants wrote that their responses to 5 items depended on the specific psychiatric disability diagnosis.

Mean effectiveness ratings for each strategy, along with the standard deviation are included in Table 1. The rating scale ranged from a low of 0 to a high of 2.

The three strategies rated as most effective were: (a) pre-arranged breaks in class (in addition to what other students in the class would typically have) \((M = 1.67)\), (b) rearrange seating \((M = 1.57)\), and (c) gave a student extra time to complete an exam \((M = 1.45)\). The three strategies rated as least effective were: (a) allowed a student to miss a class because of a problem related to his/her disability \((M = .78)\), (b) referred the student for professional help \((M = .87)\), and (c) discussed the problem with the student \((M = .88)\). Of the fifteen strategies, nine had SDs greater than .7, and none were less than .5. Ten distributions were negatively skewed, indicating that evaluations of these strategies were generally positive. T-tests of faculty members’ effectiveness ratings between men and women did not yield any statistically significant results.

Strategies Used by Engineering and Non-STEM Faculty

Fifty faculty members were included in the comparison analyses. Engineering faculty comprised 54% of the participants in the comparison analyses; also, 64% were men and 88% were Caucasian. The number of strategies that engineering faculty reported using ranged from 0 to 10 with a mean of 4.81 and a SD of 3.44. Non-STEM faculty reported using from 0 to 11 different strategies with a mean of 5.22 and SD of 3.57.

A greater percentage of engineering faculty than non-STEM faculty gave a student extra time to complete an exam \((Engineering = 59\%, \ non-STEM = 30\%)\), allowed a student to use a private testing room or test center \((Engineering = 44\%, \ non-STEM = 26\%)\), permitted an exam to be read orally, dictated, scribed, or typed \((Engineering = 11\%, \ non-STEM = 0\%)\), consulted with a professional regarding the student \((Engineering = 26\%, \ non-STEM = 13\%)\), or discussed the problem with the student \((Engineering = 63\%, \ non-STEM = 39\%)\). A larger percentage of non-STEM faculty than engineering faculty accepted alternative assignments \((non-STEM = 26\%, \ Engineering = 7\%)\), allowed a student to tape lectures \((non-STEM = 26\%, \ Engineering = 15\%)\), allowed a student to get a copy of another student’s notes \((non-STEM = 26\%, \ Engineering = 11\%)\), or allowed a student to miss a class because of a problem related to his/her disability \((non-STEM = 48\%, \ Engineering = 33\%)\).
Table 2

Descriptive Statistics for Strategy Effectiveness Ratings

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Engineering (n=27)</th>
<th>Non-STEM (n=23)</th>
<th>All (n=107)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Pre-arranged breaks in class</td>
<td>1</td>
<td>2.00</td>
<td>.000</td>
</tr>
<tr>
<td>Rearranged seating</td>
<td>2</td>
<td>1.50</td>
<td>.707</td>
</tr>
<tr>
<td>Gave a student extra time to complete an exam</td>
<td>16</td>
<td>1.69*</td>
<td>.479</td>
</tr>
<tr>
<td>Accepted alternative assignments</td>
<td>2</td>
<td>1.50</td>
<td>.707</td>
</tr>
<tr>
<td>Allowed a student to use a private testing room or test center</td>
<td>12</td>
<td>1.58</td>
<td>.515</td>
</tr>
<tr>
<td>Permitted an exam to be read orally, dictated, scribed or typed</td>
<td>3</td>
<td>1.00</td>
<td>1.000</td>
</tr>
<tr>
<td>Extended a deadline for a student</td>
<td>16</td>
<td>1.56</td>
<td>.512</td>
</tr>
<tr>
<td>Allowed a student to tape lectures</td>
<td>4</td>
<td>1.75</td>
<td>.500</td>
</tr>
<tr>
<td>Consulted with the university counseling center, student health center, student health center, mental health department, or the disability services center about an issue</td>
<td>7</td>
<td>1.14</td>
<td>6.90</td>
</tr>
<tr>
<td>Permitted an alternative test format (essay vs. multiple choice)</td>
<td>0</td>
<td>1.00</td>
<td>.000</td>
</tr>
<tr>
<td>Allowed a student to get a copy of another student’s notes or arrange for a note taker in your class</td>
<td>3</td>
<td>1.00</td>
<td>.000</td>
</tr>
<tr>
<td>Included a note on your syllabus asking students with all types of disabilities who may use accommodations to contact you (any disability - not only psychiatric)</td>
<td>2</td>
<td>1.50</td>
<td>.707</td>
</tr>
<tr>
<td>Discussed the problem with the student</td>
<td>17</td>
<td>.88</td>
<td>.697</td>
</tr>
<tr>
<td>Referred a student to professional help</td>
<td>14</td>
<td>1.00</td>
<td>.784</td>
</tr>
<tr>
<td>Allowed a student to miss a class because of a problem related to his/her disability</td>
<td>8</td>
<td>1.00</td>
<td>.926</td>
</tr>
</tbody>
</table>

*p < .05.

Faculty at the university were required to include a statement on their syllabi advising students who would need accommodations to contact the disability services office.

Non-STEM Faculty

T-tests were performed to test the following hypothesis that engineering and non-STEM faculty did not differ in their ratings of the effectiveness of strategies. One strategy was rated as significantly more effective by engineering faculty than by non-STEM faculty; providing extra time on an exam had a mean effectiveness rating of 1.69, on a scale from 0-2, among the 16 engineering faculty who had used this strategy. The effect size for this comparison was large with $d = 1.112$. The 7 non-STEM faculty who accommodated a student with extra time on an exam gave this an average effectiveness rating of 1.0. No other effectiveness ratings were significantly different between engineering and non-STEM faculty.

There were several differences in effectiveness ratings that were not statistically significant but are worth noting because so little information has been published to date on this topic. Table 3 lists the results of the T-tests along with Cohen’s $d$ for each comparison with 9 or more individuals. Extending a deadline, testing in private, and allowing a student to tape a lecture were all rated more positively by engineering faculty than non-STEM faculty. The effect size for testing in private was moderate at $d = .599$ and for allowing a student to tape a lecture was large at $d = .870$. More than half of both the engineering and non-STEM faculty had extended a deadline for a student and found it to be effective.

Discussion

Strategies Used by All Faculty

Two of the three most commonly used strategies by all faculty were extended a deadline for a student, and allowed a student extra time to complete an exam. Both strategies received high effectiveness ratings from faculty. Becker et al. (2002), GlenMaye and Bolin (2007), and Vasek (2005) also found these accommodations to be frequently used by participants in their studies. Extra time to complete an assignment is a commonly requested accommodation by students, but extra time need not be open-ended. If the faculty member does not set a new deadline, the student can take the initiative to do so.

The strategy discussed the problem with the student was used by more faculty than any other, but was one of the three rated as least effective. GlenMaye and Bolin (2007) also reported discussing the issue with the student as the most widely used strategy, but they did not report effectiveness ratings. A possible explanation for this finding is that it required initiation by the professor, while the extended a deadline and extra time to complete an exam would likely have been requested by the student. Students with psychiatric disabilities do not necessarily want their professors to know about their disability (Olney & Brockelman, 2003). Students may be concerned about the potential stigma associated with a psychiatric label, such as the assumption that students with psychiatric disabilities are less intelligent than other students (Cook et al., 1993). Commonly used student-initiated strategies were rated as highly effective (e.g. extended a deadline and extra time to complete an exam). Students who are proactive about requesting strategies may have better academic outcomes than students who choose not to discuss disability-related needs with their professors. Prior research has not made comparisons between student- and faculty-initiated strategies.

The strategy rated least effective was allowed a student to miss a class due to a disability-related problem. Although professors may not have penalized students, missing class means missing content, instruction, and discussion. The natural consequences of missing class may be what influence faculty perception that it was not effective. The high standard deviation for this strategy indicated that while some faculty found it to be totally ineffective, others gave it an effectiveness rating as high as the second most effective strategy on the questionnaire. Allowed a student to miss a class due to a disability-related problem has not been included in previous studies. A variety of factors may have affected faculty experiences with the adjustment of attendance policies including (a) how often an individual student missed class, (b) the student’s resourcefulness in learning missed content, (c) the student’s level of achievement in the course prior to missing a class, and (d) the severity and duration of the student’s symptoms.

Strategies Used by Engineering and Non-STEM Faculty

Engineering and non-STEM faculty appeared to use different accommodations and strategies with differing frequencies. Engineering faculty made more exam-related accommodations while non-STEM faculty made more classroom accommodations. One reason for these findings may be that non-STEM disciplines may assign papers or projects more often than they give exams. This study did not ask faculty about the
Table 3

*T-tests Between Engineering and Non-STEM Faculty Ratings of the Effectiveness of Strategies

<table>
<thead>
<tr>
<th>Strategy</th>
<th>$t$</th>
<th>$df$</th>
<th>$d$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gave a student extra time to complete an exam</td>
<td>-2.549*</td>
<td>21</td>
<td>1.112</td>
</tr>
<tr>
<td>Extended a deadline for a student</td>
<td>-1.202</td>
<td>27</td>
<td>.154</td>
</tr>
<tr>
<td>Allowed a student to use a private testing room or test center</td>
<td>-1.197</td>
<td>16</td>
<td>.599</td>
</tr>
<tr>
<td>Allowed a student to tape lectures</td>
<td>-1.151</td>
<td>7</td>
<td>.870</td>
</tr>
<tr>
<td>Allowed a student to miss a class because of a problem related to his/her disability</td>
<td>-.693</td>
<td>17</td>
<td>.336</td>
</tr>
<tr>
<td>Referred a student to professional help</td>
<td>-.494</td>
<td>24</td>
<td>.202</td>
</tr>
<tr>
<td>Consulted with the university counseling center, student health center mental health department, or the disability services center about an issue</td>
<td>.416</td>
<td>8</td>
<td>.294</td>
</tr>
<tr>
<td>Allowed a student to get a copy of another student’s notes or arrange for a note taker in your class</td>
<td>.284</td>
<td>7</td>
<td>.215</td>
</tr>
<tr>
<td>Discussed the problem with the student</td>
<td>.020</td>
<td>24</td>
<td>.008</td>
</tr>
</tbody>
</table>

*p < .05.

*Note. N=50. Only faculty whose STEM/Non-STEM status was known were included.*
types of courses in which they made accommodations (e.g., lab, discussion, lecture, seminar, or practicum). A possible explanation for the dissimilarity in the types of accommodations made by faculty is that appropriate means of assessing student learning depend on the type of course. Becker et al. (2002) reported that faculty in health sciences made fewer accommodations for students with psychiatric disabilities than faculty in other fields. Faculty in health sciences were not included in the comparison analyses for this study because this college within the university was comprised of departments in both STEM and non-STEM disciplines (e.g., speech and hearing sciences, leisure studies, community health and kinesiology).

Effectiveness of Strategies Used by Engineering and Non-STEM Faculty

The one accommodation rated more effective by engineering faculty was giving a student extra time to complete an exam. More detailed data on the types of exams given by faculty would be helpful in interpreting this result. It is possible that extra time is more effective for problem-solving exams than for essay exams.

Limitations

Generalizing the findings of this study to all faculty at the university studied and other universities should be done with caution due to the lack of proportional representation of colleges and cultural backgrounds in the sample. In addition, the return rate of the study was low, which further limits generalizability.

Another limitation is that faculty were asked for the college of their primary appointment within the university, making it impossible to determine whether or not some faculty were in STEM fields or not. For example, the College of Liberal Arts and Sciences includes departments such as East Asian Languages and Cultures as well as Physics and Biology. Asking faculty for their college rather than specific department was done in the interest of ensuring the anonymity of faculty in small departments who could be identified by their demographic information.

No definition of psychiatric disability was provided in an effort to not limit the variety of individuals that faculty included in this category. Including a brief paragraph in the cover letter explaining why a definition, or specific diagnosis, was purposefully not given may have provided faculty with a better rationale for responding to the questions.

A positive response bias may have affected the results of this study. It is possible that faculty with more positive perceptions of students with mental health problems were more likely to respond to the survey. Response bias may not have influenced the data, though. According to Weisberg, Krosnick, and Bowen (1996), participants in mail surveys, who can complete questionnaires in private, tend to give more candid responses than participants in telephone or face-to-face surveys.

Implications for Practice

The effectiveness of an accommodation or strategy may vary depending on the subject matter of the course and the type of course, not to mention the numerous different characteristics of individual students and faculty members. Although allowing a student to miss class was rated as an ineffective strategy, we cannot know what the outcome would have been if the student went to class on a highly symptomatic day. The negative social and academic consequences of embarrassing behavior may be worse than those of simply missing class. As professionals, we can work with students to plan ahead for potential absences by arranging for a friend to record the lecture, getting phone numbers of friends in class early in the semester, and e-mailing the professor before the missed class if possible. Also, be creative in developing alternatives to missing class with a student. Taking extra breaks during class and changing one’s seat may enable a student to attend a class on a day that he or she previously would have skipped.

We can talk with students about whether or not they want to use accommodations for each class individually. A student whose disability warrants extra time on exams may choose to use that extra time in STEM courses and not use it in social science courses. We can empower students by teaching them to attend to what strategies and accommodations work for them and what ones do not in a variety of situations.

Future Research

Factors that may predict faculty accommodation of students with psychiatric disabilities should also be explored. Examples of potential factors include (a) the number of students a faculty member instructs per semester, (b) the amount of time faculty spend arranging strategies for their students with psychiatric disabilities, (c) students’ behavior when requesting strategies, and (d) whether the professor or the student initiated the strategy.
The development of training materials and resources for faculty should be investigated. Most faculty in this study were interested in resources, and most had taught students with psychiatric disabilities. Therefore, any training materials or resources provided to faculty need to be validated through research prior to dissemination. A more in-depth evaluation of strategy usage and effectiveness, including supporting evidence based on student grades, would also provide a valuable contribution to the development of resource materials.

References


About the Author

Karin Brockelman earned her Ph.D. in Special Education at the University of Illinois at Urbana-Champaign. She earned her M.S. in Rehabilitation from the University of Illinois at Urbana-Champaign as well and is a Certified Rehabilitation Counselor. Dr. Brockelman is currently a postdoctoral fellow in the Department of Psychiatric Rehabilitation and Counseling Professions at the University of Medicine & Dentistry of New Jersey. She can be reached by email at: brockeka@umdnj.edu and brockelm@illinoisalumni.org

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Perceptions of Academic Staff towards Accommodating Students with Disabilities in a Civil Engineering Undergraduate Program in a University in South Africa

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Abstract
This study explored the perceptions of academic staff towards admission of students with disabilities, and their accommodation once accepted into an undergraduate Civil Engineering program in a South African university. Qualitative responses relating to the perceptions of five academic staff were obtained through semi-structured interviews. The academic staff had limited interactions with persons with disabilities prior to the study. They were also uninformed about disability issues. However, they were willing to admit and accommodate students with disabilities in the undergraduate Civil Engineering program. The perceived attitudes of the academic staff towards people with disabilities, and their knowledge and awareness about disability issues may negatively impact the accommodation of students with disabilities in the program.

In 1997, the United Nations Educational, Scientific and Cultural Organization (UNESCO) reported the outcome of a survey that gathered information on students with disabilities in 24 universities in 11 English-speaking African countries, including South Africa (UNESCO, 1997). The survey was carried out to assist universities in Africa to develop policies and practices regarding the needs of students with disabilities, as well as strengthening cooperation between universities in the field of disability. The survey was based on the principles of United Nations Standard Rules of Equalization of Opportunities for People with Disabilities (Hendriks, 1995). The questionnaire for the survey was completed by the key person responsible for students with disabilities in each participating university.

The survey revealed that a majority of students with disabilities in participating universities had physical or visual impairments, but only few of the universities had written policies regarding how to address the needs of such students. Some of the universities did not encourage students with disabilities to register for certain courses which required a lot of field work. Participating universities considered accessibility as the biggest problem in accommodating students with disabilities, and tended to solve problems whenever they arose. The report therefore recommended the need to be pro-active in ensuring that a supportive environment is created before students with disabilities are recruited into academic programs. Similar recommendation was later made by Rao (2004) after research reported that the attitudes among students and academic staff towards persons with disabilities were part of the inhibitory factors to accommodating students with disabilities in tertiary education. Unfortunately, the attitudes of academic staff in higher institutions towards students with disabilities was least researched. Therefore, Rao (2004) specifically advocated for qualitative studies to find out the perceptions of academic staff regarding teaching students with disabilities that may involve making accommodations.

For students with disabilities, participation in higher education is a matter of equal opportunity and empowerment (Fuller, Bradley, & Healey, 2004). Globally, there are reports of marginal increases in the proportion of such students in higher education, ranging from 0.09% of students in higher education in Tanzania to 11.7% in Austria (Department for Innovation, Universities and Skills, 2009; Fuller et al., 2004; Goode,
Literature on admission of students with disabilities in higher education focused on physical barriers to access, problems in accessing curricula, and negative attitudes towards the students, among others (Opie & Taylor, 2008). The literature also highlighted factors that influenced the attitudes of academics towards students with disabilities, namely previous contacts and interactions with persons with disabilities, knowledge about disability issues, and willingness to accommodate the students, among other factors (Dupoux, Wolman, & Estrada, 2005; Konur, 2006; Rao, 2004). However, the development of public policies regarding the direct access to higher education by students with disabilities has been a major driving force for increased participation (Konur, 2006). The institutions of higher education provide various forms of support to accommodate students with disabilities, the most common forms being extended time for examination or alternative test formats, course substitutions or waivers, and assistive devices including audio tapes (Quick, Lehmann, & Deniston, 2003).

It has been argued that a global perspective on disability issues is needed to avoid assuming that developments in one country are the norm (Dupoux et al., 2005). While most industrialized nations like the USA have developed systematic measures to deal with access to higher education by students with disabilities (Dupoux et al., 2005; Vogel, Leyser, Burgstahler, Sligar, & Zecker, 2006), emerging nations like South Africa, South Korea, and Haiti are still in the process of articulating and implementing policies that guarantee the accommodation of students with disabilities in higher education (Dupoux et al., 2005; Kwon, 2005; Losinsky, Levi, Saffey, & Jelsma, 2003). A cross-cultural study across four continents on the attitudes of teachers toward integration of students with disabilities revealed that teachers in Germany and the United States had more positive attitudes than those in Ghana, the Philippines, Taiwan, and Israel (Dupoux et al., 2005).

A survey of three higher education institutions in South Africa revealed that only 0.4% of the students’ population reported having any form of disability (Crous, 2004), compared to about 10% or more in the more industrialized nations like the USA, UK and Germany (Fuller et al., 2004). The setting where the current study was carried out was one of the 7 universities in South Africa which participated in the survey conducted by UNESCO (1997). The UNESCO survey revealed that there were only 30 students with disabilities out of about 10,500 students in the university (0.3%) at the time of the survey. These students were enrolled in law, arts, commercial studies, social work and administration. At the same time, the university was also working on a policy document on how to accommodate students with disabilities. However, by 2004, the university had committed itself to making tertiary education and the working environment accessible and inclusive of all students and staff, including those with disabilities (University of Kwazulu Natal [UKZN], 2004). The number of students with disabilities in the university has also increased to approximately 200 out of a student population of 36 805 in 2009 (0.5%). Units to provide academic and non-academic assistance to students with disabilities, named Disability Units, have been established on the five campuses of the university. Support services available to the students included continuous liaison with the academic departments where the students are registered, counselling, obtaining permission for extended time adjustment during exams, and providing audio tape facilities for lectures. In addition, a 5-day course on Disability Studies was offered in 2008 with a view to introducing it as part of the induction program for new university staff in order to raise awareness about disability.

In spite of the achievements in the particular university, the first author (NM), who was a staff of the Disability Unit at the time of this study, observed that students with disabilities were still under-represented in the Faculties of Science and Engineering because of a misconception among the academic staff that students with disabilities could not fulfil all the criteria required to complete the academic programs. Therefore, this study was initiated to explore the perceptions of academics towards accommodating students with disabilities who may be admitted into the undergraduate Civil Engineering program in the university.

Civil engineering is a professional engineering discipline that deals with the design, construction and maintenance of the physical and natural built environment, including bridges, roads, canals, dams, and buildings. The university offers a 4-year undergraduate program in civil engineering, comprising courses such as structures, steel and concrete materials, geotechnics, surveying, hydraulics, water supply and waste water treatment, and transportation. The program is fully accredited by the Engineering Council of South Africa (UKZN, 2004).
Methodology

Research setting

The research setting for this study was the Department of Civil Engineering in the University of KwaZulu Natal in South Africa, having a complement of 13 academic staff on either full-time or part-time basis. After obtaining necessary ethical clearance, all the academic staff were targeted and invited to take part in the study. Academics who had been employed for less than six months in the department were however excluded in order to ensure that participants would have acquired some experience in working in the department. Out of the nine academics who met the inclusion criteria, five responded and agreed to take part in the study.

Participants

The five participants (two females and three males) were aged 40-60 years. Two participants were in the academic rank of professors, another two were senior lecturers, and the fifth person was at the lecturer level. Four of the participants had obtained doctoral qualifications in civil engineering, and all had over 10 years post qualification experiences. All the participants had between three and twelve years experience lecturing in the department. Each participant received an information sheet that provided information about the study.

Research design

A qualitative research methodology involving semi-structured interviews was adopted to gather necessary data. After obtaining informed consent, one of the authors (NM) carried out semi-structured interviews with the participants in the privacy of their offices. The following probing statements/questions, based on the factors reported by Rao (2004) to influence the attitudes of academics towards students with disabilities in higher education, were posed to each participant:

- Describe any past experience with an individual with disability.
- How would you feel if a student with disability was offered admission into the civil engineering program?
- Describe your initial thoughts when you hear the words “person with disability.”
- Describe what you know about disability issues.
- What are some of the challenges, if any, you foresee for students with disabilities in the undergraduate program or in the practice of the profession?
- If you should become physically disabled, what are some of the practical challenges you may face to continue to practice as a civil engineer?
- What would be the best method of creating awareness regarding disability?

These statements/questions were first piloted with two academics from one of the undergraduate programs in the Faculty of Arts in the same university.

For the main study, all the interviews were open-ended to explore issues the participants considered to be important. The discussions from the interviews were audio taped, transcribed, and analyzed through thematic analyses (Braun & Clarke, 2006; Fereday & Muir-Cochrane, 2006). Field notes developed during each interview were also analyzed. Ethical issues regarding anonymity, confidentiality and access to the data and research findings were discussed with each participant.

Findings

All five participants reported very limited interactions with persons with disabilities prior to the study. Two participants interacted with friends with disabilities, but they were uncertain about the types of disabilities. Another participant had a family member with disability who was restricted to life in a wheelchair due to problems with mobility. However, all the participants welcomed the possibility of admitting students with disabilities into the undergraduate program in civil engineering, and expressed their willingness, with some apprehension, to accommodate the students:

- “I would do whatever if the person is passionate about doing civil engineering, to accommodate the person.”
- “If we admit, we should provide the facilities. But what are the challenges which they will face on daily basis?”

One participant expressed additional thoughts about the possible impact on persons without disability:

- “A student with disability is an embarrassment on the part of non-disabled students.”
When asked to describe their initial thoughts on hearing the words “person with disability,” the participants expressed thoughts around “ability” and “mobility.”

- “I think of someone who is unable to do what others can do! People who have special needs.”
- “In civil engineering, everything involves a lot of mobility, especially if you work in contracting. People with disabilities will find it difficult to cope with the environment.”

The participants described only one disability issue they perceived could affect students with disabilities in the civil engineering program, namely access:

- “One of the problems we have in this program is access, the laboratories are not accessible and some of the features are fixed and difficult to change.”
- “Civil Engineering department is not accessible at present. We have upstairs laboratory, there is no access to the lab for people with disability. However, it is not impossible to make changes to create access to the lab.”

All the participants described the challenges they anticipated students with disabilities could encounter while going through the undergraduate program in civil engineering or in the practice of the profession. The participants also proffered solutions. Within the curriculum of the program, laboratory work was considered a major challenge:

- “There could be some problems in carrying out some of the practicals in the laboratory. Though the laboratory may be accessible and the worktable may be at the level of the student in a wheelchair, some of the equipment could be hazardous.”
- “Since students work in groups for certain projects, students without disabilities could assist students with disabilities where necessary. This buddy system or employing laboratory assistants would help students with disabilities to participate to some degree in science labs.”

In the practice of the profession, the participants expressed the following comments:

- “The challenges of site work as all students have to complete eleven weeks of site work to complete their degree. The site work or vacation work does not have to be in a construction company. Most of the students make a mistake in thinking that the requirement can only be met by working in a construction company.”
- “Civil engineering is an extremely broad field and students with disability can create their own path in the profession. There are basically two broad areas of activity – the contractual side and the consultancy side, which would suit different personalities. I would counsel a student with physical disability who wishes to study civil engineering to go the consultancy pathway, as they would find it difficult to go into the contractual pathway.”
- “Traditional civil engineering might involve areas that are difficult for students with physical disability to access. However, as a civil engineer, you can be an academic, researcher, or a designer. There is a scope for someone with physical disability to have a career in civil engineering, though it would be something that is not necessarily conventional.”

Should the participants become disabled, they all believed that they would continue to practice the profession of civil engineering though with some modification:

- “Of course, civil engineering is my passion! Yes I would. I would change the emphasis a bit. I like field work. It will be a little difficult to do that. So I would lean towards modelling, computer modelling, simulation, that kind of thing.”

A follow up question as to what the participants would do should a current student in the program suddenly develop some disabilities elicited mainly general responses like “It depends on the needs of the particular student.”

Finally, the participants made recommendations on what would be the best method of creating awareness about disability, especially within their university. All participants recommended that regular disability
awareness workshops/seminars be conducted in the university. The comments of one of the participants was representative of the views of all the participants:

- "I think education of the general public as well as those of us in educational institutions will be very helpful. We lack that. The awareness in the country is not high!"

Discussion

There is a need for caution in making inferences from the findings of this study. The participants expressed the willingness to admit and accommodate students with disabilities in the undergraduate civil engineering program in the university. The expressed willingness may be part of the impact of the ongoing efforts of the Disability Units to increase awareness about disability issues in order to accelerate the process of inclusiveness within the university environment. This could be considered a positive development in the university as it would contribute to the success of the students when they are enrolled in the program (Goode, 2007). However, it is not evident that the willingness expressed was based on appropriate knowledge and attitudes about disability and disability issues.

The initial thoughts of the participants about disability seemed to focus on the perceived limitations of persons with disability. In addition, the perception of one of the participants that a student with disabilities could be an embarrassment to students without disabilities should not be ignored. These perceptions suggest a poor awareness and image of disability, and likely the reflection of a negative attitude. Attitudes, beliefs, and misconceptions of society towards disability constitute major barriers for persons with disabilities as a person’s disability is often perceived as a negative trait (Amosun, Volmink & Rosin, 2005). This is why persons with disabilities in South Africa continue to battle with marginalization because of the perpetuation of such stereotypes of disability in the society (de Klerk & Ampousah, 2003; Integrated National Disability Strategy [INDS], 1997). Such negative attitude will not enhance the accommodation of students with disabilities in the civil engineering program.

Also, the initial thoughts of the participants about disability did not reflect any knowledge about the different types of disabilities. Though the UNESCO survey (1997) reported that majority of the students with disabilities had physical or visual impairments, the types of impairments reported by persons with disabilities are not limited to these (INDS, 1997). In addition, the UNESCO survey reported that accessibility was the biggest problem in accommodating students with disabilities in universities. This is similar to the perceptions of participants in this study. However, disability issues are much broader than access. None of the participants raised issues around the different types of disabilities, nor about various legislations around disability (INDS, 1997). The provision of accessible environments for students with disabilities is still a major challenge (Amosun et al., 2005), as access is often restricted by architectural (Losinsky et al., 2003) and budgetary constraints (Johnson, 2006).

The limited knowledge about disability and disability issues may be related to the limited prior contacts and interactions the participants had with people with disabilities. The participants’ knowledge seemed to relate only to “visible” and not “hidden” disabilities. The concern this raises is that the civil engineering program may be unable to accommodate students having certain types of disabilities, but the students may be offered admission because the participants are uninformed while participating in the student selection processes. It is critical that appropriate educational support and accommodation are in place to ensure the progress and success of students with disabilities in the program. Therefore the limited knowledge about disability and the limited prior contacts and interactions with people with disabilities will further inhibit the accommodation of students with disabilities in the civil engineering program (Dupoux et al., 2005).

Understanding the challenges that students with disabilities may encounter in the program is vital and these should be discussed with students from onset. This emphasizes the need for the participants and each student with disabilities to negotiate a career path that is best suited to the student that would not compromise the ultimate career goal of the student nor the academic quality of the degree (Konur, 2006). In order for students with disabilities to gain optimum experience working in a laboratory to meet academic requirements, adaptation and modifications may need to be created within the laboratories. With a little creativity and teamwork between the participants and students with disabilities, a learning environment can be created where all students will participate fully. The students and the participants must work creatively and
cooperatively to address the obstacles to laboratory learning, which are by no means insurmountable.

Overall, the findings of this study did not suggest that the participants had any concerns about the academic ability of students with disabilities to successfully complete the undergraduate program in civil engineering. Rather, the issues raised by the participants related more to accommodating the students if they are admitted into the program. One of the recommendations from the UNESCO survey (1997) was that universities should be proactive in ensuring that a supportive environment is created before students with disabilities are recruited into academic programs. In the United Kingdom, pro-active programs were designed to bring students with disabilities into the higher education ethos and make university staff more aware of the needs, opinions, hopes and fears of potential students (Taylor, 2004). The pro-active programs were effective in increasing the numbers of students with disabilities who subsequently made successful applications to higher education. For the participants in this study, it is necessary to strengthen ongoing university programs in raising awareness about disability and disability issues, especially in the Department of Civil Engineering. The programs should focus on improving the level of awareness about the different types of disabilities, as well as the various legislations around disability in South Africa. In addition, the programs should seek to improve the attitudes of the participants about persons with disabilities, as well as allay the concerns about accommodating students with disabilities in the Civil Engineering program in the university.

Acknowledging the achievements in industrialised countries, like the US, in dealing with access to higher education by students with disabilities (Dupoux et al., 2005; Vogel et al., 2006), the authors of this manuscript hereby recommend that attempts to broaden collaboration programs between higher education institutions in industrialised countries and developing countries should be pursued (Altbach & Knight, 2007; TeFerra & Altbachi, 2004). The staff exchange programs will offer participants in this study the opportunity to interact with other academics and learn from their experiences in the accommodation of students with disabilities.

Limitations

The reported perceptions of the participants in this study were based on interviews rather than observations. It is therefore uncertain if the behaviours of the participants will align with their reported perceptions. Another limitation relates to the small number of participants in the study. Only the full-time and part-time academic staff took part in the study, excluding tutorial teaching assistants, laboratory assistants, administrative staff and other staff who also play significant roles in creating a conducive environment for the academic success of students with disabilities. Inferences from the findings should therefore be made with necessary caution, and future research should target all staff in the department.

Conclusion

The participants in this study expressed the willingness to admit and accommodate students with disabilities in the undergraduate civil engineering program. However, their level of knowledge and awareness about disability can have negative impact in accommodating the students whenever they are admitted into the program.

References


**About the Authors**

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PRACTICE BRIEF
Success with ACCESS: Use of Community-Based Participatory Research for Implementation

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Abstract
The process of a community-based participatory research initiative to implement the Assessment of Campus Climate to Enhance Student Success survey (ACCESS) is described. A collaborative team of students, a faculty member, and the Coordinator for Students with Disabilities used ACCESS to increase awareness of disability issues and provide a framework for institutional intervention.

The Assessment of Campus Climate to Enhance Student Success survey (ACCESS) is a set of four questionnaires designed to elicit feedback from five campus constituencies including faculty, administration, staff, students with disabilities, and students without disabilities “to use in planning and garnering support for meaningful activities and changes” related to disabilities issues in higher education (Vogel, 2009, p. 35). ACCESS measures knowledge about, attitudes toward, and perceptions of disability issues. Not designed to evaluate campus climate, ACCESS is intended to assist institutions of higher education in planning strategies to better meet the needs of students with disabilities (Vogel, 2009; see Vogel, Holt, Sligar, & Leake, 2008 for the history of ACCESS development).

To realize the full potential of ACCESS as a catalyst to fuel the discussion about and planning for disability issues at Skidmore College, ACCESS was implemented via community-based participatory research (CBPR) methodology. CBPR is a model where researchers and members of a target community collaborate in the research process with the goals of promoting social action and change. Contrasted with methods that focus on conducting research “on” a community, CBPR seeks to make community members full partners in the process where they are empowered to ask questions that are most meaningful and engage in research methods that are sensitive to their specific needs (DePoy, Hartman, & Haslett, 1999). Given that CBPR builds on the strengths and resources in the community, promotes empowerment, and acknowledges that community members are the experts on their own strengths and capacities (Heckel & Moore, 2009; Higgins & Metzler, 2001), it was identified as an ideal research method to employ in the implementation of ACCESS.

Problem
Skidmore College recently invested in several efforts to promote academic achievement and retention among students with disabilities. These initiatives include changing the Coordinator for Students with Disabilities (CSD) position from a part-time to a full-time post and expanding the breadth of the job to address a wider range of service and compliance responsibilities. Subsequent to the restructuring of this position, Skidmore received a generous gift from the Simcha Foundation of the Jewish Community Endowment Fund to support efforts to develop a more inclusive campus community for students with disabilities. In order to set the stage for long-term planning, the college contracted with AHEAD to implement ACCESS in the fall of 2008 using a CBPR approach.
Students and Location Information
Located in upstate New York, Skidmore is: a highly selective liberal arts college with a reputation for its creative approaches to just about everything. With its relatively small size and student-faculty ratio, the College is a close-knit academic community. Skidmore is known for its faculty of teacher-scholars devoted to the instruction and mentoring of undergraduates—approximately 2,400 talented men and women (Skidmore College, 2010).

This academic context coupled with the college’s initiative to improve services to students with disabilities set the stage for ACCESS implementation utilizing an innovative CBPR strategy.

Strategy

The ACCESS CBPR project was completed in an upper-division interdisciplinary course in social work, Research in the Community, in collaboration with the Coordinator for Students with Disabilities (CSD). The course goals included introducing students to the philosophy, theory, ethics, and methods of community-based participatory research through the completion of a community project. Employing an active pedagogy, the focus was on “learning by doing” through service. Students were admitted to the course only by permission and interviewed by the professor to assess suitability. With the assistance of the CSD, a group of students were identified that had an interest in such a course and four were enrolled to work on ACCESS; two of the students had disabilities and two did not.

The professor employed hooks’ (1992) paradigm of “engaged pedagogy” in course delivery. Based on the work of Freire (1970), this approach promotes self-actualization among students and their teachers, considers both the heart and mind of the participants in the learning process, focuses on the connections between course content and overall life experiences, and pushes students to take responsibilities for their choices. At the beginning of the course, students were told that the primary objective was to complete their chosen research project in collaboration with their team and disseminate the results to the target community in a manner that best served social change ends – the way in which these ends were accomplished was up to them. The professor acted as a team member, a research consultant, and at times, a mediator when group dynamics became difficult.

The ACCESS team (four students, the professor, and the CSD) met on a weekly basis, and the students met much more often. Early in the semester, the team chose the date on which ACCESS would be launched, and much of the work before the launch was devoted to publicizing the purpose and importance of this effort. Given the challenges associated with achieving robust response rates to ACCESS (e.g., Vogel et al., 2008; Vogel, Leyser, Burgstahler, Sligar, & Zecker, 2006), the team focused on a variety of efforts to increase the response rate while simultaneously raising consciousness on campus regarding disability issues.

The students created flyers and postcards that described the importance of ACCESS, and these were posted around campus and put in all faculty mailboxes. Considerable time was spent on deciding if incentives should be utilized to increase the response rate, and based on the students’ research, it was determined that a small incentive (a coupon for a hot beverage) would be most effective. To make each campus office aware of the impending survey, the students visited office heads (including the college president and upper-level deans) and urged them to encourage their employees to complete ACCESS. Students also made an appeal to all faculty members at a monthly faculty meeting. The team set up computer kiosks around campus and encouraged passers-by to complete the brief survey at that time. An announcement was also made on the widely-read blog, SkidmoreUnofficial, and the team crafted e-mails for each constituency and made strategic decisions as to who would send out the original and follow-up e-mail. To honor confidentiality, the CSD was the only person who communicated with the students with disabilities group. All four constituencies were surveyed simultaneously during a three-week period mid-semester and follow-up e-mails were sent to encourage broader participation.

Observed Outcomes
As a result of these efforts, the overall response rate was 26% (see Table 1). Once the survey was closed and data compiled by AHEAD, the students presented the findings and distributed an Executive Summary to approximately 75 members of the Dean of Students staff. The team made various recommendations that included the development of an Advisory Board for Disability Issues that will be considered next academic year (see Table 2).
Table 1

*Response Rates to ACCESS for Campus Constituencies*

<table>
<thead>
<tr>
<th>Constituency</th>
<th>Response Rate</th>
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<tbody>
<tr>
<td>Faculty</td>
<td>39% (123 of 316)</td>
</tr>
<tr>
<td>Administration / Staff</td>
<td>26% (151 of 595)</td>
</tr>
<tr>
<td>Students With Disabilities</td>
<td>45% (83 of 185)</td>
</tr>
<tr>
<td>Students Without Disabilities</td>
<td>23% (485 of 2128)</td>
</tr>
<tr>
<td>Total Participants</td>
<td>26% (842 of 3224)</td>
</tr>
</tbody>
</table>

Table 2

*Recommendations for Change Based on ACCESS Data*

- Survey results indicate that Skidmore College needs to develop a greater awareness of students with disabilities and the process of accommodation.
- Data reveals a stronger relationship is needed between the faculty and the Office of Disability Services.
- Advisory board comprised of students, faculty, administration and staff should be convened to further interpret this data and plan future initiatives that promote inclusion.
Implications

In conclusion, this method for ACCESS implementation, successful at Skidmore College, could be replicated at other institutions. Considerations include time needed for the research, buy-in from the administration, strategic selection of research team members, and funding for project expenses. This project proved to be time consuming and the team felt it would have been preferable to implement ACCESS over a full academic year. The students reported that their research, communication, and collaboration skills were challenged and ultimately improved; the students without disabilities found that working with students with disabilities was not any different from other academic experiences with other students. Actively including different campus groups in the ACCESS process helped to make our data collection strategies more relevant and appealing to each constituency which resulted in the inclusion of more voices in the survey data. The direction, structure, and legitimacy of the discussion about disability issues on campus is informed by our diverse group, and the team looks forward to continuing this discussion and working for change next academic year.

References


Carolyn Eilola received her BS in Social Work and BA in Psychology from Skidmore College in May 2010. As a social work major, she completed an internship working with older adults in a nursing home and short-term rehabilitation unit at a local hospital. She has been part of several research projects while a student at Skidmore. She can be reached by email at: ceilola@skidmore.edu

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Journal of Postsecondary Education and Disability
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**Guidelines for authors:**

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Manuscripts should demonstrate scholarly excellence in at least one of the following categories:

- **Research:** Reports original quantitative, qualitative, or mixed-method research
- **Integration:** Integrates research of others in a meaningful way; compares or contrasts theories; critiques results; and/or provides context for future exploration.
- **Innovation:** Proposes innovation of theory, approach, or process of service delivery based on reviews of the literature and research
- **Policy Analysis:** Provides analysis, critique and implications of public policy, statutes, regulation, and litigation.

**Format**

All manuscripts must be prepared according to APA format as described in The Publication Manual (6th ed.), American Psychological Association, 2010. For responses to frequently asked questions about APA style, consult the APA web site at http://www.apastyle.org/faqs.html

- Manuscript length typically ranges between 25 and 35 pages including figures, tables, and references. Exceptions may be made depending upon topic and content.
- Write sentences using active voice.
- Authors should use terminology that emphasizes the individual first and the disability second (see pages 71-76 of the APA Manual). Authors should also avoid the use of sexist language and the generic masculine pronoun.
- Manuscripts should have a title page that provides the names and affiliations of all authors and the address of the principal author.
- Include an abstract that does not exceed 250 words. Abstracts must be double spaced on a separate page, or placed in an e-mail request.
- Provide a cover letter asking that the manuscript be reviewed for publication consideration and that it has not been published or is being reviewed for publication elsewhere.
- Tables and figures must conform to APA standards, and must be in black and white only. All tables and figures should be vertical and fit on the page, no landscape format.

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- A 40-50 word bibliographic description for each author.
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JPED will devote a few pages of general issues to a Practice Brief Section to expand the pool of innovative ideas. Practice Briefs will consist of practical strategies and programs used to support postsecondary students with disabilities. The body of the Practice Brief papers will be four pages long (excluding title page, abstract, reference page, Tables, and Figures). The Practice Briefs will not replace the regular research-based JPED papers. They will provide an opportunity for Postsecondary Disability Service staff to share their best practices.

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- **Problem** (one paragraph)
- **Students and Location Information**
- **Strategy**
- **Observed Outcomes**
- **Implications**
- **References**
- **Tables and Figures** (if needed)

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