# Table of Contents

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<table>
<thead>
<tr>
<th>Title</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>From the Editor</td>
<td>3</td>
</tr>
<tr>
<td><em>David R. Parker</em></td>
<td></td>
</tr>
<tr>
<td><strong>The Relationship of Institutional Distance Education Goals and</strong></td>
<td>5 - 19</td>
</tr>
<tr>
<td><strong>Students’ Requests for Accommodations</strong></td>
<td></td>
</tr>
<tr>
<td><em>Lucy Barnard-Brak</em></td>
<td></td>
</tr>
<tr>
<td><em>Valerie Paton</em></td>
<td></td>
</tr>
<tr>
<td><em>Tracey Sulak</em></td>
<td></td>
</tr>
<tr>
<td><strong>Predictors of Graduation Among College Students with Disabilities</strong></td>
<td>21 - 36</td>
</tr>
<tr>
<td><em>Laura N. Pingry O’Neill</em></td>
<td></td>
</tr>
<tr>
<td><em>Martha J. Markward</em></td>
<td></td>
</tr>
<tr>
<td><em>Joshua P. French</em></td>
<td></td>
</tr>
<tr>
<td><strong>Understanding the Early Integration Experiences of</strong></td>
<td>37 - 50</td>
</tr>
<tr>
<td><strong>College Students with Disabilities</strong></td>
<td></td>
</tr>
<tr>
<td><em>Dustin K. Shepler</em></td>
<td></td>
</tr>
<tr>
<td><em>Sherry A. Woosley</em></td>
<td></td>
</tr>
<tr>
<td><strong>Crossing the Communication Barrier: Facilitating Communication in</strong></td>
<td>51 - 63</td>
</tr>
<tr>
<td><strong>Mixed Groups of Deaf and Hearing Students</strong></td>
<td></td>
</tr>
<tr>
<td><em>Carol Marchetti</em></td>
<td></td>
</tr>
<tr>
<td><em>Susan Foster</em></td>
<td></td>
</tr>
<tr>
<td><em>Gary Long</em></td>
<td></td>
</tr>
<tr>
<td><em>Michael Stinson</em></td>
<td></td>
</tr>
<tr>
<td><strong>Barriers to Participation of Women Students with Disabilities in</strong></td>
<td>65 - 79</td>
</tr>
<tr>
<td><strong>University Education in Kenya</strong></td>
<td></td>
</tr>
<tr>
<td><em>Bathseba Opini</em></td>
<td></td>
</tr>
<tr>
<td><strong>PRACTICE BRIEF</strong></td>
<td>81 - 86</td>
</tr>
<tr>
<td>“Lessons Learned from a Disabilities Accessible Study-Abroad Trip”</td>
<td></td>
</tr>
<tr>
<td><em>Sarah E. Twill</em></td>
<td></td>
</tr>
<tr>
<td><em>Gaetano R. Guzzo</em></td>
<td></td>
</tr>
<tr>
<td><strong>PRACTICE BRIEF</strong></td>
<td>87 - 95</td>
</tr>
<tr>
<td>“Classroom Strategies for Teaching Veterans with PTSD and TBI”</td>
<td></td>
</tr>
<tr>
<td><em>Jennifer Blevins Sinski</em></td>
<td></td>
</tr>
<tr>
<td><strong>BOOK REVIEW</strong></td>
<td>97 - 98</td>
</tr>
<tr>
<td><em>Rebecca Daly Cofer</em></td>
<td></td>
</tr>
<tr>
<td><strong>Author Guidelines</strong></td>
<td>Inside Back Cover</td>
</tr>
</tbody>
</table>
FROM THE EDITOR
DAVID R. PARKER

The word “collaboration” is a mantra in the important work carried out by readers of this journal. Disability service (DS) providers, faculty, and administrators partner with students to ensure their access to the built environment, instructional experiences, and social dimensions of higher education. Increasingly, such collaborations reach beyond the physical borders of a given campus. Postsecondary institutions seek to understand and respond to the needs of individuals with disabilities by conducting transition programs for incoming students, surveying alumni, widening access to online instruction, and minimizing barriers for students during international educational opportunities. Similarly, colleges and universities face a growing need to collaboratively engage with students whose disabilities were sustained during military service abroad and with international students whose cultures construct the disability experience in uniquely different ways. This issue of JPED includes a wide range of research and practice briefs that reflect the dynamic nature of these collaborative efforts.

Understanding the importance of “virtual” access, Barnard-Brak and Osland Paton open with a study that examined the relationship between an institution’s distance education goals and the accommodations students request in online learning environments. The findings from this national study report a generally positive trend in campus-wide efforts to make online learning more accessible.

Pingry O’Neill, Markward, and French conducted a comprehensive investigation of factors that predict graduation rates among undergraduates with disabilities. By examining the accommodations and disability-related services that over 1,200 students utilized on three campuses, the authors developed a model to better understand the impact of four variables on students’ graduation rates.

Respecting the relationship between student engagement and matriculation, Shepler and Woosley used Tinto’s model of student attrition to study an intriguing question: Do the early integration experiences of new college students with disabilities differ from those of students without disabilities? You may be surprised by the results of this carefully-designed study.

Marchetti, Foster, Long, and Stinson investigated innovative uses of technology in STEM classrooms. This study provides important and useful insights instructors can use to facilitate cooperative learning experiences that include students who are deaf or hard of hearing with hearing students.

This issue also includes three articles that explore collaborative understandings and/or practices across cultures. Opini deftly integrates the lived experiences of female college students in Kenya with a review of that nation’s educational policies regarding individuals with disabilities. She compares policies and practices in Kenya with those in other countries. Her research-based consideration of gender and disability issues may have universal relevance.

In the first of two practice briefs, Twill and Guzzo describe their efforts to conduct a study abroad experience for U.S. undergraduates in Switzerland. Read how faculty interacted with a disability services office and what the participating students taught the authors about a range of travel-related considerations. Readers who are interested in this topic may enjoy comparing it to another program described at http://blog.utc.edu/news/2009/08/international-summer-abroad-trip-explores-accessibility/.

In the second practice brief, Blevins Sinski explores the learning and social/emotional needs of returning veterans in college classrooms. Read her suggestions about instructional strategies for enhancing the learning experience for all students, including those with post-traumatic stress disorders and/or traumatic brain injuries.

Finally, Cofer provides an engaging review of Temple Grandin’s book, “How I See It.” Perhaps the most important initial step in successful collaborations is an authentic understanding about another person’s point of view. Read how the opportunity to hear Dr. Grandin’s point of view enhanced the reviewer’s ability to “see” the world from a different perspective.

In closing, I would like to thank Christine Duden Street, J.D., Assistant Director of Disability Resources at Washington University in St. Louis, who served as a guest reviewer for one of the articles in this issue.

Wishing each of you a happy new year.
The Relationship of Institutional Distance Education Goals and Students’ Requests for Accommodations

Lucy Barnard-Brak
Valerie Paton
Texas Tech University

Tracey Sulak
Baylor University

Abstract
Institutional distance education goals reflective of policy can have an impact on practice. These goals have been noted as possibly being associated with improving access and outcomes for students with disabilities. The purpose of this study is to re-examine the association of institutional distance education goals with the frequency in which students with disabilities request accommodations in courses offered at a distance; it consists of a nationally representative sample of institutions of higher education. Results indicate a positive and significant relationship between institutional distance education goals and the frequency with which students with disabilities request accommodations in online courses.

Keywords: Disability, higher education, distance education, accommodations

Institutional distance education goals can ostensibly impact the enrollment of students taking these course offerings, including but not limited to non-traditional student populations such as students with disabilities. Despite research indicating positive outcomes associated with distance learning opportunities for students with disabilities (Brown, Crosby, & Standen, 2001; Barnard-Brak & Sulak, 2010), the intersection of disability and distance education has received limited examination in the research literature. Singh, O’Donoghue, and Worton (2005) echo this sentiment indicating numerous possibilities for college students with disabilities given the flexible and dynamic nature of e-learning or distance learning via the Internet. Singh et al. (2005) further suggest that distance education courses delivered via the Internet are restructuring traditional models of higher education in creating new expectations for students, instructors, and institutions themselves. These new expectations lend to the formation of new goals for institutions of higher education with respect to distance education and disability.

An examination of institutional goals with respect to the intersection of distance education and disability is particularly warranted given that students with disabilities continue to experience barriers to participation in courses delivered online (Edmonds, 2004). Edmonds (2004) notes that the presence of these barriers may be attributable to the “…patchwork of federal and state laws” (p. 51) that apply to persons with disabilities and the delivery of distance education. This patchwork can create unwanted complexity in the delivery of distance education to individuals with disabilities. As early as 1998, projects like the Campus Computing Project were tracking the use of computers in higher education and identifying gaps in technology utilization in distance education, such as the lack of long-term institutional goals to direct the budgets in technological infrastructure (Green, 1999). Edmonds (2004) concluded that institutions of higher education must be proactive in improving accessibility for students with and without disabilities to, “avoid costly litigation and offer online distance education courses that are more usable...,” (p. 60). In view of Edmonds (2004), the examination of institutional distance education goals becomes all the more important given this call to proactive leadership in forming these goals.
Section 504 of the Vocational Rehabilitation Act of 1973 and the Americans with Disabilities Amendments Act (ADAAA) of 2008 require institutions of higher education to provide equal access to all programs, including online programs, for persons with disabilities if these institutions accept federal funding (Edmonds, 2004). Moisey (2004) found the rate of participation in online courses for persons with disabilities was lower than expected, a finding that may be reflective of issues of access. This may also reflect the lack of appropriate accommodations for students with disabilities, as postsecondary institutions are also required by law to provide reasonable academic accommodations for students with a disability (United States Government Accountability Office [GAO], 2009). As Edmonds (2004) noted, the regulations guiding the provision of accommodations are not specific and may be implemented by an institution on a case-by-case basis, which leaves ample room for a university-specific translation of the terms “access” and “accommodation.” While online courses appear to offer increased access for students with disabilities, case studies like Moisey (2004) suggest this access may be illusory.

Institutional distance education goals through Disability Services offices have been indicated as improving the learning experiences of college students with disabilities in distance learning (Moisey, 2004). Although institutions of higher learning are legally obligated to provide equal access to online programs for otherwise-qualified persons with disabilities, these requirements only extend to issues of access and do not include issues related to modifications of curriculum (Edmonds, 2004). Disability Services offices serve a disability-specific function and attempt to help instructors adapt distance learning environments to the needs of the student with the disability through reasonable accommodations. Adaptations of the distance-learning environment are reflective of increased access and this increased access may translate into increased student participation. Moisey (2004) concluded that disability-specific support services can only enhance student success on an individual basis whereas institutions of higher education have the power to effectuate policy and set goals to improve outcomes for students with disabilities as a whole.

Moisey (2004) makes an important distinction between access and success for students with disabilities in higher education. Institutions of higher education must provide equal access to distance education for students with disabilities so that disability-specific services may enhance their opportunities for success. While the issue of access is legally mandated, disability-specific accommodations are only suggested and the institution of higher education may use discretion when provided these (GAO, 2009). Due to the vague nature of legal requirements for higher education with respect to disabilities, institutional goals regarding disability-specific accommodations may help ensure that all students receive the support necessary for success. Establishing clear institutional goals focused on bringing the promise of technology in line with the realities of distance education may help create a more service-based information technology (Green, 2003). In view of Moisey (2004), institutional distance education goals can ensure that students with disabilities find the “doors” (p. 90) to success.

In studying the intersection of distance education and disability, Kim-Rupnow, Dowrick, and Burke (2001) considered whether the increase in distance education course offerings at institutions of higher education resulted in better access and outcomes for students with disabilities. As a part of research undertaken through the National Center for the Study of Postsecondary Educational Supports, Kim-Rupnow et al. (2001) reviewed current literature to illustrate several themes of interest in distance education and included journal articles published prior to 2001 that represented the intersection of distance education and disability accommodations in postsecondary education. The majority of studies reviewed by Kim-Rupnow et al. (2001) are case studies or small group studies, a factor that limits the application of the results to a broader setting (Flyvbjerg, 2006). The findings of the study are also limited by the research available in 2001 and indicate the need for more studies about distance education and persons with disabilities. From their examination, Kim-Rupnow et al. (2001) indicated a positive relationship between increased emphasis on distance education through strategic planning and goals at institutions of higher education and an increased access to curriculum for students with disabilities at their respective institutions as identified through three main themes: learner characteristics, trends in technology, and support services for individuals with disabilities.

In reviewing the work of Kim-Rupnow et al. (2001), however, Kinash, Crichton, and Kim-Rupnow (2004) noted that this question of a relationship between increased emphasis on distance education and
increased access for students with disabilities had been answered “inconclusively due to the paucity of research” (p. 10). Kinash et al. (2004) also alluded to the theme of increased access leading to better education outcomes for learners with disabilities because increased access should lead to the use of principles such as Universal Design. Issues of access are addressed in the design phase of a course when the principles of UD are implemented as opposed to the current policy of providing accommodations retroactively to students who may have limited access to a course due to a disability (Burgstahler, 2006).

The purpose of the current study was to re-examine this relationship by investigating the association between distance education institutional goals aimed to improve distance education outcomes and how often students with disabilities enroll in these distance education courses and request accommodations at their respective institutions. It should be noted, though, that an increased application of the principles of UD may minimize the need for students to request accommodations. The current study may be distinguished from previous literature based upon two characteristics: (1) the nature of the sample to be analyzed, and (2) the variables we were able to include in our analyses. First, the current study consisted of a nationally representative sample of institutions of higher education. Second, in re-examining the research question of Kim-Rupnow et al. (2001), the current study provided an additional examination of this relationship by including the impact of institutional distance education goals as evaluated by their institutionally-estimated importance and whether they were met according to the institutions in our analyses. These institutional goal evaluation variables examined not only institutional policy but how institutions perceive their policy and practice. In short, we hypothesized that, as institutions evaluate distance education goals as important and meet those goals as reported by them, students with disabilities would appear to experience enhanced access from this increased emphasis.

### Method

#### Participants

The study consisted of a sample of 1,591 institutions of higher education across the United States collected as part of the Postsecondary Education Quick Information System (PEQIS) developed by the National Center for Education Statistics (NCES, 2005). These 1,591 institutions were sampled to represent a total population of 4,130 Title IV-eligible, degree-granting institutions across all fifty states, including the District of Columbia, based upon institutional characteristics data from the Integrated Postsecondary Education Data System (IPEDS). From the sampling frame of the 4,130 institutions, these 1,591 institutions were selected according to institutional characteristics such as institutional type, Carnegie classification, degree of urbanization, whether the institution may be classified as minority serving and whether the institution has graduate degree programs to represent the population of institutions of higher education in the sampling frame. Approximately 12.87% (n = 193) of the institutions sampled identified themselves as minority-serving. Approximately 48.6% (n = 729) of the institutions of higher education sampled had graduate degree programs while 51.4% (n = 771) of the institutions sampled did not have graduate degree programs. Table 1 contains the summary statistics for institutional type, Carnegie classification, and degree of urbanization variables that reflects national characteristics. These institutional demographic variables were not significantly related to the outcome variables of interest in the current study and thus were not included in our model.
Table 1

Institutional Summary Statistics

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<th>Institutional Type</th>
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<td>Private, Two-year</td>
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<td>Public, Four-year</td>
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Carnegie Classification

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<td>Doctoral</td>
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<tr>
<td>Master’s</td>
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<td>Bachelor’s</td>
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<td>Associate</td>
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<tr>
<td>Specialized</td>
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<td>Other</td>
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Degree of Urbanization

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<th>Degree of Urbanization</th>
<th>Frequency</th>
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<tr>
<td>City</td>
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<tr>
<td>Urban Fringe</td>
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<tr>
<td>Rural</td>
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<td>21.27%</td>
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Instrumentation

Data were collected as part of the Distance Education at Postsecondary Education Institutions survey, a dataset from the PEQIS (NCES, 2005). Please refer to the Appendix B for a screen shot of the survey. As such, each participating institution was asked to identify a campus representative to serve as survey coordinator. This survey coordinator would then identify the appropriate respondent to complete the survey. These respondents were administrators who were considered as being the most knowledgeable and having the most access to information about their institutions’ technology and distance education course offerings and programs, including those with respect to students with disabilities. Relevant administrators were encouraged to consult with any departments, offices, or personnel at their institution in responding to the survey.

As part of the survey study, relevant administrators were asked to estimate the frequency with which students with disabilities requested accommodations in distance education course offerings during the previous three years (i.e., 2002-2005) for the institution as a whole. This item, which estimates the frequency with which students with disabilities requested accommodations in distance education courses according to the relevant institutional administrators, consisted of a
4-point, forced choice format with responses ranging from “never,” “occasionally,” “frequently,” to “don’t know.” Responses of “don’t know” were subsequently treated as missing data in our analysis. Table 2 contains the eight survey items concerning institutional distance education goals analyzed in the current study. Relevant administrators at the sampled institutions of higher education rated the importance of each of these eight distance education goals at their institution as being “not important,” “somewhat important,” or “very important.” Then, the same administrators were asked the extent to which each of the goals was met as being “not at all,” “minor extent,” “moderate extent,” or “major extent.” Importance of the goals and the extent to which the goals were met were estimated as two separate, latent variables, which composed the higher, second order latent variable that estimated the overall evaluation of the goals. Confirmatory factor analyses of these two, separate latent variables indicate evidence towards the construct validity of them with Comparative Fit Index (CFI) and Tucker Lewis Index (TLI) values ranging from .96 to .98 and Root Mean Square Error of Approximation (RMSEA) values being less than .05. To examine the reliability of the survey items, an internal consistency of scores of $\alpha = .83$ and $\alpha = .91$ was achieved for the latent variables of ‘goal importance’ and ‘goal met’ respectively.

**Procedure**

Analyses were performed in MPlus (v. 5.10) (Muthén & Muthén, 2008). Missing data for scores were analyzed using full information maximum-likelihood (FIML) as the method of estimation. As an extension of maximum likelihood, FIML takes advantage of all possible data points in analysis. Enders and Bandalos (2001) indicated that full information maximum-likelihood is superior to listwise, pairwise, and similar response pattern imputations in handling missing data that may be considered ignorable. Missing data accounted for less than 10% of all cases. Weights were employed in MPlus (v. 5.10) to produce accurate population estimates based upon sample characteristics by accounting for sampling errors due to random discrepancies between the true population and sample achieved.

**Analysis**

Structural equation modeling was performed to examine how the goals as evaluated as a function of goal importance and the extent to which goals were met, were related to the frequency with which students with disabilities requested accommodations in distance education course offerings. Structural

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Table 2

*Survey Items*

**Distance Education Goal Items**

Q7A: Reducing institution’s per-student costs.

Q7B: Making educational opportunities more affordable for students.

Q7C: Increasing institution enrollments.

Q7D: Increasing student access by reducing time constraints for course taking.

Q7E: Increasing student access by making courses available at convenient locations.

Q7F: Increasing the institution’s access to new audiences.

Q7G: Improving the quality of course offerings.

Q7H: Meeting the needs of local employers.
equation modeling may be considered a means of testing conceptual models by specifying relationships among latent and observed variables. Latent variables refer to those variables represented by circles and are considered comprised of observed or measured variables represented by squares. Hence, responses to measurable goals as identified through the survey in the current study were utilized to estimate the two latent or unobservable variables of “goal importance” and “goal met.” These two latent variables were utilized to estimate a higher order latent variable of “goal evaluation.” We then examined the association of “goal evaluation” on the frequency with which students with disabilities requested accommodations while statistically controlling for the number of distance education offered. Refer to Figure 1 for this conceptual model and Appendix A for more information regarding structural equation modeling and its applications. In performing our analyses, five statistics reflecting fit were reported: the chi-square ($\chi^2$) test statistic; the ratio of chi-square statistic to degrees of freedom; the RMSEA; the TLI, also known as the Non Normed Fit Index (NNFI); and the CFI as appropriate.

**Results**

In evaluating model fit, the chi-square goodness-of-fit statistic was significant, indicating that the data may not fit the model, $\chi^2(100) = 250.92, p < .05$. The chi-square statistic has been indicated as being sensitive to sample size, thus an adjunct discrepancy-based fit index may be used as the ratio of chi-square to degrees of freedom ($\chi^2/df$). A $\chi^2/df$ ratio value less than 5 has been suggested as indicating an acceptable fit between the hypothesized model and the sample data (MacCallum, Brown, & Sugawara, 1996). With a $\chi^2/df$ ratio value of 2.51, the proposed model may have an acceptable fit. The RMSEA compensating for the effects of model complexity was 0.037, which according to Browne and Cudek (1993) indicates an acceptable fit of the model being less than or close to 0.05. The value of TLI, also known as the NNFI, was .960, and value of the CFI was .971. Hu and Bentler (1999) note that fit index values of .95 (or better) are indicative of good fit. Figure 1 contains the path diagram for the association between the evaluation of distance education institutional goals and frequency in which students with disabilities request accommodations.

After establishing model fit, the model can then be examined with respect to individual path values. In our analyses, we statistically controlled for the number of courses offered at a distance on the frequency with which students requested accommodations given that as the number of courses offered at a distance increase at an institution, the frequency of requests for accommodations in these distance education courses would logically also increase. In modeling the number of courses offered at a distance as a covariate, this variable was positively associated with the frequency in which students requested accommodations for courses offered at a distance with a standardized path coefficient of .15 ($p < .01$). The relationship of institutional distance education goals as evaluated for their importance and how these goals were met as it relates to the number of DE courses offered is shown in Figure 1.

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

*Figure 1. Path diagram for institutional distance education goals*
Barnard-Brak, Paton, & Sulak; Institutional Distance Education Goals

11

The relationship indicates that, as the importance of institutional distance education goals and these goals being met increases, the frequency of students’ requests for accommodations also increases. Thus, evaluation of institutional distance education goals may be considered a function of how important institutions consider these goals and whether these goals were met according to the institution. This finding suggests how institutional distance education goals can translate into enhanced access for students with disabilities. Table 3 contains the standardized path coefficients from the latent variables of goal importance and goal met to the observed variables.

Discussion

The results of this study indicate a significant and positive relationship between institutional distance education goals and the frequency with which students with disabilities request accommodations in distance education while statistically controlling for the number of courses offered at a distance. This result indicates that these institutional distance education goals that are evaluated as important and as met according to institutions, appear to have a positive impact on the frequency with which enrolled students with disabilities subsequently request accommodations for courses offered at a distance. Meeting these goals, considered important and met by institutions, may not only benefit students with disabilities by providing enhanced access but may also benefit the institutions themselves, the communities they serve, and students enrolled in courses offered at a distance as these courses can offer access to higher education to students who would not otherwise have such access.

Several limitations emerged in conducting the current study. Firstly, the frequency of students with disabilities who request accommodations may be an underestimate given the unknown number of students with disabilities who do not request accommodations for their disabilities regardless of course delivery format. The Distance Education at Postsecondary Education Institutions survey does not appear to collect data pertaining to institutional distance education curricular accessibility, which includes day to day accommodation practices and receptivity to requests. Secondly, other institutionally related variables such as student population characteristics, availability of accommodations, and number and types of course of-

<table>
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<th>Std. Coeff</th>
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<td>Goal Importance → Q7Aa</td>
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ferings and their accessibility to students with disabilities need to be examined as they relate to the number of requests for accommodations. The extension of the Distance Education at Postsecondary Education Institutions survey to include these variables would support the spirit of legislation and policy pertaining to postsecondary students with disabilities and their access to higher education that has increased over the past three decades.

Additionally, instructors of distance education courses may adhere to the principles of UD, thereby minimizing students with disabilities’ need to request accommodations. Indeed, Barnard-Brak, Lechtenberger, and Lan (2010) indicated that “…adhering more closely to the principles of UD could make disability a non-issue” (p. 425). However, the survey utilized in the current study did not ask questions about the use of UD in developing distance education course offerings. A final limitation that should be noted is that a student with a disability who requests accommodations in a distance education course does not automatically receive those accommodations, as the provision of accommodations is a function of both the eligibility of the student and reasonableness of the request. Thus, the results of the current study should be tempered by a potential difference between the changes in requested accommodations and those that were actually provided. Interestingly, in examining the perceptions of students with disabilities in the online versus face-to-face learning environment, Barnard-Brak and Sulak (2010) found that students with disabilities as a whole did not differ significantly in their perceptions or attitudes regarding requesting accommodations between these learning environments. As a result, we may be able to conclude that frequency of requesting and receiving accommodations may have a similar pattern among students with disabilities but institutional policy may influence this pattern.

In addition to federal legislation that has increased access to higher education for students with disabilities, several consortia and organizations have emerged as leaders in the last decade in developing innovative practices for the delivery of online course content. In particular, the W3C is a global consortium of members from “industry, disability organizations, accessibility research centers, government, schools and universities…” that has sponsored the Web Assisted Initiative (WAI), which has established standards to “ensure that Web technologies support access,” WAI, Web content accessibility, and policy development for Web-accessibility (W3C Web Accessibility Initiative, 2006). In particular, WAI’s “Essential Elements of Web Accessibility” are critical to institutions engaged in the delivery of online coursework to students with disabilities. However, the available course management systems for delivery of online curricula still lag behind the “best practices” of the WAI. The result is that institutions vary markedly in the accessibility of their online curricula.

Conclusion

As the purpose of the current study was to examine the association between distance education institutional goals aimed to improve distance education outcomes and how often students with disabilities enroll in these distance education courses and request accommodations at their respective institutions, results indicate enhanced access to students with disabilities as associated with these distance education goals. It appears from these findings that disability service providers should pay attention to their institution’s distance education policies and goals as these goals do appear to be associated with enhanced access to students with disabilities. Thus, disability service providers should be concerned with the development and implementation of their institution’s distance education goals as students with disabilities will ostensibly be impacted by these goals. Future research should consider examining how relevant institutional administrators consider distance education policies and goals as these goals relate to the access and persistence of students with disabilities. Additionally, future research should consider examining the perceptions of relevant institutional administrators, students with disabilities, as well as students without disabilities regarding access to courses offered at a distance and the implementation of the principles of UD. The questions for relevant institutional administrators as compared to students with and without disabilities would differ as to this purpose but would seek to determine the impact of UD in curriculum and instruction.
References

Barnard-Brak, L., & Sulak, T. N. (2010). Online versus face to face accommodations among college students with disabilities. American Journal of Distance Education, 24, 81-91.
About the Authors

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Appendix A

SEM Technical Notes

For readers less familiar with structural equation modeling (SEM), let’s begin with the end in mind. The goal of SEM is to determine the extent to which a conceptual model fits or represents sample data. Therefore, in SEM, a researcher proposes a conceptual or theoretical model that is tested based upon their data. These models consist of observed (or measured variables) and latent (or hidden) variables. Observed variables are represented by squares while latent variables are represented by circles. Observed variables are variables that are directly measurable in some quantity. For example, in the current study, the number of courses offered at a distance is an observed variable. Latent variables are constructs that are the function of observed variables. For example, in the current study, the importance of distance education goals was considered a function of ratings by relevant administrators at institutions surveyed. Thus, a composite construct was created from the observed ratings of relevant administrators. For more information regarding SEM and its applications, please refer to the following resources:

Appendix B

PEQIS Survey
1. Did your institution offer any distance education courses (as defined on the front of this questionnaire) in 2000–2001 (12 month academic year), or plan to offer any such courses in the next 3 years (2001–2002 through 2003–2004)? (Circle only one number.)

- Offered courses in 2000–2001 ................................................................. 1
- Did not offer in 2000–2001, but planned to offer in the next 3 years ........ 2
- Did not offer in 2000–2001, and did not plan to offer in the next 3 years 3

2. In the grid, please provide information about the distance education courses offered by your institution in 2000–2001 (12-month academic year).
   - For courses, provide information about the number of different distance education courses offered by your institution in 2000–2001. If a course had multiple sections or was offered multiple times during the academic year, count it as only one course. If your institution did not offer a particular type or level of distance education course in 2000–2001, enter 0.
   - Dual-level courses (i.e., courses that can be taken for either undergraduate or graduate credit) should be reported as undergraduate courses, and enrollments for these courses should be counted as undergraduate enrollments.
   - Enrollments may include duplicated counts of students, i.e., a student should be counted for each course in which he/she was enrolled.

   ⇒ In column 1, report the number of distance education courses for all levels and audiences, and the number of students enrolled in those courses. Include courses designed for all types of students, including elementary and secondary school, college, adult education, continuing and professional education, etc.

   ⇒ In columns 2 through 4, report only college-level, credit-granting distance education courses and their enrollments, as follows:

   - In column 2, report the total (i.e., the sum of undergraduate and graduate/first professional).
   - In column 3, report for undergraduate-level only.
   - In column 4, report for graduate/first-professional-level only.

<table>
<thead>
<tr>
<th>For 2000–2001 (12-month academic year)</th>
<th>1. Total for all levels and audiences</th>
<th>2. Total for college-level credit-granting (undergraduate and graduate)</th>
<th>3. Undergraduate only</th>
<th>4. Graduate/first-professional only</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Number of courses</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Number of enrollments</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3. In 2000–2001 (12-month academic year), did your institution have any college-level degree or certificate programs designed to be completed totally through distance education? (Include only degree or certificate programs that are based on credit-granting courses; include programs that may require a small amount of on-campus coursework or lab work, clinical work in hospitals or similar arrangements, and baccalaureate degree completion programs.)

   Yes................................. 1 (Continue with question 4.)
   No................................. 2 (Skip to question 5.)

4. How many different college-level degree or certificate programs designed to be completed totally through distance education did your institution offer in 2000–2001 (12-month academic year)?

<table>
<thead>
<tr>
<th>Distance education degree and certificate programs</th>
<th>Undergraduate</th>
<th>Graduate/first-professional</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total number of college-level distance education degree and certificate programs based on credit-granting courses</td>
<td>Degree</td>
<td>Certificate</td>
</tr>
<tr>
<td>Degree</td>
<td>Certificate</td>
<td></td>
</tr>
<tr>
<td>Degree</td>
<td>Certificate</td>
<td></td>
</tr>
</tbody>
</table>

5. Does your institution participate in any distance education consortia?

   Yes................................. 1 (Continue with question 6.)
   No................................. 2 (Skip to question 7.)
6. In what types of consortia does your institution participate? (Circle one on each line.)

   a. System (e.g., within a single university system or community college district) ........................................ 1 2 3
   b. State (i.e., within a single state) ........................................................................................................... 1 2 3
   c. Regional (i.e., multi-state) ...................................................................................................................... 1 2 3
   d. National ............................................................................................................................................... 1 2 3
   e. International .......................................................................................................................................... 1 2 3

7. How important are the following goals to your institution’s distance education program? For each goal that is somewhat or very important, indicate to what extent your distance education program is meeting that goal.

<table>
<thead>
<tr>
<th>Importance</th>
<th>Not important</th>
<th>Somewhat important</th>
<th>Very important</th>
<th>Not at all</th>
<th>Moderate extent</th>
<th>Major extent</th>
<th>Don’t know</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Reducing institution’s per-student costs ................................................................. 1 2 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Making educational opportunities more affordable for students .......................... 1 2 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. Increasing institution enrollments ........................................................................... 1 2 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. Increasing student access by reducing time constraints for course taking ........... 1 2 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>e. Increasing student access by making courses available at convenient locations .......... 1 2 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>f. Increasing the institution’s access to new audiences ................................................... 1 2 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>g. Improving the quality of course offerings .................................................................. 1 2 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>h. Meeting the needs of local employers ......................................................................... 1 2 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>i. Other (specify) ......................................................................................................................... 1 2 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

6. How often in the last 3 years has your institution received requests to provide accommodations for students with disabilities in your distance education courses? (Circle one.)

   Never .......... 1
   Occasionally .... 2
   Frequently ..... 3
   Don’t know ....... 4

9. To what extent do the Web sites for the distance education courses offered by your institution follow established accessibility guidelines or recommendations for users with disabilities (e.g., guidelines/recommendations from the U.S. Department of Education or the World Wide Web Consortium)? (Circle one.)

   if no web sites are used, check here □ and skip to question 10.

Not at all ...... 1
   Minor extent ...... 2
   Moderate extent ...... 3
   Major extent ...... 4
   Don’t know ...... 5

10. Which types of technology did your institution use as a primary mode of instructional delivery for distance education courses in 2000–2001 (12-month academic year)? Circle yes for all the technologies that any distance education course used as a primary mode of delivery. If a course used multiple technologies to deliver instruction, but only one mode predominated, circle yes for the predominant mode for the course. (Circle one on each line.)

   a. Two-way video with two-way audio (i.e., two-way interactive video) ........................................ 1 2
   b. One-way video with two-way audio .......................................................................................... 1 2
   c. One-way live video .................................................................................................................... 1 2
   d. One-way prerecorded video (including prerecorded videotapes provided to students, and television broadcast and cable transmission using prerecorded video) ........................................ 1 2
   e. Two-way audio transmission (e.g., audio/phone conferencing) ........................................... 1 2
   f. One-way audio transmission (including radio broadcast and prerecorded audiotapes provided to students) .................................................................................................................. 1 2
   g. Internet courses using synchronous (i.e., simultaneous or “real time”) computer-based instruction (e.g., interactive computer conferencing or Interactive Relay Chat) ........................................ 1 2
   h. Internet courses using asynchronous (i.e., not simultaneous) computer-based instruction (e.g., e-mail, listservs, and most World Wide Web-based courses) ........................................ 1 2
   i. Multi-mode packages (i.e., a mix of technologies that cannot be assigned to a primary mode) (specify technologies used) .............................................................. 1 2
   j. Other technologies (specify) .......................................................................................................... 1 2
11. In the next 3 years, what are your institution’s plans concerning the number of distance education courses that will be offered using the following technologies as the primary mode of instructional delivery? If a course will use multiple technologies to deliver instruction, but one mode will predominate, consider the course under the predominant mode. (Circle one on each line.)

<table>
<thead>
<tr>
<th>Reduce</th>
<th>Keep same number</th>
<th>Start or increase</th>
<th>No plans</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

a. Two-way video with two-way audio (i.e., interactive video)...

b. One-way video with two-way audio...

c. One-way live video...

d. One-way prerecorded video (including prerecorded videotapes provided to students, and television broadcast and cable transmission using prerecorded video)...

e. Two-way audio transmission (e.g., audiophone conferencing)...

f. One-way audio transmission (including radio broadcast and prerecorded audiocassettes provided to students)...

g. Internet courses using synchronous (i.e., simultaneous or “real time”) computer-based instruction (e.g., interactive computer conferencing or Interactive Relay Chat)...

h. Internet courses using asynchronous (i.e., not simultaneous) computer-based instruction (e.g., e-mail, infobuttons, and most World Wide Web-based courses)...

i. CD-ROM...

j. Multi-mode packages (i.e., a mix of technologies that cannot be assigned to a primary mode)...

(specific technologies to be used)...

k. Other technologies (specify)...

12. To what extent, if any, are the following factors keeping your institution from starting or expanding distance education offerings? (Circle one on each line.)

<table>
<thead>
<tr>
<th>Not at all</th>
<th>Minor extent</th>
<th>Moderate extent</th>
<th>Major extent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

a. Lack of fit with institution’s mission...

b. Lack of perceived need (e.g., limited student market)...

c. Lack of support from institution administration...

d. Program development costs...

e. Equipment failures/costs of maintaining equipment...

f. Limited technological infrastructure to support distance education...

g. Concerns about faculty workload...

h. Lack of faculty interest...

i. Lack of faculty rewards or incentives...

j. Legal concerns (e.g., intellectual property rights, copyright laws)...

k. Concerns about course quality...

l. Lack of access to library or other resources for instructional support...

m. Interinstitutional issues (e.g., alloccations of financial aid, course credit)...

n. Restrictive federal, state, or local policies (e.g., limitations on the number of distance education credits students may earn, student eligibility for financial aid)...

o. Inability to obtain state authorization...

p. Other (specify)...

13. Is your institution offering any distance education courses this academic year (2001–2002)?

Yes.............. 1 No.............. 2

14. For institutions that did not offer any distance education courses in 2000–2001: Did your institution offer any distance education courses in the previous 5 years (1995–2000)?

Yes.............. 1 (Date last offered__________) No.............. 2 Don’t know.............. 3

Thank you. Please keep a copy for your records.
Predictors of Graduation Among College Students with Disabilities

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University of Missouri

Joshua P. French
University of Colorado Denver

Abstract
This exploratory study determined which set of student characteristics and disability-related services explained graduation success among college students with disabilities. The archived records of 1,289 unidentified students with disabilities in three public universities were examined ex-post-facto to collect demographic data on the students, the disability-related services they qualified for while enrolled in the institution, and student graduation status. A hierarchical logistic regression framework was used to compare models predicting graduation among students with disabilities in college. A model selection procedure was then used to construct a parsimonious model of the data. The final model constructed included predictors related to gender, age, disability type, and several disability-related services. Given the limitations of this study, more research is needed to validate this model using a similar sample of students with disabilities in 2-year and 4-year institutions.

Keywords: Postsecondary education, disabilities, accommodations, graduation, college students

Many persons with disabilities have difficulty obtaining competitive employment due to lack of education and inadequate supports, which often means these individuals are unable to financially support themselves and live above the poverty line. In order to be competitive in the current labor market, it has become increasingly important for individuals with disabilities to receive a college degree (Gil, 2007), primarily because having a four-year degree is positively correlated with employment rates (Stodden, Dowrick, Anderson, Heyer, & Acosta, 2005). With these trends in mind, universities can best support students with disabilities by ensuring that they receive the appropriate accommodations needed to move towards successful completion of courses and graduation.

Conceptual Framework
Astin (1998) identified the input-environment-output college impact model (IEO) in which the major proposition is that the characteristics and abilities students bring to the college experience and environmental factors within the postsecondary academic setting significantly impact their ability to succeed. While student characteristics include demographics, skills, experiences, motivation, academic achievements, and aptitude test scores (Astin, 1998), environmental factors that influence student success include administrative policies, curriculum, student services, teaching practices, peers, and technology. In this context, it seems salient to identify which combination of individual and environmental factors best predict graduation outcomes of students with disabilities (Astin, 1998).

Background/Rationale
Although enrollment of students with disabilities in higher education has decreased slightly in recent years, their overall pattern of enrollment has significantly increased in the United States since the 1960s (Dukes, 2001). With this increase, universities have created more accessible facilities and worked toward ensuring that students receive the appropriate accommodations they need to have equal access to postsecondary environments. In the academic year 2007-2008, more females (57.3%) than males were
enrolled in postsecondary institutions at the undergraduate level (National Center for Education Statistics [NCES], 2010). Although two thirds of undergraduate students with disabilities were white, the remaining third were Black (12.7%), Hispanic (12.3%), Asian/Pacific Islander (4.8%), American Indian/Alaska Native (0.8%), and “other” (3.2%). More than half of the students were between 15 and 23 years of age (54%), 20.1% of students were between 24 and 29 years of age, and 25.9% of students between 30 years of age and older. Between 2003-2004 and 2007-2008, there was a 12.1% percentage decrease in the undergraduate enrollment among students 30 years of age and older, but there was a similar percentage increase in enrollment among younger students between 15 and 29 years of age (NCES, 2010).

Horn and Nevill (2006) found that 11% of undergraduate students reported a disability, the majority of whom attended four-year public institutions. In the 2003-2004 school year students reported the following disabilities: orthopedic (25.4%), mental illness/depression (21.9%), health impairment (17.3%), attention deficit disorder ([ADHD], 11%), learning disability ([LD], 07.5%), hearing impairment (5.0%), visual impairment (3.8%), speech impairment (0.4%), and other (7.8%). Females were more likely than males to report mental and physical health problems, while men were more likely to report ADHD.

In 2007-2008, 60.8% of students with disabilities enrolled at the graduate level were female (NCES, 2010). Nearly 64% of graduate students were white, which is similar to the percentage of white students enrolled at the undergraduate level. While the proportion of Black and Asian/Pacific Islander students enrolled at the graduate level (19%, 7.3%) was greater than at the undergraduate level (12.7%, 4.8%), the proportion of Hispanic students enrolled at the graduate level (7.4%) was lower than at the undergraduate level (12.3%). As one might expect, there are greater numbers of students with disabilities who are 24 years of age and older enrolled at the graduate level (92.2%) than at the undergraduate level (46%).

Barriers to Academic Success
Students with disabilities encounter more academic, attitudinal, and physical barriers while attending college than students without disabilities. Specifically, they are more likely than their non-disabled peers to have difficulty in the following areas: study/test skills, note-taking, listening comprehension, organization, social skills, self-esteem, and reading-writing deficits (Reaser, Prevatt, Petscher, & Proctor, 2007; Trainin & Swanson, 2005). Students also have concerns about the ability of instructors to modify classroom environments to meet their needs. Junco (2002) found that negative instructor attitudes decreased the willingness of students to advocate for themselves. In this regard, students with physical disabilities, especially those who use wheelchairs, have considerable difficulty negotiating many campus environments.

Disability-Related Services Needed
In terms of services needed, Getzel, McManus, and Briel (2004) assessed the effectiveness of the supported model of postsecondary disability services and found that students value time management strategies, use of technology, self-advocacy strategies, study/test taking support, and practice sessions that help students achieve clinical requirements. In particular, effective self-advocacy, as well as self-determination, results in success for college students with disabilities (Getzel & Thoma, 2008; Gil, 2007; Skinner, 2004). In terms of technology, one group of students in Canada valued spelling/grammar aid, dictation software, scanners, portable note-taking devices, and materials presented in electronic format (Fichten, Asuncion, Barile, Fossey, & Robillard, 2001; Fichten et al., 2004).

Disability-related Services and Academic Success
In one study, computer laboratory utilization and less advisement contributed positively to cumulative grade point average (GPA) of students with disabilities (Keim, McWhirter, & Bernstein, 1996). In another study, course substitutions, particularly substitutions for foreign language requirements, contributed positively to the graduation rates of students with disabilities (Skinner, 1999). Test accommodations, specifically giving students extra time to take exams, positively influenced the test scores of students with learning disabilities (Jarvis, 1996; Ofishesh, 2000; Runyan, 1991a, 1991b; Weaver, 2000). In examining outcomes of students with disabilities in a Canadian college over a 12-year period, Jorgensen et al. (2005) found that those who took lighter course loads earned the same grades and had the same graduation outcomes as students without disabilities.
Impact Models to Measure Academic Success

Numerous enactments have been passed to enhance the lives of persons with disabilities. Those include the Architectural Barriers Act of 1968 (P.L. 93-480), Rehabilitation Act of 1973 (P.L. 93-112), Education for All Handicapped Children Act of 1975 (P.L. 94-142), which is now the Individuals with Disabilities Education Act (IDEA, P.L. 105-17) with 1990, 1997, and 2004 amendments, Fair Housing Act (P.L. 100-430), and the Americans with Disabilities Act (P.L. 101-336) with 2008 amendments. Despite the importance of these enactments, nearly one-fourth of college students with disabilities reported not receiving the appropriate accommodations needed to be academically successful (NCES, 2003). Even though the Americans with Disabilities Act provides a legal avenue for individuals with disabilities to pursue if their civil rights are not granted due to discrimination on the basis of disability (Eckes & Ochoa, 2005), differences in interpretation of the act make it difficult to address those practices legally (Tagayuna, Stodden, Chang, Zeleznik & Whelley, 2005).

Even so, legal recourse may be unnecessary, given that experts in higher education now acknowledge that environmental factors impact student success in college as much as the student’s disability, if not more (Burgstahler, 2007; Whelley, Hart, & Zafft, 2002). As a result, universities are considering the use of impact models to assess the progress of students with disabilities (Pascarella & Terenzini, 2005). Unfortunately, there is no model of variables that shows which combination of student characteristics and environmental services predicts graduation among college students with disabilities.

Purpose of Study

Using both individual characteristics and disability-related services identified in the literature as potential predictors of graduation among students with disability, this study identified a relatively small combination of student characteristics and services that provided nearly optimal prediction ability of graduation among college students with disabilities. The following research questions were answered:

1. What are the individual characteristics of students registered in the disability offices of public, four-year universities, and how do they vary by primary disability of students?
2. What types of services do students qualify for through the disability offices of the universities, and how do services vary by primary disability of students?
3. What is the graduation rate of students registered at disability offices at public, four-year universities, and how does it vary by primary disability of students?
4. Which set of student characteristics and disability-related services are useful in predicting graduation among college students with disabilities?

Method

Participants

This study surveyed students qualifying for post-secondary disability services ex post facto via information contained in the records of students qualifying for accommodations by registering for services in university disability offices. A non-probability purposive sample of 1,289 inactive files of former students located in the disability offices of three Midwestern public universities was identified for the record review. The three universities will be identified in this article as universities A, B, and C. Student records from disability offices included all student files deemed inactive in the school years 2001-2002 through 2004-2005.

Only records of students who were no longer enrolled at the universities were reviewed. Each university’s institutional review board waived the informed consent of the students for the following reasons: data were analyzed in aggregate and no names were attached in any way, ensuring anonymity when data were transferred from records onto the questionnaire. The resulting raw data were kept in a locked file cabinet located in the office of the researchers.

Materials

A 20-item questionnaire was developed to be used as a mechanism to collect student demographic data, qualified disability-related services, and student graduation. Demographic variables included gender, age, ethnicity, disability, and student status (undergraduate/graduate). Students’ disabilities were categorized into three primary types: (a) cognitive, (b) mental disorder, and (c) physical. Accommodation variables included: (a) accessible classrooms, (b) alternative format tests and assignments, (c) assistive technology, (d) class-
room assistants, (c) course waivers or substitutions, (f) distraction reduced testing, (g) extended test time, (h) flexibility in assignment and test dates, (i) interpreting services, (j) learning strategies/study skills assistance, (k) note taking services, (l) physical therapy/functional training, (m) residence halls specialized in accommodating students with physical disabilities, (n) support groups/individual counseling, and (o) transportation. The outcome variable was student graduation status.

**Procedure**

The study utilized a prediction survey design that relied upon information contained in the records of college students with disabilities. The record review was used as a mechanism to collect student demographic data, qualified disability-related services, and student graduation status. In the process, no subjects were directly involved. This design was selected because it allowed the researchers to determine which set of student characteristics and disability-related services are most highly related to students’ graduation rate.

The University of Missouri’s Campus Institutional Review Board (IRB), as well as those of the three universities that participated in this research, approved the study and waived informed consent due to anonymity. The researchers asked administrators of the disability support programs at all three participating institutions by telephone if they would participate in the study. Administrators were informed of the criteria for selecting student case files that were deemed inactive from the school years 2001-2002 through 2004-2005. During this time period, 206 (University A), 345 (University B), and 738 (University C) inactive student files in the three universities served as the sample from which data were collected. After the IRB officials at the participating universities signed forms to approve the study, the researchers, with the help of a graduate student worker, proceeded to systematically collect the data from student files. Student name was not linked to records; instead, each questionnaire was numbered and data from records were transferred to the questionnaire.

**Variables.** The design of this study utilized 19 predictor variables and a single outcome variable, college graduation. The predictor variables included gender, age, ethnicity, disability, student status (undergraduate/graduate) and accommodation services provided. Students’ disabilities were categorized into three primary types; (a) cognitive, (b) mental, or (c) physical disorder.

The three types of disabilities require professional validation via documentation and/or assessment. The following definitions were used to categorize student disability in this study.

**Disability categories.** First, students with cognitive disabilities included those with a specific learning disability, attention deficit hyperactivity disorder (ADHD), or a traumatic brain injury/ acquired brain injury. Second, students with mental disorders must provide current documentation from a licensed professional that includes a specific, current psychiatric diagnosis as per the DSM-IV. Examples included depression, anxiety disorders, bipolar disorder, and schizophrenia. Third, students with physical disabilities included students with deafness or hearing loss, students with a visual impairment or who are blind, and students with a mobility, systemic, or disease-related disability such as spinal cord injury, amputations, cerebral palsy, arthritis, diabetes, heart/lung conditions, kidney disease and cancer. Only the students’ primary disability was documented during the record review, which was defined by the universities as the disabling condition that has the greatest impairing effect on academic progress and performance. Not all of the participating disability offices in this study documented students’ secondary disability; therefore, this variable could not be included in the analysis.

**Disability-related services.** Fifteen disability-related services identified in the literature as potential predictors of graduation among students with disability, and listed by at least one of the participating disability offices as a service provided by their center, were included on the questionnaire. All universities provided students with accessible classrooms, alternative format tests/assignments, assistive technology, classroom assistants, extended test time, interpreter services, and note-taking services. Universities B and C provided students with distraction-reduced testing, course waiver/substitutions, and flexibility in assignments/test dates. Learning strategies/study skills assistance, physical therapy, specialized residence hall, group/individual counseling, and transportation at no cost were services provided by the disability office at university C. It is also important to note that priority/early registration was not included as an accommodation variable because not all of the participating disability offices maintained records on this service. This was due to the fact that the service is provided by the registration office at the universities.
The researchers compared and reviewed disability-related service descriptions provided by the participating universities to ensure similar services were provided at each university. They then used the descriptions of each accommodation across disability offices to develop definitions that were used during the record review to ensure each accommodation was being documented in the same way.

Academic accommodations include: (a) accessible classrooms, allowing for student physical accessibility; including preferential/accessible seating, lap boards, table top desks, class relocation, frequent breaks, and permission to stand or lay down during class; (b) alternative format tests or assignments, providing students with the option to request the format of a test or assignment be altered, such as altering a multiple-choice exam to essay format; (c) assistive technology, providing resources such as sound amplification systems, adaptive computers, talking calculators, voice synthesizers, tape recorders, calculators or keyboards with large buttons, and text conversion in an alternative format; (d) classroom assistants, who may be a scribe, reader, lab assistant, library assistant, or mobility assistant; (e) course waivers or course substitutions, allowing students to have a foreign language, communication, or quantitative reasoning requirement waived or substituted for another course; (f) distraction-reduced testing, allowing a student to test in a room having fewer sensory distractions; (g) extended test time granting a student additional time for completing tests (ranging from time and a half to unlimited time); (h) flexibility in assignment and test dates to address disabilities that fluctuate, such as depression or diabetes; (i) interpreter services, providing interpreters to students in the classroom who have a documented profound hearing loss or deafness; (j) learning strategies and study skills assistance, granting one-on-one weekly, biweekly, or as-needed appointments with a learning disabilities specialist to work on learning strategies, such as test preparation, reading comprehension, written expression, organization, goal setting, and problem solving; and (k) note taker services, providing students with lecture notes.

Non-academic disability-related services include: (l) physical therapy and functional training, aiding students whose disabilities significantly limit the effective utilization of university fitness and recreational resources in implementing personal exercise programs, particularly for developing and maintaining range of motion, strength, conditioning, and transfer skills; (m) specialized residence halls, accommodating the residential needs of students with severe physical disabilities by assisting students in the development of a transitional disability management plan and empowering students to share in the responsibility for managing personal attendant staff with the residential administrative team; (n) support groups and individual counseling, addressing the needs of students with ADHD, learning disabilities, physical disabilities, and students with mental disorders; and last (o) transportation services, providing accessible university transportation to students with disabilities through the university disability office.

Data collection. The researchers traveled to universities A and B to collect data directly from student files located within the disability offices. Disability office personnel at each university escorted the researchers to file drawers that contained student files deemed inactive from the school years 2001-2002 through 2004-2005. The researchers reviewed student demographic information and disability accommodations documented in individual files and recorded this information onto the 20-item questionnaire. Application of disability and accommodation descriptions developed for the study was regularly reviewed during this process to ensure predictor variables were documented in the appropriate category. Each student’s school identification number was then documented on the 20-item questionnaire. Once student demographic and accommodation information was collected, all student identification numbers were entered into the campus-wide database to determine student graduation status, which was then recorded on individual questionnaires as a binary (yes/no) variable. Since it is unknown whether students who withdrew from their university before graduating transferred to another postsecondary institution to complete their degree, any student who did not graduate before leaving the university was classified as “no” for graduation status.

A graduate student employed in the disability support center at university C was recruited and trained to collect the required information from the student database in the center. The researchers briefed the graduate student worker on the research project, reviewed the 20-item questionnaire, and provided written definitions of the disability categories and accommodation descriptions. The researchers then discussed the categories with the student worker and checked for
understanding. Additionally, the researchers were in regular communication with the graduate assistant to answer questions related to the assigned disability and accommodation categories. University C’s disability center database was connected to the campus-wide database allowing the graduate student to access graduation status for each student.

Scoring and data analysis. The record review survey was used as a mechanism to collect student demographic data, qualified disability-related services, and student graduation. Student demographics were recorded on the questionnaire as categorical variables of the appropriate measurement level. The disability-related services each student qualified for were recorded as binary, categorical variables (yes/no), as was student graduation status. Once data collection was completed at all three universities, the researchers converted all data into an SPSS dataset.

Binary logistic regression was used to construct a model relating student characteristics and disability-related services to graduation status, with a goal of finding the variables which helped to accurately predict graduation. Binary logistic regression analysis differs from multiple linear regression analysis in that the outcome variable of interest is a binary categorical variable (in this case, graduated or did not graduate) as opposed to a numerical variable. Consequently, the standard assumptions of multiple linear regression analysis are violated and multiple linear regression is not an appropriate technique to analyze the data.

Binary logistic regression models the probability an outcome occurs using a non-linear function of the predictor variables. The resulting equation can be used to predict whether the outcome of interest occurs for a specific subject using the observed values of the predictor variables. In this study, the probability that a student graduated was modeled using the demographic and disability services data gathered in the questionnaires. One may refer to Hosmer and Lemeshow (2000) or Mertler and Vennatta (2005) for more details about binary logistic regression analysis.

The effect size of a specific variable in logistic regression is often quantified through the use of the odds ratio. All of the predictor variables considered in this study are binary, indicating whether a student possessed a particular characteristic. Consequently, the odds ratio for a predictor variable in this context is the odds a student graduates when the characteristic is present, divided by the odds a student graduates when the characteristic is not present (Hosmer & Lemeshow, 2000). More specifically, if the odds ratio for a predictor variable is more than 1, then a student is more likely to graduate if he/she possesses that characteristic. If the odds ratio for a predictor variable is less than 1, then a student is more likely to graduate if that attribute is not present. An odds ratio of 1 for a predictor variable indicates that the variable does not appear to affect the probability a person graduates.

One may assess the adequacy of the fit of a binary logistic regression model in a number of ways. One of the most common measurements of the fit of the model is the -2 Log Likelihood value. Informally, this statistic measures how likely it is that the data came from the proposed model. The smaller the value, the more likely it is that the data came from the proposed model, indicating a better model fit (George & Mallery, 2000). An alternative measure of model fit is Akaike’s Information Criterion (AIC) statistic (Akaike, 1974). This criterion is based on the -2 Log Likelihood but penalizes for every variable added to the model so that too many predictor variables are not added to the model. As with the -2 Log Likelihood value, the smaller the AIC statistic, the better the model explains the data. The AIC statistic provides the researcher with an objective method for model selection.

Results

Student Characteristics

The researcher reviewed the inactive records of 1,289 students who were registered in the offices of disabilities at three universities in the school years between 2001-2002 and 2004-2005. Students’ files were deemed inactive based on the last year of enrollment in courses, and of the 1,289 students identified in this sample, 18.1% of the student’s files were deemed inactive in the 2001-2002 school year, 24.8% were deemed inactive in the 2002-2003 school year, 25.8 percent were deemed in active in the 2003-2004 school year, and 31.3% were last enrolled during the 2004-2005 school year.

Of the participants (N=1,287), slightly more were male (53.3%) than female (46.7%), and ages ranged from 17 to 67 years of age (N=1,279, X=26.13, SD=7.515). Student age was determined by using the student’s birth date to calculate his/her age on May 1st of the school year during which the file was deemed inactive. Students self-identified ethnicity in
the following ways (N=1,281): White/Non-Hispanic (76.0%); Black/Non Hispanic (11.4%); Asian/Pacific Islander (5.7%); Hispanic (5.9%); and Native American or Alaskan Native (0.9%). For purposes of conducting logistic regression, ethnicity was also classified into two categories; White/Non Hispanic (76%) and Minority (24%). Of the students, 82.3% were undergraduates and 17.7% were graduate students (N=1,274). Students’ disabilities were categorized as one of three types: cognitive (55%); mental disorder (14%); and physical (31%). Table 1 illustrates the percentage of students by demographic characteristic and disability category.

---

**Table 1**

*Student Demographics by Disability (N=1,289)*

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Cognitive Disabilities (n=709)</th>
<th>Mental Disorders (n=185)</th>
<th>Physical Disabilities (n=395)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td>1,287</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td></td>
<td>56.9%</td>
<td>47.6%</td>
<td>49.5%</td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td>43.1%</td>
<td>52.4%</td>
<td>50.4%</td>
</tr>
<tr>
<td><strong>Ethnicity</strong></td>
<td>1,281</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White/Non Hispanic</td>
<td></td>
<td>76.4%</td>
<td>74.6%</td>
<td>74.4%</td>
</tr>
<tr>
<td>Black/ Non Hispanic</td>
<td></td>
<td>10.7%</td>
<td>10.8%</td>
<td>12.7%</td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td>12.6%</td>
<td>13.5%</td>
<td>11.9%</td>
</tr>
<tr>
<td><strong>Student Status</strong></td>
<td>1,274</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Undergraduate</td>
<td></td>
<td>83.5%</td>
<td>81.6%</td>
<td>80.3%</td>
</tr>
<tr>
<td>Graduate</td>
<td></td>
<td>16.5%</td>
<td>18.4%</td>
<td>19.7%</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td>1,289</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22 and Younger</td>
<td></td>
<td>27.2%</td>
<td>23.8%</td>
<td>17.7</td>
</tr>
<tr>
<td>23 - 30</td>
<td></td>
<td>60.8%</td>
<td>53.0%</td>
<td>53.9%</td>
</tr>
<tr>
<td>31 and Older</td>
<td></td>
<td>11.1%</td>
<td>23.2%</td>
<td>27.3%</td>
</tr>
</tbody>
</table>

---

**Student Services**

The disability services each student qualified for were documented during the data collection process. In the 1,289 files reviewed, most students qualified for extended test time and note-taking services. The results in Table 2 show the percentage of students qualifying for each type of service by disability type. It should be noted that some of the categories may appear to have only a small percentage of students qualifying for that service because not all services were offered by all universities, as previously indicated.
Table 2

*Student Demographics by Disability (N=1,289)*

<table>
<thead>
<tr>
<th></th>
<th>All Students w/ Disabilities (N=1,289)</th>
<th>Cognitive Disabilities (n=709)</th>
<th>Mental Disorders (n=185)</th>
<th>Physical Disabilities (n=394)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extended Test Time</td>
<td>79.9%</td>
<td>91.4%</td>
<td>82.7%</td>
<td>58.0%</td>
</tr>
<tr>
<td>Note-Taking Services</td>
<td>43.8%</td>
<td>48.5%</td>
<td>24.3%</td>
<td>44.6%</td>
</tr>
<tr>
<td>Distraction Reduced Tests</td>
<td>29.0%</td>
<td>37.4%</td>
<td>49.7%</td>
<td>3.2%</td>
</tr>
<tr>
<td>Assistive Technology</td>
<td>24.4%</td>
<td>20.9%</td>
<td>9.2%</td>
<td>38.0%</td>
</tr>
<tr>
<td>Flexibility in Due Dates</td>
<td>19.7%</td>
<td>17.5%</td>
<td>34.6%</td>
<td>16.7%</td>
</tr>
<tr>
<td>Accessible Classrooms</td>
<td>14.0%</td>
<td>4.8%</td>
<td>4.9%</td>
<td>34.9%</td>
</tr>
<tr>
<td>Learning Strategies</td>
<td>17.0%</td>
<td>25.1%</td>
<td>16.8%</td>
<td>.8%</td>
</tr>
<tr>
<td>Classroom Assistants</td>
<td>10.1%</td>
<td>7.2%</td>
<td>3.8%</td>
<td>18.2%</td>
</tr>
<tr>
<td>Alternative Format</td>
<td>9.9%</td>
<td>7.8%</td>
<td>2.7%</td>
<td>17.2%</td>
</tr>
<tr>
<td>Physical Therapy/ Functional Training</td>
<td>6.9%</td>
<td>1.8%</td>
<td>0.0%</td>
<td>19.2%</td>
</tr>
<tr>
<td>Transportation</td>
<td>6.4%</td>
<td>2.0%</td>
<td>1.6%</td>
<td>16.7%</td>
</tr>
<tr>
<td>Support Group/Counseling</td>
<td>3.7%</td>
<td>2.1%</td>
<td>14.1%</td>
<td>1.8%</td>
</tr>
<tr>
<td>Course Waiver/Substitution</td>
<td>3.3%</td>
<td>4.2%</td>
<td>1.1%</td>
<td>2.5%</td>
</tr>
<tr>
<td>Residential Hall</td>
<td>2.6%</td>
<td>.8%</td>
<td>1.1%</td>
<td>6.3%</td>
</tr>
<tr>
<td>Interpreting Services</td>
<td>2.0%</td>
<td>.6%</td>
<td>.5%</td>
<td>5.3%</td>
</tr>
</tbody>
</table>

**Hierarchical Comparison of Models**

Of the students whose files were reviewed, 74.2% of the students graduated (N=1,289). The proportion of students graduating for each disability type are: cognitive (73.8%); mental (69.7%); and physical (77%). In the logistic regression analysis, graduation status was the outcome variable scored as yes/no (1=yes, 0=no). The predictor variables were grouped into two types: student characteristics and disability services. Initially, the two types of predictors were entered into the regression equation in a hierarchical fashion, with student characteristics entered first and student disability services entered second. This produced results for two models: the model using only student characteristic data as predictor variables and the model using all available information. By entering the variables into the model in this way, it is possible to compare the two models using a drop-in deviance test to determine whether the disability services provided to the student affect the probability a student graduates.
The model including only student characteristic predictor variables had a -2 Log Likelihood statistic of 1,347.66. Gender, age, and student status (graduate versus undergraduate student) were found to be statistically significant in predicting graduation among students with disabilities. By comparison, when disability services were added in model II, the demographic variables gender, age, and disability type were statistically significant, as well as the disability services predictor variables alternative format tests, assistive technology, classroom assistants, distraction reduced testing, flexibility in assignment and test dates, learning strategies, and physical therapy/functional training. The addition of student services to student characteristics in model II reduced the -2 Log Likelihood by 181.01 to 1,166.65.

Using the drop-in deviance test to compare models I and II, the resulting test statistic was 181.01 (df = 15; p < .05). We conclude that Model II, the model including both demographic characteristics and the disability services available to the student, is a more appropriate model for the data than the model with demographic characteristics alone. In terms of prediction ability, model I was able to correctly predict the graduation status of students with disabilities 75.1% of the time, while model II was able to do so 79.7% of the time. The summaries of analyses are shown in Table 3.

Final Model and Interpretation of Coefficients

As a follow-up to the comparison of models I and II, the model was refined to include only the variables that seemed to contribute substantially in predicting whether a student would graduate. A stepwise selection procedure was used to add or remove variables from the logistic regression model according to the AIC criterion. Starting with the model that includes all predictor variables, individual variables were added or removed from the regression model based on whether the new model would have a lower AIC statistic, indicating a better fit of the model to the observed data. The final model that resulted from this procedure included the characteristics male, age, and disability type, as well as the disability services alternative format tests, assistive technology, classroom assistants, distraction reduced testing, flexibility in assignment and test dates, learning strategies, note-taker services, and physical therapy/functional training. This final model was able to correctly predict the graduation status of students 79.9% of the time. Those results are shown in Table 4.

To discuss the interpretation of the coefficients in the final model, we will begin with the interpretation for student characteristic variables and then for the disability services variables. The odds that a female student graduated were approximately 1.5 times larger than a male student with identical characteristics and disability services. Additionally, the odds that a student would graduate was 5.4 times larger for students whose age was between 23 and 30 than a student whose age was between 15 and 22, while the odds was 2.9 times larger for students whose age was 31 and above. Students with a cognitive disability were only one half as likely to graduate as a student with a physical disability, and students with a mental disability were only one third as likely to graduate as a student with a physical disability. Students qualifying for tests and assignments in an alternative format were 1.8 times more likely to graduate than students not qualifying for this accommodation. The odds that a student qualifying for a distraction-reduced testing environment would graduate was 4.2 times larger than for a student without this service. Students qualifying for flexible assignments and test dates were 2.5 times more likely to graduate than students without this resource. Learning strategies were associated with a student being 2.4 times more likely to graduate, while students qualifying for physical therapy were 3.5 times more likely to graduate than students not qualifying for this treatment. In the same vein, students qualifying to receive assistive technology in the classroom, classroom assistants, or note-taker services were approximately 20% to 40% less likely to graduate than students not qualifying for those services.

Discussion

Prior to discussing the results of the study in the context of the input-environment-output college impact model, it is important to note the assumptions and limitations of this study. The major assumption in this study was that all students with disabilities attending the universities asked for the accommodations they needed to graduate and actually utilized the accommodations for which they had become eligible. The major limitation of this study was that the universities participating were not randomly selected, so the results technically apply only to the universities involved. However, it seems reasonable that similar patterns would hold for comparable Midwestern, four-year,
Table 3

Logistic Regression of Student Graduation ($N=1,274$)

<table>
<thead>
<tr>
<th>Block 1: Student Characteristics</th>
<th>Model I</th>
<th>Odds Ratio</th>
<th>95% CI</th>
<th>Model II</th>
<th>Odds Ratio</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender (Male)</td>
<td>-.55***</td>
<td>.58</td>
<td>0.44-0.76</td>
<td>-.42**</td>
<td>.66</td>
<td>0.49-0.89</td>
</tr>
<tr>
<td>Age (ref=22 and Younger)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23-30</td>
<td>1.40***</td>
<td>4.03</td>
<td>2.98-5.47</td>
<td>1.74***</td>
<td>5.67</td>
<td>4.00-8.03</td>
</tr>
<tr>
<td>31 and Older</td>
<td>.43*</td>
<td>1.53</td>
<td>1.04-2.26</td>
<td>1.19***</td>
<td>3.28</td>
<td>2.09-5.13</td>
</tr>
<tr>
<td>Ethnicity (ref=White)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minority</td>
<td>-.06</td>
<td>.94</td>
<td>0.69-1.27</td>
<td>-.22</td>
<td>.80</td>
<td>0.57-1.12</td>
</tr>
<tr>
<td>Disability (ref=Physical)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cognitive</td>
<td>-.11</td>
<td>.89</td>
<td>0.66-1.22</td>
<td>-.61**</td>
<td>.54</td>
<td>0.37-0.80</td>
</tr>
<tr>
<td>Mental</td>
<td>-.33</td>
<td>.72</td>
<td>0.48-1.08</td>
<td>-1.19***</td>
<td>.30</td>
<td>0.18-0.51</td>
</tr>
<tr>
<td>Student Status (Graduate)</td>
<td>.44*</td>
<td>1.56</td>
<td>1.07-2.27</td>
<td>-.14</td>
<td>.87</td>
<td>0.57-1.32</td>
</tr>
</tbody>
</table>

| Block 2: Student Services        |         |            |         |          |            |        |
| Accessible Classroom             | -.24    | .79        | 0.48-1.28 |          |            |        |
| Alternative Format               | .69*    | 1.99       | 1.09-3.64 |          |            |        |
| Assistive Technology             | -.36*   | .70        | 0.50-0.99 |          |            |        |
| Classroom Assistants             | -.53    | .59        | 0.38-0.93 |          |            |        |
| Course Waiver/Substitution       | -.40    | .67        | 0.25-1.77 |          |            |        |
| Distraction Reduced Testing      | 1.44*** | 4.22       | 2.73-6.51 |          |            |        |
| Extended Test Time               | .34     | 1.41       | 0.95-2.09 |          |            |        |
| Flexibility in Due Dates         | .99***  | 2.69       | 1.68-4.31 |          |            |        |
| Interpreting Services            | .62     | 1.86       | 0.59-5.89 |          |            |        |
| Learning Strategies              | .94***  | 2.57       | 1.47-4.50 |          |            |        |
| Note-Taking Services             | -.30    | .74        | 0.55-1.00 |          |            |        |
| Physical Therapy/Functional      | 1.95*   | 7.04       | 1.25-39.52 |          |            |        |
| Residential Hall                 | -.74    | .48        | 0.08-2.86 |          |            |        |
| Support Group/Counseling         | -.05    | .96        | 0.27-3.20 |          |            |        |
| Transportation                   | -.16    | .86        | 0.16-4.66 |          |            |        |

-2 Log likelihood 1347.66 1166.65
Nagelkenke R Square .12 .30

Notes: $p<.05=*$, $p<.01=**$, $p<.001=***$
Table 4

Logistic Regression of Student Graduation (N=1,282)

<table>
<thead>
<tr>
<th>Model III</th>
<th>β</th>
<th>Odds Ratio</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender (Male)</td>
<td>-.42***</td>
<td>.66</td>
<td>0.49-0.88</td>
</tr>
<tr>
<td>Age (ref=22 and Younger)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23-30</td>
<td>1.68***</td>
<td>5.37</td>
<td>3.82-7.55</td>
</tr>
<tr>
<td>31 and Older</td>
<td>1.08*</td>
<td>2.95</td>
<td>1.93-4.49</td>
</tr>
<tr>
<td>Disability (ref=Physical)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cognitive</td>
<td>-.53</td>
<td>.59</td>
<td>0.41-0.84</td>
</tr>
<tr>
<td>Mental</td>
<td>-1.17</td>
<td>.31</td>
<td>0.19-0.50</td>
</tr>
<tr>
<td>Alternative Format</td>
<td>.59</td>
<td>1.80</td>
<td>1.01-3.19</td>
</tr>
<tr>
<td>Assistive Technology</td>
<td>-.37</td>
<td>.69</td>
<td>0.49-0.97</td>
</tr>
<tr>
<td>Classroom Assistants</td>
<td>-.52</td>
<td>.59</td>
<td>0.39-0.92</td>
</tr>
<tr>
<td>Distraction Reduced Testing</td>
<td>1.44</td>
<td>4.21</td>
<td>2.77-6.42</td>
</tr>
<tr>
<td>Flexibility in Due Dates</td>
<td>.95</td>
<td>2.58</td>
<td>1.63-4.06</td>
</tr>
<tr>
<td>Learning Strategies</td>
<td>.89</td>
<td>2.43</td>
<td>1.42-4.17</td>
</tr>
<tr>
<td>Note-Taking Services</td>
<td>-.25</td>
<td>.78</td>
<td>0.58-1.04</td>
</tr>
<tr>
<td>Physical Therapy/Functional</td>
<td>1.27</td>
<td>3.55</td>
<td>1.42-8.85</td>
</tr>
</tbody>
</table>

-2 Log likelihood | 1185.84
Nagelkenke R Square | .29

Notes: p<.05=*, p<.01=**, p<.001=***

Public universities. Additionally, only two of the universities participating in the study documented both the students’ primary and secondary disabilities, and as a result, only students’ primary disability was identified. The extent to which students’ secondary disabilities impact learning is beyond the scope of this study. Other limitations include the lack of a comparison group of students with disabilities who did not register for services, the inability to collect qualitative data from students, and the inclusion of only demographic variables as student characteristics. For example, other student characteristics such as talents, experiences, academic achievements, and aptitude scores may have influenced student outcomes.

Last, there was no way to determine the quality of interactions of students with disabilities and office personnel, professors, family, and/or other persons in their environments. This limitation takes on particular salience relative to the finding that the graduation rate for students qualifying for disability services at university C in this study was 44% higher than the graduation rate for students qualifying for services at university A and 36.9% higher than students qualifying for services at university B. The graduation rates of students qualifying for disability services at university A and B were more consistent with the 53% graduation rate reported by the United States Department of Education for students with disabilities attending postsecondary institutions throughout the country (Horn & Berktold, 1999). While university C’s graduation rate may be due to the institution’s strict admission requirements and overall higher graduation rates of students, additional factors might explain the difference in graduation rates, such as students’ self-advocacy skills, self-esteem, and self-determination. Identifying those factors was not possible in this study, primarily due to the anonymity
given to each university as a condition of participation in the study as well as to the archival nature of the data collected. Despite these limitations, the model of variables that predicted graduation among college students with disabilities in this study warrants discussion.

**Student Characteristics Favoring Graduation**

Females and students 23 years of age and older were more likely to graduate than their male and younger counterparts, respectively. The finding that females and students 23 years of age and older are more likely than males and younger students to graduate seems consistent with national statistics, especially when one considers that graduate students were included in this sample. The national statistics show that there are many more female graduate students with disabilities than male graduate students with disabilities, and on a whole, graduate students are 24 years of age and older (NCES, 2010). In addition, females are more likely than males to report mental disorders, especially depression (NCES, 2006). Within the context that individuals with mental disorders are often on medications that may interfere with cognition, concentration, and planning, females with mental disorders may have benefited more than males from distraction reduced-testing, flexible due dates, alternative format tests, and learning strategies. In contrast to this explanation, it may be that medications alone contributed to the graduation rates of females.

Students with physical disabilities were more likely to graduate than students with cognitive or mental disabilities. This finding may have been influenced by the fact that students with physical disabilities are less likely to experience cognitive functional limitations, such as decoding impairments or restricted attention or memory abilities, which likely influence the use of accommodations and graduation patterns of students with cognitive and mental disorders (Rehabilitation Services Administration [RSA], 2006).

**Disability Services Favoring Graduation**

The odds of graduating were best for students who qualified for distraction-reduced testing. This accommodation is often provided to students who experience high levels of distractibility when exposed to certain auditory or visual stimuli. This distractibility can impact students’ cognitive processing and can cause anxiety-related reactions. Findings of this study suggest that students with disabilities may greatly benefit from settings that minimize extraneous stimuli, and this may be especially true for students with ADHD and mental disorders.

Alternative format tests, flexibility in assignment and test dates, learning strategies/study skills assistance, and physical therapy/functional training were also significant predictors of student graduation. The finding that learning strategies/study skills assistance significantly improved the odds of graduation seems consistent with student reports that time management and test-taking strategies contribute the most to their success in college (Getzel et al, 2004). Additionally, while physical therapy is not usually a service provided by most university disability offices, it seems to be a very significant factor in predicting student graduation. Based on this finding, university disability offices may want to consider the benefits of providing physical therapy, recreation, and functional training services to their students.

Extended test time was not a significant explanation of graduation in this study, which is inconsistent with findings in previous studies that show this factor improves test scores (Jarvis, 1996; Ofiesh, 2000; Runyan, 1991a, 1991b; Weaver, 2000). Eighty percent of students who participated in the study qualified for extended test time, and of those, the following types of disabilities were represented: cognitive disabilities (91%), mental disorder (83%), and physical disability (58%). It may be that students in one of the disability categories or a subgroup of students in the disability category who qualified for extended time may not benefit from this service. Additionally, the findings in this study did not support previous findings that indicate course substitutions are significant predictors of graduation (Skinner, 1999).

**Odds Against Graduation**

Assistive technology, classroom assistants, and the use of note-taking services decreased the odds of college graduation for students with disabilities. This does not necessarily indicate these services are detrimental to student graduation, but it simply means that students qualifying for these services are less likely to graduate. Therefore, disability service personnel may want to coordinate specifically with students qualifying for these services to determine additional supports they need to succeed in higher education. Within the context that assistive technology decreased the odds of students graduating, several explanations seem plausible.
First, universities may fail to provide students with the individual attention they need to access available technology. Second, universities may not have adequate funding to provide the most up-to-date, useful technology. Last, universities may fail to provide the type of training students need in order to utilize available technology in an effective manner (Parker & Banerjee, 2007). Students who qualify for assistive technology accommodations may also have more significant disabilities, and as a result, they may encounter additional obstacles that contribute to the lack of success in college.

The results in this study show that classroom assistants and note-taking services also decreased the odds of graduation for students with disabilities. This may be due to the possibility that the correlation between type of disability and service provision results in more challenges than benefits for students. Also, students’ success may be negatively impacted if they must rely on unqualified assistants, and in addition, it seems plausible to speculate that a volunteer’s note-taking may be less accurate than those of a paid note-taker, teaching assistant or professor. The quality of notes can be extremely important to students reviewing course material or preparing for an exam. In the current study, paid and unpaid note-takers provided services to students.

Based on the results in this study, disability office personnel may want to review training procedures and personnel selection related to classroom assistants and note-takers in order to ensure these assistants are able to provide the quality of services students need to have academic success. In general, the accommodations that were negatively correlated to student graduation are typically services students with more significant disabilities use; therefore, there may be more obstacles to their success at the university. Regardless, assistive technology, note-taking services, and the use of classroom assistants are services that students with significant disabilities often need.

Implications

The results in this study contribute to the evidence about the services and accommodations college students with disabilities seem to need in order to graduate. The model of variables that predict graduation for students with disabilities in this study provides those in university disability offices with information that can help them enhance the graduation rate among students with disabilities. In this process, it will be important to examine the services and accommodations that decrease the odds of college graduation for students with disabilities. This knowledge lays the foundation for the development of postsecondary and governmental policies that promote the institutional services for students with disabilities.

The major implication of this study is for more research that tests the model identified herein using a similar sample of students with disabilities in 4-year institutions of higher education, as well as testing the model in 2-year institutions. Beyond testing this model, additional models are needed that identify the extent to which particular traits and characteristics of students, such as self-determination, self advocacy, and motivation, increase the odds of college graduation for students with disabilities, including additional outcome measures such as GPA at graduation and attendance while enrolled in school. Similar studies are needed to explore disability-related services that predict graduation for students with the following disabilities: attention deficit disorder; blind/ low vision; deaf/ hearing impairment; learning disability; mental disorders; and mobility, systemic, and disease-related disabilities.

In the meantime, practitioners in university settings can use the results of this study to develop strategies in the areas of curriculum, campus accessibility, student affairs, and disability services. Practitioners, including academic administrators, supportive personnel in disability offices, and professors, can make programmatic decisions and create instructional environments that are most appropriate for and helpful to particular groups of students with disabilities. In order for practitioners to make decisions that enhance the likelihood of graduation for students with disabilities, they will need the support of key university personnel.
References


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Understanding the Early Integration Experiences of College Students with Disabilities

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Abstract
This study sought to better understand the early integration experiences of college students with disabilities by examining two research questions: (1) How well do the variables in Tinto’s (1993) classic model of student attrition predict the early integration experiences of college students with disabilities? and (2) How do students with disabilities differ from other students with regard to the variables in Tinto’s model? A series of four multiple regressions was conducted to determine whether social integration, academic integration, institutional satisfaction, and homesick-related distress could be predicted using variables in Tinto’s (1993) model. Results indicated commitment to higher education, perception of on-campus environment, basic academic behaviors, and expected level of involvement in campus organizations allowed for increased predictability compared to pre-entry variables of gender and admissions test scores alone. A series of one-way analysis of variance (ANOVA) tests found that students with disabilities did not differ significantly from students who did not report having disabilities in respect to the independent and dependent variables in Tinto’s model. This suggests that the earliest college transition issues for students with disabilities are similar to the issues for other students.

Keywords: Student integration, college transition, student adjustment, student retention, map-works survey

“Adjusting to a college environment presents challenges for all students; however, for students with disabilities, the responsibility of managing their accommodations along with their academic coursework presents a set of challenges that are unique to these students” (Getzel, 2008, p. 208). While a great degree of variation and heterogeneity exists in the population of students with disabilities, it is apparent that they face unique challenges in integrating into college/university life. It is possible that those challenges may be particularly problematic during the initial transition. Research on students in general has demonstrated the importance of the first year of college, and a more limited subset of research has focused on early transition experiences (Woosley, 2003; Woosley & Miller, 2009); yet, early college transition and integration experiences for students with disabilities has been largely overlooked in previous research. This paper sought to address that gap by testing the utility of a traditional model of student persistence with a sample of students with disabilities. It further examined variables in the model and compared students with disabilities to students with no reported disabilities to explore whether the initial transition experiences of students with disabilities were different than or similar to other students to other students.

Students with Disabilities
Although the number of students with disabilities who pursue higher education is increasing (National Center for the Study of Postsecondary Educational Supports [NCES], 2000; National Council on Disability, 2003), their success rates in terms of degree completion have not matched their counterparts (Jones, 2002). This difference appears to be especially true for students with psychiatric disabilities who appear to have especially low college completion rates (Hunt, Eisenberg, & Kilbourne, 2010; Kessler, Foster, Saunders, & Stang, 1995). Thus, researchers have focused
attention on a variety of issues related to the success of college students with disabilities. One theme of the literature regarding students with disabilities and their success in college has focused on accommodations and intervention strategies. Researchers have investigated faculty attitudes regarding accommodations (Ginsberg & Schulte, 2008; Murray, Flannery, & Wren, 2008; Skinner, 2007; Smith, 2010; Zhang, Landmark & Reber, 2010) as well as faculty attitudes towards students with disabilities in general (Cook, Rumrill & Tankersley, 2009; Hong & Himmel, 2009). In addition to the focus on faculty and instructors, researchers have investigated the efficacy of specific intervention strategies such as executive function coaching (Parker & Boutelle, 2009), test-taking strategies (Holzer, Madaus, Bray, & Kehle, 2009), and specific advising models (Ryser & Alden, 2005). This strategy research typically focuses on particular populations of students, including students with ADHD (Parker & Boutelle, 2009; Ryser, & Alden, 2005), Asperger’s Syndrome (Wenzel & Rowley, 2010), and learning disabilities (Chiba & Low, 2007; Holzer et al., 2009; Parker & Boutelle, 2009; Ryser, & Alden, 2005; Troiano, Liefeld, & Trachtenberg, 2010) to address best practices in increasing the success of students in these sub-populations.

Overall, researchers have found support for addressing faculty attitudes and providing various intervention strategies to increase the success of students with disabilities. Yet the issue of college success for students with disabilities is most likely broader than just faculty attitudes and practices and intervention strategies by other campus professionals.

In addition to faculty and staff responses, researchers have also focused attention on the students themselves. A number of researchers have examined use of services (Collins & Mowbary, 2008), perceptions of services and accommodations (Barnard-Brak, Lechtenberger & Lan, 2010; Cawthon & Cole 2008; Marshak, Van Wieren & Ferrell, 2010), and self-advocacy behaviors and strategies (Barnard-Brak, Sulak, & Tate, 2010; Trammell & Hathaway, 2007). Other researchers have investigated specific student characteristics and compared students with disabilities to students without disabilities. For instance, Estrada, Dupoux, and Wolman (2006) examined locus of control and adjustment, comparing students with learning disabilities to students without learning disabilities. They found no differences in locus of control orientation or personal-emotional adjustment. Hall and Webster (2008) compared metacognitive and affective factors, and found students with learning disabilities had higher levels of initiative and resiliency but lower levels of academic self-efficacy and higher levels of self-doubt than students with no learning disabilities. Adams and Proctor (2010) examined attributional style and found that students with disabilities had a “more internal, stable, and global attributional style” but had lower adaptation and adjustment to college than their peers without disabilities (p. 166). Hong, Ivy, Gonzalez, and Ehrensberger (2007) stated those students with disabilities “in short…are not self-determined” (p. 33) as evidenced by their difficulties in setting and achieving goals, making decisions, and self-advocating for recreational and social opportunities. They also found that students with disabilities were less likely to take on leadership roles, more likely to lack self-control and self-discipline, less likely to have developed facets of their identities, and had poorer academic skills in general (Hong et al., 2007). Therefore, researchers have begun to explore differences between college students with disabilities and those without. Because much of the research has been on small samples, there may still be much to learn about college students.

A third theme of the research is the transition from high school to college. The greatest attrition of college students occurs in the first fall quarter after enrollment (Adler, 1999). This suggests that it is important to investigate early integration experiences of all students; however, students with disabilities may have unique predictors of persistence compared to students with no reported disabilities. In a synthesis of literature, Garrison-Wade and Lehmann (2009) proposed a conceptual framework for understanding the transition to community college, in which they discuss three areas for improving the transition: (1) preparing for the transition (including self-advocacy development), (2) planning the transition, and (3) accessing necessary services and supports at the community college. Addressing the first area of Garrison-Wade and Lehmann’s framework, Morningstar et al. (2010) focused on the links between high school preparation and self-determination. Morningstar et al. suggested that high school students’ preparation to transition to college was significantly related to their level of self-determination (as measured by three variables: hope, psychological empowerment, and locus of control). DaDeppo (2009) took a broader view, focusing on the “relative influence of background characteristics, precollege achievement,
and college integration” and their impact on academic performance and intent to persist (p. 122). DaDeppo reported that “…while academic and social integration were not unique predictors of college GPA, both integration variables were unique predictors” (p. 122) of students’ with learning disabilities intent to continue collegiate level academic work.

In a study of students who had both apparent and non-apparent disabilities, Wessel, Jones, Markle, and Westfall (2009) reported that, regardless of disability status, student retention and graduation rates were similar. However, the same study found that students with disabilities were more likely to drop out during their fourth and fifth years of postsecondary education than their counterparts. This further suggests that time-specific persistence factors may be useful to examine in regard to understanding how students with disabilities persist. Even with limited research (Wessel et al., 2009) regarding persistence of students with disabilities, the college transition experience of students with disabilities has not received broad attention in the research. Such research may be useful in helping to explain the differences seen in the persistence of students with disabilities and those without disabilities.

Overall, there is still much to learn about the successful transition experiences of students with disabilities. Much of the research has focused on faculty perceptions, on comparisons between students with disabilities and those without, and on specific sub-populations. What has not received as much attention is the broader transition (beyond just accommodations) that students experience as they move into the collegiate environment. Tinto’s (1993) classic model of student attrition emphasized the longitudinal nature of persistence and attrition decisions. He highlighted the importance of integration into both the social and academic systems of an institution as predictors of persistence. Numerous studies have validated Tinto’s constructs as predictors of college students’ success and persistence (Allen & Nelson, 1989; Beil, Reaisn, Zea, & Caplan, 1999; Berger, 1997; Berger & Milem, 1999). Research has indicated that factors such as standardized test scores were predictive of student success in the first semester (DeBerard, Spielmans, & Julka, 2004). Such factors are directly related to Tinto’s pre-entry characteristics. Similarly, researchers have found that the initial integration experiences are related to both long-term and short-term outcomes for college students (Allen et al., 2008; Woosley, 2003; Woosley & Miller, 2009). As a result, researchers have suggested that the initial integration experiences may lay a foundation for subsequent experiences and thus may play a critical role in establishing the path and destination of a student. Thus, a better understanding of the initial experiences of students with disabilities may shed light on their transition to college as well as their subsequent completion of a degree. Therefore, this study sought to begin addressing the need to look beyond pre-entry characteristics, such as standardized scores, by examining two research questions:

1. How well do the variables in Tinto’s (1993) classic model of student attrition predict the early integration experiences of college students with disabilities?
2. How do students with disabilities differ from other students with regards to the variables in Tinto’s model?

Method

Participants

Three weeks into the fall semester of two consecutive years, all enrolled, first-time freshmen at a medium-sized Midwest public university were asked to participate in the university’s annual first-year student survey. Of the 5135 students that provided complete responses, 120 students had registered with the university’s office of disabled student services and their responses to the survey were used to address the first research question. Admissions records, which use federally mandated race labels, were used to obtain participants’ gender, entrance exam scores, and race. The sample was composed of both male students with disabilities (n = 50; 41.7%) and female students with disabilities (n = 70; 58.3%). Of the 120 students who reported having a disability, 86 (71.7%) identified as White while 34 (28.3%) were racial/ethnic minorities or did not respond to the racial/ethnicity demographic item on their admissions application.

To address the second research question and make comparisons between students with disabilities and those with no reported disabilities, data from all first-year students (both those who were registered with the office of disabled student services as well as those who were not) from both fall classes who completed the items required for this study were utilized. The data from the same 120 students used to address the
first search question were also used for this second research question. Data for the comparison group (students with no reported disability) were provided by 5015 students who had completed the first-year student survey but had not registered with the office of disabled student services. Of the 5015 students included in the comparison group, 1982 (39.5%) were male, 3033 (60.5%) were female, and 3865 (77.1%) self-identified as “White” while 1150 (22.9%) self-identified as either a racial/ethnic minority or did not respond to the race/ethnicity demographic item on their admissions application.

**Procedure**

Data for this study were collected from university records, including records from the annual first-year student survey, institutional records (admissions and demographic data), and a list of students provided by the office of disabled student services. The annual first-year student survey was sent to all first-time freshmen electronically, with two additional reminders sent to non-respondents. The instrument was the Making Achievement Possible (MAP-Works) survey (Educational Benchmarking, n.d.), which is used by the university annually. Responses from the MAP-Works survey were used to calculate variables. In addition to the survey, data from institutional records were gathered and included SAT and ACT composite scores (which were used to calculate stanine scores; The ACT, n.d.; SAT, n.d), gender, and race/ethnicity information. The list of student identification numbers was obtained from the university’s office of disabled student services in order to identify those participants with a documented disability. Consistent with previous research on integration (Wessell et al., 2009), no attempt was made to separate students based on the exact type (e.g., physical versus learning or psychological) or severity of the disabilities reported, nor were any contacts made with students as a part of this study.

**Instruments**

Tinto’s (1993) model suggests that variables used in this study fit into one of three levels. First-level or “pre-entry” entry variables included gender and stanine scores. One second-level variable, “commitment to higher education” (commitment) was identified. Third-level variables included “on-campus environment,” “expected self-involvement” (involvement) in campus organizations, and “basic academic behaviors.” These six variables were expected to predict “institutional satisfaction,” “social integration” (as measured by the MAP-Works “peer connection” scale), “academic integration,” and “homesickness-related distress.”

**MAP-Works Survey.** The MAP-Works survey has been used at more than 80 institutions of higher education. The survey was designed to assess students’ earliest college experiences, provide students feedback about their expectations and behaviors, and assist faculty and staff who may work with the students. Student feedback, which was provided electronically, included individualized feedback based on a student’s survey responses, and information about possible campus resources to improve academic performance and social integration. Each of the 24 MAP-Works scales is composed of at least two items. Because different scales have different numbers of items, item responses are averaged to provide standardized scores. Scale scores could therefore range from “1” (Not at All) to “7” (Extremely) and scores were treated as continuous variables. Participants were excluded if they did not provide responses to all items used to calculate all scale scores (listwise deletion). Not all scales were used in this study. Only those scales that were used to measure variables relevant to this study are discussed further.

The commitment to higher education scale consisted of two items that asked how committed students were to completing their first year of college as well as how committed they were to completing their college degree. Environment was measured using the four-item on-campus environment scale, including questions about adjusting to campus life and satisfaction with the residence hall experience. The basic academic behaviors scale is a six-item scale that asked students about study habits, such as how well they are able to pay attention in class. Expected level of involvement was measured using a two-item scale, created specifically for this study. The two items asked how involved students thought they would be in campus organizations and how interested they were in holding leadership positions within organizations.

The purpose of this study was to provide answers to two questions. The first question asked how well Tinto’s (1993) model explained the experience of students with disabilities. This question led to the hypothesis that Tinto’s model would explain a greater amount of variance than gender and academic potential alone. To test this hypothesis, dependent variables consistent
with Tinto’s model were identified as social integration, academic integration, institutional satisfaction, and homesick-related distress.

The second purpose was to determine if differences exist in self-reported integration and satisfaction levels between students who report having disabilities compared to students who do not report having disabilities. Based on the existing research, it was hypothesized that students who reported having disabilities would report lower levels of integration and satisfaction. It was also hypothesized that there would be little difference in level of homesickness-related distress between the two groups.

Results

All scales used in this study were found to have internal reliability with Cronbach’s alphas ranging from .646 to .921. The Involvement scale ($\alpha = .646$) and the Commitment scale ($\alpha = .688$) each have only two items, which likely led to their comparatively lower alpha levels. All individual scale alphas can be found in Table 1.

Research question 1 asked about the extent to which Tinto’s (1993) model would better explain students with disabilities’ integration experiences than gender and academic potential alone. A series of four multiple regressions was conducted in order to investigate the ability to predict (1) social integration, (2) academic integration, (3) institutional satisfaction, and (4) homesick-related distress. Step-wise regression models (block models) were used to determine whether early experiences added to the predictive power of the models beyond what pre-entry characteristics could predict. Pre-entry variables (gender and stanine score) were included in the first block of each model. Commitment to higher education (“commitment”) and pre-entry variables composed the second block of each model. The third block of each model built on the second block by adding how students perceived the on-campus environment (“environment”), students’ expected involvement level in campus organizations and clubs (“involvement”) and students’ self-reported ability to perform basic academic behaviors (“academic behaviors”). Overall, the three-block models were best able to explain variance and predict the dependent variables.

Social integration was examined in the first model. The first block of this model, which included only the pre-entry variables of gender and stanine scores, was not significant $F (2, 119) = .625$, $p = .537$, $R^2 = .011$. The second block, which included pre-entry variables and commitment, was also not significant $F (3, 119) = 1.522$, $p = .213$, $R^2 = .038$, indicating that when commitment was added to the regression model, the model was not significantly better able to explain social integration. As observed in Table 3, the three-level model was significant $F (6, 119) = 7.672$, $p < .001$ and most explanatory of the three variations of the model ($R^2 = .289$). Both on-campus environment ($p < .001$) and involvement ($p = .005$) were found to have significant predictive ability in the Social Integration regression model.

A second regression model focused on academic integration. The model using only pre-entry variables was not significant, $F (2, 119) = .182$, $p = .834$, $R^2 = .003$. The second block, that included pre-entry variables and commitment, was also non-significant $F (3, 119) = .766$, $p = .515$, $R^2 = .019$. The third block model, which included previous variables as academic behaviors, involvement, and environment, was significant $F (6, 119) = 11.455$, $p < .001$, $R^2 = .378$, indicating that the hypothesized model was most predictive of academic integration (see Table 4).

To examine institutional satisfaction, a third regression was conducted. The first block, which included only pre-entry variables, was non-significant, $F (2, 119) = 2.004$, $p = .139$, $R^2 = .033$. The second block model, which included pre-entry variables and commitment, was not significant $F (3, 119) = 2.662$, $p = .051$, $R^2 = .064$. The third model, which included previous independent variables as well as academic behaviors, involvement, and environment, was significant $F (6, 119) = 7.136$, $p < .001$, $R^2 = .275$ (see Table 5).

A fourth regression was used to investigate homesick-related distress. All three blocks were significant; however, predictive ability increased as variables were included in each successive block model. The first block model, $F (2, 119) = 3.465$, $p = .035$, $R^2 = .056$ suggested that pre-entry variables were able to predict homesickness-related distress. Block two was somewhat better at predicting distress, $F (3, 119) = 3.905$, $p = .011$, $R^2 = .092$ than was model one. As hypothesized, the third model was able to explain the greatest amount of variance, with an increase in $R^2$ of .183 above pre-entry variables alone, and therefore best able to predict homesickness-related distress, $F (6, 119) = 5.931$, $p < .001$, $R^2 = .273$ (see Table 6).
Table 1

Scale Alphas

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<tr>
<td>Academic Integration</td>
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<td>Institutional Satisfaction</td>
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<tr>
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Table 2

Descriptives & Pearson Correlations of Predictors, n=120

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<tr>
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<td>.264**</td>
<td>-.265**</td>
<td>.216*</td>
<td>.195*</td>
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<tr>
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<td>.095</td>
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<td>.275**</td>
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<td>-.095</td>
<td>.162</td>
<td>.430**</td>
<td>.292**</td>
<td>.353**</td>
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<td>.265**</td>
<td>.289**</td>
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<td>.103</td>
<td>.143</td>
<td>.185*</td>
<td>.455**</td>
<td>.222*</td>
<td>.136</td>
<td>.347**</td>
<td>.375**</td>
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<tr>
<td>Homesickness Distress</td>
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<td>1.49</td>
<td>-.187*</td>
<td>.156</td>
<td>.181*</td>
<td>.412**</td>
<td>-.009</td>
<td>.163</td>
<td>.301**</td>
<td>.217*</td>
<td>.484**</td>
</tr>
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</table>

+ Gender was coded as male = 0; female = 1; *significant at the 0.01 level, **significant at the 0.05 level (2-tailed)
Table 3

Social Integration Regression Coefficients

<table>
<thead>
<tr>
<th>Step</th>
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<th>β</th>
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<td>-.098</td>
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<tr>
<td>Gender</td>
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<td>.228</td>
<td>-.048</td>
</tr>
<tr>
<td>Stanine</td>
<td>-.102</td>
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<td>.165</td>
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<td>.167</td>
<td>.345**</td>
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<td>.138</td>
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Notes: F (6, 119) = 7.672, p = .000, * = p = .005, ** = p < .000

To test hypotheses related to the second question addressed in this study (Do differences in the integration experience exist between students with and without reported disabilities?), a series of one-way analysis of variance (ANOVA) tests was conducted between students with reported disabilities (coded as 1) and students without reported disabilities (coded as 0). Unlike the regression analyses above, data from 5135 student respondents were included. Each of the 5135 students responded to all items necessary to compute scale scores.

For commitment, ANOVA results indicated that no significant differences existed between students with disabilities and students without disabilities F(1, 5135) = .745, p = .388 with a partial eta squared effect size of .000. The mean for students with disabilities was 6.700, (SD = .609) and the mean for the students without disabilities was 6.753, (SD = .672).

For campus environment, ANOVA results indicated that no significant differences existed between students with disabilities and students without disabilities F(1, 5135) = 1.026, p = .311 with a partial eta squared effect size of .000. The mean for students with disabilities was 5.790, (SD = .968) and the mean for the students without disabilities was 5.885, (SD = 1.018).

For basic academic behavior, ANOVA results indicated that no significant differences existed between students with disabilities and students without disabilities F(1, 5135) = 1.085, p = .298 with a partial eta squared effect size of .000. The mean for students with disabilities was 5.921, (SD = .892) and the mean for the students without disabilities was 5.996, (SD = .781).

For involvement, ANOVA results indicated that no significant differences existed between students with disabilities and students without disabilities F(1, 5135) = .024, p = .878 with a partial eta squared effect size of .000. The mean for students with disabilities was 4.417, (SD = 1.640) and the mean for the students without disabilities was 4.440, (SD = 1.612).

For social integration, ANOVA results indicated that no significant differences existed between students with disabilities and students without disabilities F(1, 5135) = 1.026, p = .311 with a partial eta squared effect size of .000. The mean for students with disabilities was 6.700, (SD = .609) and the mean for the students without disabilities was 6.753, (SD = .672).
Table 4

*Academic Integration Regression Coefficients*

<table>
<thead>
<tr>
<th>Step 1</th>
<th>B</th>
<th>SE B</th>
<th>β</th>
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<tbody>
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<td>.044</td>
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<td>.075</td>
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<td>.075</td>
<td>-.033</td>
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<td>.128</td>
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<table>
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<th>β</th>
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</thead>
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<td>-.096</td>
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<tr>
<td>Stanine</td>
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<td>Commitment</td>
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<td>Environment</td>
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<td>.079</td>
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</tr>
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<td>.990</td>
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</table>

*Notes:* F (6, 119) = 11.455, p = .000, ** = p = .000

For academic integration, ANOVA results indicated that no significant differences existed between students with disabilities and students without disabilities F(1, 5135) = 2.526, p = .112 with a partial eta squared effect size of .000. The mean for students with disabilities was 5.622, (SD = .941) and the mean for the students without disabilities was 5.760, (SD = .940).

For institutional satisfaction, ANOVA results indicated that no significant differences existed between students with disabilities and students without disabilities F(1, 5135) = .973, p = .324 with a partial eta squared effect size of .000. The mean for students with disabilities was 5.763, (SD = 1.021) and the mean for the students without disabilities was 5.682, (SD = 1.075).

For homesick-related distress, ANOVA results indicated that no significant differences existed between students with disabilities and students without disabilities F(1, 5135) = .567, p = .451 with a partial eta squared effect size of .000. The mean for students with disabilities was 5.65, (SD = 1.494) and the mean for the students without disabilities was 5.750, (SD = 1.432).

**Discussion**

Data were collected from students with and without disabilities three weeks after they began their first semester of college. Four regression models, each with three-block levels, were conducted in order to investigate whether adding theoretically derived variables could better predict which factors may allow increased accuracy in predicting students with disabilities’ integration experience to university life. Results generally suggest that Tinto’s (1993) model is better at explaining early integration experiences than
Table 5

Institutional Satisfaction Regression Coefficients

<table>
<thead>
<tr>
<th>Step</th>
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<th>β</th>
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</thead>
<tbody>
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<td>.188</td>
<td>.112</td>
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<tr>
<td>Stanine</td>
<td>.127</td>
<td>.077</td>
<td>.150</td>
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<tr>
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<td>.076</td>
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<tr>
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<tr>
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</table>

Notes: Note: F (6, 119) = 7.136, p = .000, ** = p = .000

pre-entry variables alone. Specifically, students with disabilities perceptions of the on-campus environment and their expectations for involvement with campus organizations were significant factors in predicting their social integration (e.g., making friends). Results also suggest that basic academic behaviors, such as study skills and participation in classes, allowed for greater explanation of students with disabilities self-reported academic integration. Interestingly, commitment to completing a degree was not a significant factor in predicting academic integration. Logically, this finding may be because most students who take the time to apply and commit to enrolling in a university have already decided that they were committed to earning a degree.

This logical inference has direct implications for secondary educational settings and families of students with disabilities. Secondary education professionals (e.g., special education instructors and guidance services professionals) and family members may play a key role in helping students with disabilities achieve in postsecondary education settings in key ways. Educators and family members can assist students with disabilities in recognizing their potential by working with students to set realistic goals. Such goal setting may be most effective when not limited to simply determining a major. Instead, professionals and family members should work with students to examine what types of institutional support, choice of majors, and student organizations or student life exist at various institutions. Such planning may contribute to students’ success in transitioning from high school to postsecondary study and the university social milieu.

After the student selects an institution and gains acceptance, guidance counselors and special education professionals may further contribute to the students’ integration experience by working together and with students to plan. For example, secondary professionals may recognize what types of interventions have led to a student’s success in high school and communicate this information to postsecondary specialists in pre-
Table 6

Homesickness-Related Distress Regression Coefficients

<table>
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<td>.144</td>
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<td>-.053</td>
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Notes: F (6, 119) = 5.931, p = .000, * = p < .05, ** = p = .000

arranging academic expectations (e.g., appropriate course planning, transportation, and number of credit hours for which a student should enroll) and services (e.g., note takers, scanning textbooks into electronic format, access to mental health or psychiatric services and learning center tutors). By involving students in this planning process, they may experience increased commitment to obtaining a degree and feel more confident, or self-determined, in their ability to complete their academic (and social) goals. Although preparation, planning, and communication are essential in developing strategic goals and services and families and students can take part in this process, families may provide yet another asset in the transition and early integration experience.

Family members (and professionals) should be aware that homesickness is a normal experience for many college students and that the feelings of homesickness experienced by students with disabilities may differ very little from that experienced by students without disabilities. Normalizing homesickness and encouraging independence and self-advocacy is likely to not only increase students’ self-determination, but also improve their understanding of institutional procedures. As students with disabilities integrate into the postsecondary setting, family members may also need to change the way in which they offer support and encouragement. Instead of taking responsibility, advocating, and coordinating accommodations, parents may best serve their college-aged children by encouraging them to continue developing a sense of independence and self-sufficiency. Such self-directed involvement may assist students in developing valuable working relationships with campus personnel, such as disability services professionals, that can deepen their sense of connection to the university community. Feeling connected to university professionals and included in social groups is likely to lead to higher levels of institutional satisfaction and perception of the campus environment.
Institutional satisfaction was also better explained by examining students with disabilities’ perceptions of the campus environment. Not surprisingly, those students who reported more positive feelings about the campus environment were more likely to be satisfied with the institution in general. Further research is needed in order to determine the role of academic work in the area of institutional satisfaction. Like institutional satisfaction, students with disabilities’ ratings of the campus environment was inversely related to their reported level of homesickness-related distress. Those students who liked the campus environment were less likely to experience distress related to missing family and friends from “back home.”

Consistent with Tinto’s (1993) model, the results of this study suggest that the evaluation of the campus environment may be especially important to the earliest integration experiences of students with disabilities. If the implications of Tinto’s model are true longitudinally, then further research may be able to explore the potential long-term impact of campus environment on outcomes beyond initial integration such as persistence and graduation. It should be noted that this study was done on a single campus with an office dedicated solely to supporting students with disabilities. The office covers financial obligations associated with having student note takers attend classes with students who qualify for such services, works with faculty to determine appropriate classroom accommodations and match students with faculty mentors, provides other academic-related services, offers programming directed at students with disabilities, and sponsors an organization for students with disabilities. As any single campus study, this one is limited by the experience of the students on that campus. Further research is necessary to determine if the results from this study are applicable in other campus contexts.

Another caveat that applies to this research is the limitations of population and data sources used. The sample of students with disabilities included only those who had registered with an office for students with disabilities. It is possible that students with disabilities may not have registered, either because they did not want or need services, were unaware of the availability of services, or were ineligible to receive accommodations. Regardless, our sample was thus limited to students who were registered; students who had not registered were then in the comparison group. In addition, the analysis for this study did not differentiate students based on the type of disability. Previous research has largely focused on specific sub-populations of students with disabilities, such as those with learning disabilities. It is possible that the type of disability may affect perceptions and predictors of integration. Thus, future research should also further explore whether the relationships found in this study are consistent across groups of students with different types of disability.

Overall, the findings of this study suggest that no significant differences exist between students who report having disabilities and those who do not report having disabilities in regards to social integration, academic integration, homesickness-related distress, and institutional satisfaction. In no instance did responses obtained by those in each group differ significantly, which suggests that the hypothesized relationship between disability status and university integration experiences were not accurate. Results suggest instead that students with disabilities integrate in a similar manner to students without disabilities and that their experiences are more comparable than previously suggested. Further replication of these findings is essential to determine whether these results are specific to the sample or campus or, if instead, they represent a broader, more accurate view of how students with disabilities are successfully integrating into university life. Future studies should also attempt to increase accuracy in the categorization process in some manner, such as including an open-ended item in the first-year survey asking students to list any disabilities they may have and cross-checking to ensure that students are classified appropriately.

Overall, results support the hypothesis that Tinto’s (1993) model is applicable in understanding the integration of students with disabilities. This finding may support future research that seeks to apply this specific model to persistence and degree-completion studies. Furthermore, findings suggest that students, regardless of disability status, are likely to respond similarly when campus environment, commitment to obtaining a degree, basic academic behaviors, and expected level of involvement in campus organizations are factors of interest. This set of findings, if replicated and found to be generalizable, is of interest both to those who practice in offices for students with disabilities, those who work in university counseling centers who serve a population that includes students with disabilities, and those who conduct research to better understand.
the university experience of students with disabilities. Taken together, the findings reported in this study may suggest that more similarities than differences exist between new students with and without disabilities.

References


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Sherry Woosley, Ph.D. received her BS in Secondary Education from University of Vermont, and M.A. and Ph.D. from University of California, Santa Barbara. Her experience includes working in institutional research and assessment for Ball State University, where she founded a graduate level program in institutional research. Dr. Woosley is nationally recognized for work in assessment and predictive analytics. She is currently the Director of Analytics and Research at EBI. Her research interests include college student success, the transition to college, and assessment methods. She can be reached by email at: swoosley@webebi.com.
Crossing the Communication Barrier: Facilitating Communication in Mixed Groups of Deaf and Hearing Students

Carol Marchetti
Susan Foster
Gary Long
Michael Stinson
Rochester Institute of Technology

Abstract
Teachers of introductory technical courses such as statistics face numerous challenges in the classroom, including student motivation and mathematical background, and difficulties in interpreting numerical results in context. Co-operative learning through small groups addresses many such challenges, but students for whom spoken English is not their primary language – which may include international, first generation Americans, and deaf or hard of hearing students – are less likely to benefit from group work. This paper examines two possible approaches to improve communication in groups where there is a mix of deaf or hard of hearing students and hearing students for whom English is their native language.

Keywords: Group work, communication, deaf, hard of hearing

Introduction
Among the challenges facing teachers of introductory technical courses such as statistics are the low motivation and insufficient mathematical backgrounds of students (Onwuegbuzie, 1997), as well as obstacles in communication related to the dependence of interpretations on language (Rangecroft, 2002). Student engagement is a factor that has been associated with increased learning outcomes (Carini, Kuh, & Klein, 2006), and one approach to increasing student engagement, cooperative learning through small group work, is widely used at all levels of education (de Corte, 2004; Jenkins, Antil, Wayne, & Vadasy, 2003). For example in statistics education, benefits of group work include practice with statistical skills and communicating in the language of statistics (Roseth, Garfield, & Ben-Zvi, 2008). Since language is a primary tool for participation in group work (Lerman, 2001), students who struggle with verbal communication are less likely to benefit from group work (Webb, 1989, 1991; Webb & Farivar, 1994). Deaf and hard of hearing students report classroom communication in general as a challenge (Stinson, Liu, Saur, & Long, 1996). The difficulty with communication often leads to student passivity (Saur, Layne, Hurley, & Opton, 1986), with the result that deaf and hard of hearing students learn less than their hearing peers (Richardson, Marschark, Sarchet, & Sapere, 2010).

Add to this the inherent challenges associated with group work (Roseth et. al., 2008), including having one student performing most of the work or students working completely independently. International, first-generation Americans, and deaf or hard of hearing students may communicate more comfortably in a language other than spoken English. When such students are integrated into work groups within a classroom, the potential problems may be magnified. This paper examines two possible approaches to improving communication and student learning in groups where there is a mix of deaf or hard of hearing students and hearing students for whom English is their native language. The study is exploratory with the goal of identifying potential interventions for more intensive research.
Background

In the past 25 years, the number of deaf and hard of hearing students enrolled in postsecondary programs has increased dramatically. The most recent statistics available from the National Center for Health Statistics reported that there were more than 26,000 deaf and hard of hearing students enrolled in college and university programs in the United States in 1999 (Marschark, Lang, & Albertini, 2002). A majority of these students received their education in mainstream classes alongside hearing classmates (Lang, 2002; National Center for Education Statistics [NCES], 2000). However, recent statistics indicate that approximately 70-75% of deaf and hard of hearing students enrolled in postsecondary programs fail to complete them. This is more than twice the 30% attrition rate of hearing students (Marschark, 2007; Stinson & Walter, 1997).

Due to the presence of the National Technical Institute for the Deaf (NTID) on our campus, Rochester Institute of Technology (RIT) has approximately 500 deaf and hard of hearing students registered in “mainstream” RIT classes each quarter; that is, classes that are not strictly for NTID students and where the instructors do not teach using American Sign Language (ASL). Deaf and hard of hearing students often have poorer written English skills than their native English language hearing counterparts. Students who identify themselves as “deaf” may communicate through ASL and/or read lips and voice for themselves. Those who identify themselves as “hard of hearing” may use a hearing aid and/or FM amplification system, ASL, lip reading, or voice. Support for these students is most often provided through professional sign language interpreters and note takers in the classrooms. This arrangement, designed for traditional lecture courses, meets the minimum requirements by law in providing equal access to deaf and hard of hearing students. But with the introduction of active learning and group work in many courses, the model of communication only through a third-party interpreter has limitations, particularly in classes with a large percentage of deaf and hard of hearing students. Although one or two interpreters may be assigned to a class of 35 students, when there are more than two student work groups using mixed modes of communication, there cannot be an interpreter assigned full time to each group. In these situations, the interpreters will do their best to join groups when their support is requested but they cannot remain in one group for the entire class.

The solution used by some instructors is to place all of the deaf students in their own work groups. But this can place these students at a disadvantage, for they may all be relying on the note-taker’s notes which are not available until after class, and they may miss “overhearing” important information from other groups in the room (Powers, Gregory, & Thoutenhoofd, 1999). Student work groups have been shown to benefit from diversity within the group (Webb & Palincsar, 1996) – men and women, a variety of skill levels, and different backgrounds. By mixing deaf/hard of hearing and hearing students, we better mimic the working environment of the hearing world where spoken English is widely used and allow all students in the group to experience diversity and gain from it. For deaf and hard of hearing students in mainstream classrooms, participation is linked to academic success (Antia, Sabers, & Stinson, 2007). However, numerous challenges to communication exist in mixed groups of deaf/hard of hearing and hearing students (Stinson et al., 1996). For these groups, the communication and group activities are often slowed and, at times, the communication process becomes frustrating, lowering the morale and motivation within the group.

Although deaf/hard of hearing students do use interpreters to access the comments of hearing members, issues such as the processing time between when a hearing student finishes talking and when the interpreter finishes conveying the message frequently limit the deaf/hard of hearing member’s participation. Furthermore, observation of mixed groups of deaf/hard of hearing and hearing members indicates that in small groups, members often communicate directly with each other instead of through a service provider (Stinson & Liu, 1999). Unfortunately direct communication between deaf/hard of hearing and hearing students is often difficult and makes participation by all members of the group a challenge. This direct communication is difficult because the deaf/hard of hearing member usually cannot understand all of the spoken communication of the hearing members, the hearing members may not be able to understand the deaf/hard of hearing member’s speech, and the hearing members usually do not know sign language, which deaf/hard of hearing students often use to communicate. Furthermore, an interpreter is often not immediately available to assist all students (Stinson & Liu, 1999). For these reasons, it is important for educators to find better ways to support communication and learning when students with communication challenges and other students collaborate.
An RIT statistics professor and NTID researchers collaborated to develop intervention approaches with the intention of increasing the participation and learning of all students during group activities. The goal was to help groups work inclusively, quickly, and correctly, and to improve the students’ learning experience. This paper discusses the preliminary implementations and evaluations of two interventions—use of the existing classroom whiteboard and use of tablet PC’s. They were selected because they represent two kinds of possible interventions. The whiteboard is standard in many classrooms today and is therefore easily available to most instructors. It requires little or no training to use, no cost to the instructor, and no technical support; in short, it is extremely “low tech” and accessible. However, it is limited in its capacity to store and transfer information, and cannot be taken from the room upon completion of the group task. The tablet PC, on the other hand, is a more “high tech” tool. While now quite common on the campus, tablets are generally an individual tool and not configured as a visual way to share communication on a group task. The tablets used in this project include specialized software that allows wireless communication between students as well as the opportunity to share and save written work. These features enhance the usefulness of tablet PC’s in these settings but require money and training on use of the software. In short, each of the interventions has advantages and disadvantages.

Methods

The instructor introduced the interventions in two sections of the same algebra-based introductory statistics course at RIT; one in the 2007-2008 academic year, the other in 2008-2009. Both sections were taught by the same instructor and used the same material and group work format. Each section had 35 students, 10 or more of whom were deaf or hard of hearing. Each two-hour class session was divided into an hour for lecture to introduce a topic, followed by an hour of group work.

Group work consisted of a variety of activities, including skill practice, problem solving and concept discovery. The instructor circled the room, answering questions, and guiding groups of four students. The interpreters also circled the room to provide communication support where needed, most often following the instructor when she worked with a group that included deaf, and/or hard of hearing, and hearing students.

Students had to complete an individual copy of the day’s worksheet for their own records and submit a single group worksheet by the end of the class to be graded. Historically, group grades were very good for the worksheets, but when individuals asked questions outside of class, it was clear that not all students left the group understanding the material. A typical mixed-group had two deaf or hard of hearing students and two hearing students; the hearing students were all native English speakers and did not know ASL. The remainder of the groups consisted of all hearing students. Groups worked together for four weeks (until the first exam) without changes in group structure. Following the first exam in week 5, the instructor reassigned groups, placing students in the new groups to create a mix of student abilities based on exam performance.

After forming the new groups, the instructor chose two groups to use the whiteboard along with other communication methods (e.g. speech, use of interpreter, etc.) to work through problems and communicate with each other. An effort was made to select groups in which the preferred methods of communication were varied. Students in these groups were contacted by the instructor who explained the intervention to them and said they could be reassigned to another group if they preferred not to participate, emphasizing that there was no penalty for not participating. All but one student agreed to participate and this student changed places with a student in another group. The instructor provided the two groups with dry erase markers and a section of the classroom with a whiteboard, and encouraged them to use the board instead of their individual worksheets. This allowed all members of the group to clearly see the work-in-progress. While the instructor did not restrict students to only using the whiteboard for communication, this was the primary mode they used. Interpreters were available to assist these groups as requested. However, since these groups did have a communication resource available to them, they did not seek interpreter support as often as other groups. For the most part, the interpreter only worked with the whiteboard groups when the instructor was communicating with students in the group. A scribe within the group recorded their work for submission to the instructor, and the completed worksheet was scanned and emailed to group members after class. The whiteboard groups used this approach during weeks 5-6 of the course (four classes). After this period, they could choose to continue using the whiteboard, or return to working at a table.
After completion of the two-week whiteboard intervention, the instructor chose different mixed-groups to use tablet PC’s for working on assigned problems and communication, again contacting the students and noting that that participation was voluntary. The C-Print Pro software (National Institute for the Deaf [NTID], 2011) for tablets permitted students on multiple PC’s to view the group worksheet and to make contributions to the group work. They were also able to send the instructor the group worksheet electronically at the end of class, which permitted the instructor to provide feedback more efficiently and quickly. Students who were in these groups were required to attend a half-hour orientation period in which they received instruction and practiced using the tablet PC. Technicians loaded the group worksheet onto the PC’s before class. In one class session, each of the two groups of four students (two hearing; two deaf or hard of hearing) used a single tablet PC. The separate groups were not networked to each other. In the other session, one group used a pair of wirelessly networked tablet PC’s for a two-to-one student to PC ratio. Technicians provided support at all class sessions. Following each class session, the instructor reviewed and emailed the completed electronic worksheet to all group members. The PC groups used the intervention during week 8 of the 10 week quarter (two classes).

Members of the project team took turns observing the classes when the interventions were being used. They wrote field notes describing the interactions among students in intervention groups as well as the interactions in all hearing groups. Notes were used to document how students were using the whiteboard and computer tools. In particular, notes were taken describing how students used these tools to communicate with one another and to share their work in completion of assigned tasks.

At the conclusion of the interventions, the research team sent students from both the whiteboard and PC groups a follow up electronic survey. A week later reminders were sent to those who had not yet responded, resulting in a 100% response for both interventions (N = 16 responses for the whiteboard intervention and N = 12 responses for the tablet PC intervention). The survey questioned students on a range of topics, including how consistently they used the intervention, how they felt the interventions improved the learning experience, what they liked about the intervention, and what could be improved (see Appendix A for the whiteboard survey and Appendix B for the tablet PC survey). Students were also asked to identify themselves as deaf, hard of hearing, or hearing.

**Results**

Figure 1 (a - d) shows the response distributions for deaf/hard of hearing, and hearing participants using the whiteboard strategy over the two-year period. Because the number of participants is small in this study (2 hard of hearing, 6 deaf and 8 hearing), the responses of deaf and hard of hearing students were combined for analysis. In answering the question about communicating with other group members, hearing students more frequently gave “often” or “always” ratings, and deaf/hard of hearing students equally distributed their ratings among four of the five alternatives (“sometimes” to “always”). For the question about participation in group work, deaf/hard of hearing and hearing students most frequently assigned the “often,” rating.

All students thought the whiteboard helped them learn the material. However, the hearing students were more varied in terms of how much it helped (Figure 1c). Additional examination of the data (not shown in the Figure 1) revealed that students who identified themselves as hard of hearing on the survey were more positive about the intervention than those who identified themselves as deaf with respect to communication and participation. Most students (75% of both hearing and deaf/hard of hearing) were willing to try this strategy again; the remainder indicated that they might be willing to try again (Figure 1d).

The numerical survey data were also supported by students’ responses to the open-ended questions. Student comments on the surveys indicated that use of the whiteboard allowed more space for working through problems together, got individual members of the group more involved, and enhanced communication by making it more visual. Some examples:

“The fact that it led to open group discussion and it brought the group together as a team.” (Dennis, hard of hearing student)

“We could record what the other group members thought of solutions to the math problems and it helped me because it was a visual learning experience so it was very beneficial on my end.” (Dennis, hard of hearing student)
“One of things I like about using the whiteboard strategy was that I was able to see others work and understand the concept better related to the topic. For example, today we were working on hypothesis testing and I was able to see a group member solving problems on the whiteboard.” (Tom, deaf student)

“Using the whiteboard made working in the group a much more open experience, and people were more driven to pay attention and be involved with work. There were days when I didn’t feel very much like pulling my weight, but with the whiteboard, there was more pressure to contribute.” (Jane, hearing student)

“I prefer the whiteboard method because it was easier to understand our mistakes and see what the other groupmates felt about the answers or whatever that was written.” (Stacy, deaf student)

In 2007-2008, both groups who used the whiteboard elected to return to working at their tables without the whiteboard following the intervention. However, in 2008-2009, students in the intervention groups chose to continue using the whiteboard approach for the remainder of the quarter. In both years, most students felt that communication was quicker and easier with the whiteboard and that they learned more using this approach. Based on student suggestions from the first year, the option of using an overhead projector to cast the worksheet image onto the whiteboard, in addition to writing their work there, was added in 2008-2009. One whiteboard group chose to use this option, the other did not. The group that projected the worksheet onto the whiteboard felt that it helped to keep group members on the task at hand. As one student wrote, “Projecting on the whiteboard helped us all view the worksheet without going back and forth to our handouts.” Although the whiteboard approach seems to hold promise, it has its limitations. For example, all groups expressed concern that their work was visible to the
entire class and some complained that it took longer to complete the group assignment.

The tablet PC survey (Appendix B) followed the same format as the whiteboard survey, but used separate questions to collect feedback regarding communication with deaf group members and communication with hearing group members. Figure 2 (a - e) shows the response distributions for deaf/hard of hearing, and hearing participants using the tablet PC intervention over the two-year period. Students felt that the tablet PC helped to varying degrees in communicating with group members (Figures 2a and 2b). For hearing students, the responses were similar for communication with deaf as well as other hearing group members. Deaf and hard of hearing students felt that the tablet PC facilitated communication with hearing group members, but they were split about the effect on communication with deaf group members. Those students who identified themselves on the survey as hard of hearing gave the most positive responses, possibly due to a higher
level of comfort with written and spoken English (Stinson et al., 1996). The effects on student perception of participation and learning were varied with use of the tablet PC (Figures 2c and 2d). However, 66% of all the students indicated they would be willing to try this strategy again (Figure 2e).

In the first class session with the tablet PC, there was only one tablet PC per group, and a single member of one group “took over” the activity by writing all the answers and not showing the others. With two tablet PC’s per group, this did not occur. All students felt that group work was enhanced by using the PC’s. Comments included the following:

“[There was] more interaction among group members.” (Larry, hard of hearing student)

“That it helped us see and understand more clearly what was being written doing by the group members because in my case I couldn’t understand the hearing people half the time so it was very visual for me to learn and view the tablet PC, so therefore it was beneficial.” (Grace, hard of hearing student)

“When we used the tablet PC, I felt as though our group worked more as a team.” (Rita, hearing student)

“[The tablet PC’s] allowed the whole group to focus together on one thing.” (Patty, hearing student)

“I think it helped with the deaf peers because the whole group was focused on one worksheet and working together to finish it. I think that not having to fill out your own worksheet allowed for better team work. The tablet PC was useful in creating neat, accessible copies of each worksheet for each member.” (Patty, hearing student)

The learning curve for the technology – getting used to the slower writing on the tablet PC and, in 2007-2008, trial and error to determine the best format to email the completed worksheet – caused some frustration for the student participants, who wanted to complete the in-class work and get feedback as quickly as possible. However, use of the tablet PC did not leave the groups feeling as though their work was exposed to the rest of the class.

Discussion

Both the “low tech” and “high tech” strategies hold potential. The whiteboard approach was easier to implement, required no training, is portable to almost any classroom, and was favored by the hearing and hard of hearing students. With many groups in the class, there may not be enough room for all groups to use the classroom whiteboard. However, small whiteboards for each group may be a viable alternative, and might reduce or eliminate the student concern that others could see their work. Students liked the novelty of the tablet PC’s and the enhanced communication they provided. But this intervention was more difficult to implement, requiring access to the proper equipment and software, out-of-class training, and technical support. A “mid-tech” intervention, such as a smart board, was not available to the authors, but may prove to be another avenue for further investigation.

This study did not examine specific learning outcomes. This is a natural and necessary area for future research. Predictably, the small samples in this preliminary study did not show statistical significance. Use of larger samples will increase the power of these tests and provide more reliable measures to answer research questions. Although it has been suggested that deaf and hard of hearing students may not be comfortable using written English to communicate without an interpreter, written communication is a realistic alternative for work, school, and social situations. With the emergence of text messaging as a form of communication, many students are already comfortable expressing themselves using written messages and many deaf and hard of hearing students are enrolling in online courses where communication with the instructor and other students is text-based.

Research suggests that instructional improvements intended for a specialized group often benefit all students in the classroom (Pliner & Johnson, 2004). Hence, interventions to improve communication, participation, and learning for deaf and hard of hearing students may well serve hearing students. In particular, hearing students for whom English is a second language, who come from cultures in which communication norms are different than those in the U.S. or have challenges involving speech (i.e., students who stutter, have Tourettes, vocal chord injuries, paralysis, etc.) or social interaction (i.e., Aspergers) may benefit from alternative communication tools for group work.
Continued work will examine both “best practices” and “best practical practices” for instructors. Potential ideas include creating a whiteboard surface for some tables, or a lazy-susan whiteboard to allow students to rotate their work for sharing. Incorporating students into brainstorming sessions could generate additional ideas for using a whiteboard in a group work situation. Finally, assessing the technique with groups of hearing students will help determine if the whiteboard is truly a universal design tool.

Limitations of this Study

This exploratory work was conducted to examine the potential usefulness of two distinct tools for group work in mixed communication teams. The number of participants was small and the duration of the interventions was short. The small number of students required combining students who self-identified as deaf with those who self-identified as hard of hearing. There were differences between these two groups – the hard of hearing students tended to be more satisfied with the interventions than the deaf students – but with only two hard of hearing students using the whiteboard intervention and three using the tablet PC intervention, one could draw no conclusions from this finding. The PC groups had such a short time to learn and use the technology that it is difficult to know whether their responses were overly influenced by the normal frustrations that occur when there is a learning curve involved in using a new tool. In short, this project is intended to illuminate possible areas for further study.

Recommendations for Further Research

Further research is recommended to include larger numbers of students and longer durations for interventions. Additional measures to evaluate student progress with the interventions and learning outcomes should be incorporated into the research design. The potential for universal design applications deserve additional attention, also. That is, all students could be asked to provide anonymous information regarding their disability status to learn whether the interventions may be helpful to other special populations of postsecondary students.

This study focused on communication in mathematics workgroups where symbols are often the language of communication. It is recommended that other STEM disciplines be studied using these interventions, as well as the fields of social science and business. Most disciplines today employ team or group work as a strategy for problem solving in postsecondary education and in the workplace. Since both settings are crucial to long-term career success, it is suggested that research should be conducted in both settings to determine if tools developed for use in higher education could be applied in employment settings.

Some of the suggestions described above will be implemented in 2011-2012. The project team will study two sections of the same statistics course with the same instructor, materials, and group work format using a modified whiteboard approach. One section of the class will continue in the traditional manner (without communication intervention) while the other section will use whiteboards for all workgroups throughout the entire twenty-session course (including both mixed communication groups and groups comprised of only hearing students). In this study the whiteboards will be on the tables, eliminating student concerns regarding other students observing their work. The challenge will be to use the boards in a way that still enables students to view fellow group members’ work easily. This iteration of the project will include measures of learning outcomes as well as student surveys and class observations. The experimental design includes all students in two sections of the course, allowing us to examine the effect of the intervention for groups of hearing students as well as for mixed groups of deaf/hard of hearing and hearing students. In addition to hearing loss, we will ask students to self-identify any other disability, thus providing the possibility for comparisons among multiple types of student groups.

The tablet PC software team that participated in the exploratory studies will initiate a new project in 2011 to enhance the product’s ability to support deaf, hard of hearing, and hearing students in workgroups. This project will modify existing software (C-Print Pro) to support collaborative communication and learning of students. Features that the software may include will enable collaborating students to create, view, and save shared documents in text, graphical, or combined text-graphic formats. Collaborators will use two or more computers that communicate with each other in a wireless network. These students may be able to simultaneously view each other’s additions and modifications to documents. The tool’s software may also allow quick insertion of a variety of electronic media into the shared documents, including instructor-produced worksheets, and website pages. Students may also use, in addition to speech, sign, etc., a graphic- or
a text-messaging feature to communicate directly with each other. Thus, this approach, while having more technological requirements than the whiteboard, may give students a more powerful tool for communicating and working together. For example, students will have the capability to save work in electronic files in a manner that is not possible with the whiteboards. This project is starting with collection of extensive data from students and instructors regarding crucial features to be included in the enhanced software and will then develop and field-test these improvements in educational settings.

Clearly, RIT presents a rich context for studying academic interactions among deaf, hearing, and hard of hearing students. Few other postsecondary educational institutions have so many deaf or hard of hearing students. However, the interventions being developed for group work at RIT should work equally well in settings where there are only a handful of deaf students. In fact, they may be more crucial in these settings since the option of placing multiple deaf students in the same group to facilitate communication is rarely a possibility, and in rural settings it is frequently difficult to find fully certified interpreters. We hope that researchers at other universities may be interested in conducting research at RIT regarding applications of the tools we are developing and testing, and welcome contact from possible collaborators.

Conclusion

This exploratory study yielded interesting findings that need further investigation. Overall, the implication for educators is that we can improve the student experience (and possibly, learning outcomes) in collaborative work groups by providing alternative methods of communication. Portable whiteboards provide a simple, inexpensive method, and tablet PCs with special software may provide powerful tools, to facilitate such communication, encourage participation, and improve the learning experience for all students.

As educators, it is imperative that we continually explore instructional strategies that have proven benefits for student learning. Additionally, since most classrooms today are multicultural and include learners with a variety of learning styles and needs, it is important to study the potential of interventions for universal design and application. As a result, our future research will expand upon the exploratory work reported in this paper to document the impact of the whiteboard tool for all students, including those who are deaf, hard of hearing, or hearing, and will include tests to measure learning outcomes with and without whiteboard conditions for all students.

References


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Appendix A

Survey Questions from the Whiteboard Intervention

1. I am
   ___Deaf   ___Hard of hearing   ___Hearing

2. Our group used the whiteboard to do the group work during the time we were asked:
   ___Never   ___Sometimes   ___Half the time   ___Often   ___Always

3. I participated in the group work more because of the whiteboard strategy:
   ___Never   ___Sometimes   ___Half the time   ___Often   ___Always

4. The whiteboard strategy helped me to communicate more easily with other group members:
   ___Never   ___Sometimes   ___Half the time   ___Often   ___Always

5. The whiteboard strategy helped me learn/understand the material:
   ___Never   ___Sometimes   ___Half the time   ___Often   ___Always

6. I would use this strategy again
   ___No   ___Maybe   ___Yes

7. One of the things I liked about using the whiteboard strategy is…

8. One of the things I did not like about using the whiteboard strategy is…

9. Did using the whiteboard help you communicate with your hearing/deaf peers? Please explain your response.

10. You tried the whiteboard strategy and also, in the past you worked at the table without using the whiteboard.
    Which did you prefer? Why? How were these two strategies different from each other? How were they the same?

11. How could the whiteboard strategy be improved?

12. Any other comments?
Appendix B
Survey Questions from the Table PC Intervention

1. I am
   ___Deaf   ___Hard of hearing   ___Hearing

2. Our group used the tablet PC to do the group work during the time we were asked
   ___Never   ___Sometimes   ___Half the time   ___Often   ___Always

3. Using the tablet PC helped me to communicate more easily with other deaf group members
   ___Never   ___Sometimes   ___Half the time   ___Often   ___Always

4. Using the tablet PC helped me to communicate more easily with other hearing group members
   ___Never   ___Sometimes   ___Half the time   ___Often   ___Always

5. Using the tablet PC helped me learn/understand the material:
   ___Never   ___Sometimes   ___Half the time   ___Often   ___Always

6. I participated in the group work more because of the tablet PC technology
   ___Strongly Disagree   ___Disagree   ___Not Sure   ___Agree   ___Strongly Agree

7. I would use the tablet PC to do similar group work again
   ___No   ___Maybe   ___Yes

8. One of the things I liked about using the tablet PC is…

9. One of the things I did not like about using the tablet PC is…

10. Did using the tablet PC help you communicate with your hearing/deaf peers? Please explain your response.

11. You tried the tablet PC and also worked at the table without using the tablet PC. Which did you prefer? Why?
    How were these two strategies different from each other? How were they the same?

12. How could use of the tablet PC for the group work be improved?

13. Was it better to have two tablet PCs or one? What is the reason for your preference?

14. Any other comments?
Barriers to Participation of Women Students with Disabilities in University Education in Kenya

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Abstract
This paper discusses barriers to the participation of women with disabilities in Kenyan university education. While studies have shown that students with disabilities are increasingly enrolling in and completing university education, the number of women with disabilities in higher education remains low. This paper highlights the factors that contribute to this low participation in a Kenyan context. Among the factors examined are poverty, sexual abuse, discrimination, indifferent reactions, limited learning resources, and physical access. Recommendations for improvement are provided.

Keywords: Women, Disability, Kenya, Barriers, University/Higher Education

Research studies in Sub-Saharan Africa show that women continue to experience constraints in participating in postsecondary education. These constraints to educational achievement have subsequent implications on the individual development of women and the continent’s overall development. Educating women is considered key to human development. Education not only improves women’s earning capacity but also society’s general health and well-being. In spite of these realities of the importance of education for women, attaining gender equity in education in higher education contexts in Africa has remained a challenge. Gender inequities in higher education in Africa date back to the colonial period when establishment of universities was dedicated to the production of colonial subjects to inherit masculine and ableist structures put in place by the colonialists. These structures persist to date and as a result few women with disabilities in Africa have a high school or college diploma, let alone vocational training.

Background and Educational Policy Context
Until 1960, education in Kenya was offered to three distinct demographic populations: African, Asian and Arab, and European. The colonial government’s greatest interest was in educating the European and Asian populations and by the time of independence, educational infrastructure was more highly developed in these areas. At independence in 1963, the government sought to reform the education system to meet local needs. Different Commissions were established to chart the way for these reforms. For people with disabilities, three commissions in particular had significant implications for the education of students with disabilities. These were the Ominde Commission of 1964, the Kamunge Report of 1988, and the Koech Report of 2000. The Ominde Commission of 1964 sought to reform the education system and make it more responsive to the needs of the country. The Commission recommended measures to address the Government’s role in coordination and improve-
ment of service, quality, and delivery strategies in the disability sector (Ministry of Education, 2006). These recommendations set the pace for Government leadership in the provision and coordination of services to persons with disabilities and in the provision of technical, industrial, and vocational education for young adults with disabilities in Kenya. The Kamunge Report of 1988 focused on improving education quality and financing (Ministry of Education, 2006). The Report led to the introduction of the policy of cost-sharing between government, parents, and communities. This shift affected students with disabilities, especially those from poor backgrounds, because parents lacked the finances to support them. The Koech Report of 2000 looked into ways and means of enabling the education system to facilitate national unity, mutual social responsibility, accelerated industrial and technological development, life-long learning, and adaptation in response to changing circumstances. It also looked at the special educational needs of people with disabilities and ways of increasing their participation in day-to-day activities (Ochoggia, 2003).

The recommendations from these three reports prompted the Kenyan Government to recognize the existence of persons with disabilities among its citizenry (Ochoggia, 2003). Since then, considerable efforts have been made to increase government involvement and interest in the education of people with disabilities in the country (Ndurumo, 1993) but greater focus has been on primary education. Policies that address the educational needs of students with disabilities at secondary and postsecondary levels of education remain limited, showing that disability still occupies a low profile in Kenya’s higher education. This is not to deny the significant steps the country has made in addressing the needs of people with disabilities since independence, as seen, for example, in the passing of the Persons with Disabilities Act (PDA) - ACT NO. 14 of 2003. The argument is that more needs to be done, particularly in terms of enforcing these laws and policies in higher education contexts.

Persons with Disabilities Act (PDA) - ACT NO. 14 of 2003

The Persons with Disabilities Act (PDA) was enacted by the Kenyan parliament on December 2003. The Act seeks to provide for the rights and rehabilitation of persons with disabilities, with the ultimate goal of achieving equalization of opportunities for people with disabilities (International Labour Organization [ILO], 2004; Kenya Law Reports, n.d.).

The passing of the PDA in Kenya was a result of both internal and external influences. Internally, the various organizations for people with disabilities in the country advocated for their rights and a legal framework that defines those rights. Externally, the international Disability Rights Movement and passing of legislations in countries such as the USA had an effect. Organized advocacy for the rights of people with disabilities started to be seen in Kenya in 1964 when a group of people with disabilities spent a whole night camping outside the state house in Nairobi. They wanted the then president, Jomo Kenyatta, to intervene in their discrimination in society (Disability Rights Promotion International [DRPI] Africa, n.d.).

Beginning in the 1980s, disability activism in Kenya increased with corresponding global changes. African disability activists had been involved in advocating for the rights of people with disabilities since the historic advent of Disabled Peoples’ International (DPI) in 1981 (Wakene, 2011). Following the United Nations (U.N.) Declaration on the Rights of Disabled People in 1975, the Kenyan government declared 1980 the National Year for Persons with Disabilities. Awareness campaigns on disability were launched during that year and continued during the U.N. International Year, 1981(DRPI Africa, n.d.). In 1990, the Americans with Disabilities Act (ADA) became law. The ADA, which borrowed a leaf from the civil rights movement, provided comprehensive civil rights protection for people with disabilities. The ADA interprets disability discrimination as a civil rights issue and mandates equal opportunities and reasonable accommodations for disability difference (Kaplan, n.d.). The ADA influenced disability law and activism in several countries around the world, Kenya included. In fact shortly after its passing, the Attorney General of Kenya appointed a Task Force to review laws relating to people with disabilities in 1993. This Task Force presented a report and a draft Bill to the Attorney General in 1997. The draft Bill was signed into law [the Persons with Disability Act] in December 2003 (DRPI Africa, n.d.).

The Persons with Disability Act (PDA) prohibits all manner of discrimination against persons with disabilities (African Union of the Blind [AFUB], KUB & CREAD, 2007). In terms of education, Section 18 of the PDA stipulates that: (1) No person or learning institution shall deny admission to a person with a dis-
ability to any course of study by reason only of such disability, if the person has the ability to acquire substantial learning in that course; (2) Learning institutions shall take into account the special needs of persons with disabilities with respect to the entry requirements, pass marks, curriculum, examinations, auxiliary services, use of school facilities, class schedules, physical education requirements and other similar considerations (Kenya Law Reports, n.d). With respect to accessibility, Section 21 states that “... persons with disabilities are entitled to a barrier-free and disability-friendly environment in order to enable them to have access to buildings, roads and other social amenities, and [are entitled to] assistive devices and other equipment to promote their mobility” (Kenya Law Reports, n.d).

Since the enactment of the PDA in 2003, efforts have been made to enhance access to education for people with disabilities in Kenya, but there are still gaps. In education, the Act provides a very general explanation of the discriminatory practices that are not allowed and also calls for establishment of special schools and institutions for people with disabilities. Although these provisions are important, they can be improved further by identifying some key aspects that educational institutions, especially universities and colleges, ought to address to improve access to higher education for people with disabilities.

Moreover, while the PDA challenges discrimination in education, training, employment, and social participation, it fails to acknowledge the diversity among peoples with disabilities. The Act does not pay attention to how disability affects people in relation to factors such as age, gender, religion, or social economic background. In addition, and as Mugo, Oranga, and Singhal (2010) argued, instead of addressing education as a human rights issue, the PDA takes a charity approach. The Act states that the government should make provisions for assistance to students with disabilities in the form of scholarships, loan programs, fee subsidies, and other similar forms of support in both public and private institutions (Section 7). Though the right to admission in learning institutions is strongly stated in section 18 (1), the Act is silent on circumstances where such a person cannot afford the costs of education (Mugo et al., 2010). Thus, while there is an emphasis on admission, there are neither compelling directives for the universities to provide supports and accommodations for students with disabilities upon admission nor clearly spelled out procedures and consequences to ensure compliance. This leaves the quality and quantity of accommodations for students with disabilities at the discretion of the universities. Although the universities under study made attempts to develop procedures for ensuring compliance with the PDA, much of these efforts were a result of student and staff advocacy. One could argue, therefore, that the PDA lacks a strong implementation and evaluation framework (Mugo et al., 2010). The section that follows explains university admissions in Kenya.

**University Admissions in Kenya**

University education in Kenya is largely offered through public universities that have been established by Acts of Parliament. University education is also offered through private institutions with a charter (fully accredited), through private universities with a letter of Interim Authority, and through private institutions without a charter. Admission decisions concerning entrance into an undergraduate degree program in a public university are undertaken by a centralized body called the Joint Admissions Board (JAB) (Teng’o, 2003). The admission requirements for undergraduate programs are determined by the performance of students from year to year. However, the minimum requirement is an aggregate of C+ in the Kenya Certificate of Secondary Education (KCSE) examination or its equivalent. Applicants must also meet specific degree program subject cluster points. These entry requirements are the minimum and do not entitle an applicant to a place in a public university. Students who meet the aggregate grade set for that particular year get admission into university as “regular students” [also called JAB students] and are entitled to a student loan from the Higher Education Loans Board (HELB) of Kenya. Students who do not meet the aggregate grade set for admission for that particular year, or those who want to join university as mature entrants, have to do so as “self-sponsored students” [also called parallel or private students] and their tuition fee is higher. Students wishing to join university as mature entrants qualify for the HELB loans if they are below 25 years of age. If they are over 25 years, the university has to make a case for them for HELB loans to be granted. Some of the reasons offered during that advocacy include disability and low social economic status. The majority of students with disabilities do not qualify because of curriculum barriers, among other challenges (Mugo et al., 2010). Thus, they end up joining the university as parallel students [i.e.,
private] and pay higher tuition fee than students who have been admitted through other means.

**Women and Higher Education in Kenya**

Enrollment in Kenyan universities has been increasing since the establishment of the first university, the University of Nairobi, in 1970. Total enrollment in public universities rose from 3,443 students in 1970 to 142,556 (52,945 females and 89,611 males) in 2009-2010. Despite these increments, the sector is still faced with issues of access, equity, and quality (Republic of Kenya, 2005 cited in Lelei, 2005, p. 155). Girls and women continue to be under-enrolled at the primary, secondary and university education levels. This gender gap widens as women enter university (Institute for Economic Affairs [IEA], 2008).

Table 1 shows that a greater population of men than women was enrolled in universities in Kenya between 2004 and 2007. Some literature shows that female student enrollment is much higher in private universities, where their numbers are well above 50% of the student body (Chege & Sifuna, 2006; Lelei, 2005). Most of these women do not have disabilities and come from higher socio-economic backgrounds. Thus, they can afford to pay for their education (Kigotho, 2011). Moreover, higher admissions in private universities do not suggest that there are fewer barriers for women in Kenya’s private universities. The challenges are there but in most cases private universities offer admissions to students who may have obtained the aggregate of a C+ but did not meet the average grade set for admission to public universities during a given year. Chege and Sifuna (2006) also explained that the higher enrollment of women in private universities is a result of the fact that these universities offer more arts-based programs (Bachelor of Arts programs) and more women are likely to go into such programs, compared to those that offer math and science-based subjects.

Gender also determines who is given time and resources to gain educational skills and, as a result, participate in economic roles in the public sphere (Kiluva-Ndunda, 2001). Girls continue to be seen primarily as potential mothers with the major responsibility of childbearing and childrearing, while sons are seen as future heads of households and breadwinners. Economic difficulties combined with the implementation of structural adjustment programs (SAPs) in the 1990s have also undermined efforts to equalize educational opportunities in Kenya (Nyaigotti-Chacha, 2004). Women are not only poorly represented in higher education as students but also as workers (Kamau, 1996; Onsongo, 2006). The conditions are worse for women with disabilities who are rarely represented as academics let alone administrators. There is scant information on their participation rates in Kenyan universities both as students and as academics. What we know in general is that the enrollment of students with disabilities in Kenyan schools is low. For example, a report issued

<table>
<thead>
<tr>
<th>Enrollment</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>F</td>
<td>M</td>
<td>F</td>
</tr>
<tr>
<td>Primary</td>
<td>3,815.5</td>
<td>3,579.3</td>
<td>3,902.7</td>
<td>3,688.8</td>
</tr>
<tr>
<td></td>
<td>(51.6%)</td>
<td>(48.4%)</td>
<td>(51.4%)</td>
<td>(48.6%)</td>
</tr>
<tr>
<td>Secondary</td>
<td>490.5</td>
<td>435.6</td>
<td>494.2</td>
<td>440.0</td>
</tr>
<tr>
<td></td>
<td>(53%)</td>
<td>(47%)</td>
<td>(52.9%)</td>
<td>(47.1%)</td>
</tr>
<tr>
<td>Universities*</td>
<td>58.0</td>
<td>33.6</td>
<td>58.8</td>
<td>33.5</td>
</tr>
<tr>
<td></td>
<td>(63.3%)</td>
<td>(36.7%)</td>
<td>(63.6%)</td>
<td>(36.3%)</td>
</tr>
</tbody>
</table>

* (1) Kenyan students in national Universities and accredited Universities

**Notes:** Sources: Kenya National Bureau of Statistics (2007); Ministry of Education (2010)
by the Elimu Yetu Coalition (2007) revealed that approximately 25% of the 3.5 million people with disabilities in Kenya (out of a total population of 38 million) are school-aged children and youths. About 80 to 90% of this population does not receive any services to help them engage in education. Additionally, on average, children with disabilities go to school when they are older than their counter parts (eight years and above); they become adults before they complete their educational programs. Low enrollments of children with disabilities at lower levels of education in Kenya translate into their low access to higher education, especially for women with disabilities. It is against this background that the larger project on which this article is based sought to examine the experiences of women students with disabilities in university education in Kenya. This article focuses on findings relating to the barriers women with disabilities who are enrolled in universities in Kenya face in successfully participating in the education system.

**Theoretical Framework**

The theoretical framework informing this study was Goffman’s theory of stigma. Goffman posits that in every society some persons have greater power than others and that those with power generally impose their norms, values, and beliefs on those that are without power. Those with power (the non-disabled) set the standards that are to be expected of all individuals within a given culture. They also determine how each member of that culture is to be categorized (Becker & Arnold, 1986) such that if one does not concur with those standards, then that individual is perceived as being “deviant” (Goffman, 1963). Goffman identified three forms of stigma which act to mark the less powerful as “different”: (a) abominations of the body or various physical deformities, (b) blemishes of character or weak will, domineering or unnatural beliefs, values and attitudes, and (c) tribal stigma or race, nation and religion (see also Titchkosky, 2003). Each of these instances of stigma marks the individual who bears them as having “undesired differentness.” That individual, thus, becomes perceived as being “deviant” or not quite human (Goffman, 1963). These different forms of stigma show how stigmatization creates a shared, socially maintained, and determined conception of a normal individual (the normate), sculpted by a social group attempting to define its own character and boundaries (Garland-Thomson, 1997). Dominant groups construct stereotypes which stigmatize groups that they deem inferior and thus facilitate the exercising of authority over them (Goffman, 1963; Ainlay, Becker, & Coleman, 1986). This process also governs the treatment of people with disabilities in society. The dominant groups (who often happen to be the non-disabled) create standards, and those who do not fit those standards are seen as “different.” This “differentness” is abstracted or reinforced by stigmatization, and this stigma facilitates social influence and control. One will find stigmatizing terms such as ‘crip’ and ‘gimp’ and descriptors such as ‘victim’, ‘unfortunate’ and ‘helpless’ being used, wittingly or unwittingly, to reinforce the status of people with disabilities in society” (Tompkins, 1996, p. 38). These terms reflect the dominant group’s tastes, opinions, and idealized descriptions of what is normal (Garland-Thomson, 1997). Stigma, therefore, is a comparative or scaling tool that is used to construct “in” and “out” groups in society.

Although Goffman’s theory does not provide further explanations as to why society responds to people with disabilities in negative ways (Oliver, 1990; Titchkosky, 2003), his work still “underpins the nascent field of disability studies in the social sciences” (Garland-Thomson, 1997, p. 32). Goffman’s theory places disability in its social context in order to show that disability is a result of complex intersecting social and cultural relations. The theory provides an understanding of the ways in which power relationships between the people with disabilities and those without disabilities are structured. It underpins the ways in which those without disabilities construct those with disabilities as “deviant” by creating standard rules that render the latter as “outsiders.” Such domination limits people with disabilities’ access to wealth, power, and other opportunities in society. Goffman’s theory promotes a critical engagement with the relations of power embedded in societal institutions/structures that serve to reproduce and maintain social discrimination and inequities. Such a perspective is important in understanding the barriers women with disabilities face in Kenyan universities.

**Methods**

As already noted, the research findings reported in this paper are based on part of a larger research study that was conducted in Kenya in 2006. The study examined the experiences of women students with dis-
abilities in university education in Kenya. The goals of the study were to: (a) understand ways in which women with disabilities perceive their participation in university education in Kenya; (b) understand how disability impacts the lives and education of women with disabilities; (c) examine policy issues and generate recommendations for enhancement of inclusive practices in education, aimed at promoting access to higher education for women with disabilities in Kenya.

The participants were 20 female students with disabilities and four university officers drawn from two public universities in Kenya. The universities were selected based on their age, size, and availability of accessible transportation. The female students with disabilities who participated in this study had a range of disabilities (visible and invisible) and were either graduate or undergraduate students enrolled in the selected universities. The university officials interviewed had worked with students with disabilities in a university setting for at least one year.

Research participants were first recruited by contacting faculty known to the researcher in the selected sites and requesting them to assist in identifying potential interviewees, both students and university officers. Faculty were provided with copies of the research recruitment notices for distribution to potential study participants. Following these initial recruitment initiatives a few female students with disabilities came forward expressing interest in the study. After interviewing these initial women, the snowball sampling approach to recruitment was adopted henceforth (see Table 2). Participants were requested during the interviews or through informal conversations, to recommend other individuals who could be interviewed (Creswell, 2005; Trochim, 2002).

Data were generated through semi-structured interviews, document analysis, and a supplementary questionnaire conducted by the author. The goal of the supplementary questionnaire was to gather demographic data about the study participants and was distributed at the end of each interview. Semi-structured interview guides were used to interview the female students with disabilities and the university officials regarding their experiences, challenges, coping strategies, and policies relating to disability in the university. Documents including statements of philosophy, strategic plans, student and faculty handbooks, as well as websites of the universities in question were reviewed to examine the stated policies and support systems put in place to address the needs of students with disabilities. The findings from these documents were compared with information generated through the interviews regarding ways universities support students with disabilities.

Research interviews started with general discussions of daily happenings so as to create rapport with the interviewees (Bogdan & Bigden, 2006). The interviews then proceeded as conversations, although conversations with a “guided purpose or plan” (Najarian, 2006). This allowed for maintenance of some order in the interviews and facilitated asking similar questions of each respondent, while leaving room for the participants to discuss their experiences in their own way. Participants were also encouraged to talk about their personal biographies and experiences in order for them to have some control over what was discussed. This approach led to a deeper and more comprehensive understanding of their lived experiences (Vernon, 1996). Probes were used to elicit more information whenever participants raised useful points that needed further elaboration (Creswell, 2005). For instance, when students talked about challenges with the curriculum and accommodations, the author asked them to elaborate on those challenges. The interviews were tape recorded and later transcribed verbatim. Because of distance and communication limitations, member checking was not done once transcripts or initial thematic analyses. This was explained to the participants during the interview process and the participants consented.

Research data were analyzed qualitatively. Findings from document analysis and those from the interviews with the students with disabilities and university officers were triangulated to verify information provided during the face-to-face interviews. Triangulation was followed by a refocus in the literature for further analysis and interpretation of research findings.

Results

Barriers to Participation in University Education

The female students with disabilities interviewed for this study identified a number of obstacles that hindered them from successfully participating in university education. These were a blend of social, economic, cultural, and political factors. Specifically, they identified five categories of obstacles including poverty; risks of sexual abuse and harassment; discrimination; insufficient learning resources; and physical access, accommodation and transportation.
Table 2

**Female Students with Disabilities** [Note: All names used herein are aliases]

<table>
<thead>
<tr>
<th>Name</th>
<th>Age</th>
<th>Type of Disability</th>
<th>Self-Sponsored</th>
<th>Program of Study/Level</th>
<th>Marital Status</th>
<th>Name of University</th>
</tr>
</thead>
<tbody>
<tr>
<td>Afya</td>
<td>Mid 40s</td>
<td>Blind</td>
<td>Self-sponsored</td>
<td>M.A.</td>
<td>Married</td>
<td>Ongozi</td>
</tr>
<tr>
<td>Aminia</td>
<td>Early 20s</td>
<td>Physical</td>
<td>JAB</td>
<td>B.Ed.</td>
<td>Single</td>
<td>Khafee</td>
</tr>
<tr>
<td>Dada</td>
<td>Mid 40s</td>
<td>Physical</td>
<td>Self-sponsored</td>
<td>B.Ed.</td>
<td>Single</td>
<td>Ongozi</td>
</tr>
<tr>
<td>Dhabahu</td>
<td>23</td>
<td>Blind</td>
<td>Self-sponsored</td>
<td>B.Ed.</td>
<td>Single</td>
<td>Ongozi</td>
</tr>
<tr>
<td>Faizah</td>
<td>48</td>
<td>Physical</td>
<td>Self-sponsored</td>
<td>B.Ed.</td>
<td>Divorced</td>
<td>Ongozi</td>
</tr>
<tr>
<td>Fedha</td>
<td>Early 20s</td>
<td>Physical</td>
<td>JAB</td>
<td>B.A.</td>
<td>Single</td>
<td>Khafee</td>
</tr>
<tr>
<td>Feruzi</td>
<td>24</td>
<td>Physical</td>
<td>Self-sponsored</td>
<td>B. Comm.</td>
<td>Single</td>
<td>Khafee</td>
</tr>
<tr>
<td>Hereni</td>
<td>24</td>
<td>Physical</td>
<td>JAB</td>
<td>B.Ed.</td>
<td>Single</td>
<td>Khafee</td>
</tr>
<tr>
<td>Jamila</td>
<td>Mid 30s</td>
<td>Deaf</td>
<td>Self-sponsored</td>
<td>M.A.</td>
<td>Single</td>
<td>Khafee</td>
</tr>
<tr>
<td>Johari</td>
<td>23</td>
<td>Physical</td>
<td>Self-sponsored</td>
<td>B.A.</td>
<td>Single</td>
<td>Khafee</td>
</tr>
<tr>
<td>Karuli</td>
<td>22</td>
<td>Physical</td>
<td>Self-sponsored</td>
<td>Law</td>
<td>Single</td>
<td>Khafee</td>
</tr>
<tr>
<td>Lulu</td>
<td>44</td>
<td>Blind</td>
<td>Self-sponsored</td>
<td>B.Ed.</td>
<td>Married</td>
<td>Ongozi</td>
</tr>
<tr>
<td>Mkufu</td>
<td>23</td>
<td>Physical</td>
<td>JAB</td>
<td>B.Comm.</td>
<td>Single</td>
<td>Ongozi</td>
</tr>
<tr>
<td>Pete</td>
<td>34</td>
<td>Physical</td>
<td>Scholarship</td>
<td>B.A.</td>
<td>Single</td>
<td>Khafee</td>
</tr>
<tr>
<td>Shani</td>
<td>28</td>
<td>Blind</td>
<td>JAB (for undergraduate)</td>
<td>M.A.</td>
<td>Single</td>
<td>Ongozi</td>
</tr>
<tr>
<td>Yakuti</td>
<td>22</td>
<td>Physical</td>
<td>JAB</td>
<td>BScN</td>
<td>Single</td>
<td>Khafee</td>
</tr>
<tr>
<td>Zumaridi</td>
<td>Early 20s</td>
<td>Physical</td>
<td>Self-sponsored</td>
<td>B.A.</td>
<td>Single</td>
<td>Khafee</td>
</tr>
</tbody>
</table>

**Note1:** None of the study participants had psychiatric or learning disabilities. From my interviews with the university officers, they indicated that these students rarely come out because of stigma and also because they can easily pass unless one has close interactions with them. Efforts to recruit this group of students were futile.

**Note2:** JAB students are those who meet the aggregate grade for university admission set for a particular year and therefore get admission into university as “regular students.” They are entitled to a student loan from the Higher Education Loans Board (HELB) of Kenya.

**Note3:** Self-sponsored students may meet the minimum requirement for university admission in a particular year [i.e., an aggregate of C+ in the Kenya Certificate of Secondary Education (KCSE) examination or its equivalent] not the aggregate grade set for that particular year to get admission. They end up joining university as private stream students also called “self-sponsored” or “parallel” or “private” students. Their tuition fee is higher and they may not necessarily get HELB loans.
Poverty

Research shows that women and children with disabilities experience higher levels of poverty mainly because of structural inequalities in resource distribution (Barnes & Mercer, 2003). Consequently, girls and women with disabilities have limited access to education, especially in low income countries (UNESCO, 1995 cited by Barnes & Mercer, 2003, p. 144). Participants explained that poverty prevented most female students with disabilities from participating in higher education. Many of the women with disabilities in the university came from low socio-economic backgrounds and were self-sponsored students, meaning that they paid higher tuition fee, compared to students admitted directly through the universities’ joint admissions’ board (JAB students). Although they got government loans, the money was not enough for their fee, accommodations, learning materials, and general upkeep. Lulu, a visually impaired Bachelor of Education student from the University of Ongozi, explained:

Most of us come from very poor families, yet we come here as self-sponsored students, which means we pay more. Right now, private stream students pay over 60,000 shillings [about 600USD]. Imagine a person like me paying that much. I have a family and my three children also need school fees in high school and for other upkeep. The government just gives us that little amount which is not enough.

Poor students with disabilities face significant challenges meeting high tuition costs in Kenyan universities. These high costs are an additional concern to mature students with disabilities who have families to support. In Kenya, high school education is not free, students have to pay tuition and accommodation fees (for those in schools offering boarding facilities). Lulu’s concerns call for a review of the way higher education students in Kenya are supported. Without proper financial supports, many students with disabilities will not be able to attend university, even when they get admission as noted by Yakuti, a nursing student at the University of Khafee who has a physical disability:

There are many disabled students who I know got admission to come to university, but because their parents cannot afford the fee, they decided to take them to colleges, which are cheaper and which run two-year courses. Others did not even go to those colleges because of lack of money. Some come, but may end up dropping out, if they don’t get financial help.

Dhahabu, a visually impaired Bachelor of Education student from the University of Ongozi, narrated the problems she faced when she had not completed paying fees:

I haven’t cleared the fee... before you get an exam card you are harassed in the exam room to the extent that sometimes you even end up missing the exam. You are disturbed in accommodation, your door is locked in the room where you stay, your beddings are taken away and you sleep on a bare bed. ... Housekeepers come and say they have been authorized by the manager and they pick the beddings when you are there. You sleep on the bare bed until you pay; that is when they will return your beddings.

Here, Yakuti and Dhahabu are talking about the consequences of lack of finances on the part of students with disabilities once enrolled in university in terms of paying tuition, learning, and accommodation. This leaves them unsettled and therefore affects their learning.

Risks of Sexual Abuse and Harassment

The women remarked that the problem of sexual abuse and harassment affected the transition of girls with disabilities from high school to postsecondary education. As such, a majority of the women interviewed identified “dealing with men” as one of their biggest challenges in the university:

One of my greatest challenges is the men. Once the men realize that you have a certain problem, they will want to take advantage of your situation. So I have been very vigilant and I have been very aggressive, especially when I realize that that is the motive. So I put them off immediately. (Nadra - visually impaired, Bachelor of Education, Ongozi University)

In the above response, Nadra points to men’s tendency to think of women with disabilities as “easy subjects to prey on” (Wagner & Magnusson, 2005), a practice men see as part of exercising their masculinity (Weiser, 2005). Nadra learned to be firm and on
guard, and noted that, if she did not defend herself, there were chances of being abused and this would disrupt her education.

Dhahabu added that risks of sexual abuse and harassment created fear and insecurity in women with disabilities:

Sometimes you fear to walk around the university because there are so many things happening around you. You fear to walk alone because of fear of being raped and there have been some rape cases on campus. Or sometimes I am in the room alone and I find myself fearing that maybe if I open the door someone will get in and will start beating me at night or raping me. You just fear.

Dhahabu explained female students with disabilities’ feelings of insecurity on campus, especially at night. Although she did not provide succinct evidence of how widespread cases of sexual abuse and harassment were on campus, she showed signs of being worried about her safety in our conversations. When asked about measures taken to ensure safety on campus, one of the officers interviewed from the University of Khafee insisted that campus was very safe and shrugged off students with disabilities’ claims of possibilities of sexual abuse and harassment on campus. Such “politically correct” responses minimized the problem of abuse and left students with no clear understanding of measures to take to ensure their safety, hence their fears and concerns. As Wane and Opini (2006) argued, loopholes in school structures, administration, and leadership contribute to the increased cases of gendered violence in Kenyan schools. Serious concerns remain regarding the ability of women with disabilities and women in general to pursue their education and complete it in a risk-free environment.

**Discrimination**

Study respondents pointed to discriminatory experiences in student associations, leadership, in the classroom, and in familial contexts. Some of these discriminatory experiences were linked to age differences and to having a disability. Faizah, a Bachelor of Education student at the University of Ongoi with a physical disability, narrated how younger students perceived mature students when they initially joined university:

When we came, these young ladies and men (referring to JAB students) felt like we are invading their assets, we are not supposed to be here, we are supposed to be somewhere else - we should leave this compound for them. So they used to talk about old people, calling them names. But you find that when these young people go to class they are not serious with studies, because they don’t face the same level of problems, since they are being sponsored by their parents, and since they get HELB loans and are more comfortable. They even miss classes and go for outings, but when it comes back to class work and during exam time you find them panicking because they have not covered much and the old wazees (mature students) are relaxed. So when they realized the wazees are doing better than them, that thing stopped. Now they are friendly, they come to visit, borrowing stuff and we work with them very well.

Some students with disabilities come to university as mature students and this is challenging. Faizah illustrated how younger students tended to look down upon older/mature students. She pointed to rifts that occurred between the two groups when they first joined university. Those rifts narrowed following better academic performance by mature students, and due to the latter’s problem-solving skills and life experience.

The problem of discrimination also extended to student leadership and representations. Fedha, a Bachelor of Arts student from the University of Khafee who has a physical disability, revealed how students with no disabilities were reluctant to appoint students with disabilities as student representatives on claims that their impairment will deter them from performing their duties:

When it comes to representing others in the university, there are those disabled students who have been vying but I have not seen any of them being elected. It is like they are kind of discriminated against because you can find some posters like maybe someone has been told like you, you don’t walk, how will you run around and lead people when we are organizing for strikes? They even hold campaigns and talk like that.

Dhahabu equally explained how impairment was also equated to “not [being] a good student” especially
When lecturers required students to engage in cooperative learning activities:

When you are in a class and people are forming groups, discussion groups or groups to write some kind of term papers or even doing research on a certain question, some people tend to choose themselves and leave the disabled students alone. You find that in most cases disabled students are in one group. Some students are not willing to make a group with you because they claim that they will be going to the library alone to look for the relevant books and you won’t be there so there is not much help you will provide. They won’t accommodate you in their group.

All these narratives demonstrate the intolerance displayed by students without disabilities and their tendency to look down upon students with disabilities thinking that the latter are incapable of academic success. These findings call for a need to dismantle ableist gazes that are deeply entrenched in the students’ minds and in society as a whole.

Outside campus, students with disabilities also experienced discrimination from peers. One respondent explained how non-disabled peers tried to discourage her from pursuing university education while another one suggested that she go for surgical reconstructions to “normalize” her body:

Sometimes I could meet people who are very negative and they discourage me from continuing with school. When I was in Form One this lady wanted me to go do surgery so I could look more “normal” and yet I was not sick. But I didn’t give up. Although when it comes to doing stuff, we could do it slower and take much more time, but it is okay. (Mkufu – Physical impairment, Bachelor of Commerce, Ongozi University).

Mkufu’s experiences point to hooks’ (1992) observation that there is “power in the looks.” People with no disability are so caught up in a culture that emphasizes physical appearance as a form of cultural capital that whoever does not match up to those looks is compelled to conform to belong. Mkufu’s response also confirms Goffman’s (1963) assertion that the powerful in society set particular standards, such that those who do not meet those standards are considered “deviants” that need to be “normalized.” The lady assumed that there was something “wrong” with Mkufu’s looks, which translated into limited chances of academic success. Mkufu fell short of the idealized “normal” image and needed some fixing (Porter, 1997). Nonetheless, Mkufu chose not to conform to these physical ideals. She was contented with who she is and hence, challenged the stereotypical assumptions of “excellence” often reserved for non-disabled bodies.

Aminia, a Bachelor of Education student at the University of Khafee with a physical impairment, added that the “misreading” of the “disabled body” also occurs within families:

In our area there was this lady with a physical disability. Her parents are not very well off. She did not go to school, not even to nursery, but the parents took other kids to school. She died in 2005. They didn’t take her to school in the name of not having money but others were taken and they are now in fact working. Even the siblings who were working then did not support her; they didn’t appreciate the way she was. Both of her legs were paralyzed. She could not walk so she relied on people to move her around.

Aminia reveals the plight of a woman with a disability who was discriminated against within her own family and who could not get the required support to help her lead an independent life. Evident here is how families make choices in terms of who to invest in because they have expectations of returns of some kind, monetary or otherwise. Women with disabilities are disadvantaged as it is presumed that they may not contribute much in return (Kiluva-Ndunda, 2001).

Insufficient Learning Resources

Study participants reported a lack of resources such as consistent readers (for blind students), enough books, Braille materials, and sign interpreters for deaf students. For visually impaired students, the absence of reliable readers affected their successful participation in the learning process.

We could get readers at the beginning of the semester, volunteers could come - maybe five or six - but all of them are students and they also have their work to do. You could make a timetable with them but out of the five or six maybe only two may show
up, keep the time and come and read for us; so reading was a problem. (Afya – Visually impaired, Master of Arts, Ongozi University).

Visually impaired students had to deal with uncertainties when it came to accessing learning information that is in regular print. Since they relied on students to serve as volunteer readers, these readers got busy in the middle of the semester and failed to honor their volunteer commitments. This left students with disabilities stranded at times. Braille materials and books were also a huge problem as explained by Afya:

The college does not supply materials like Braille papers. One has to buy. I was taking religious studies and we wrote very many notes. So I was to spare maybe KShs. 2,000 for Braille papers per semester. If I did not have those papers, I could not write the notes. And also the fact that there were no Braille books was a challenge when an individual wanted to read and there are no readers to help.

The narratives above demonstrated that insufficient resources worked against women with disabilities’ learning needs and this compromised their overall academic achievements.

Physical Access, Accommodation, & Transportation

Participants from Khafee University described how their halls of residence were completely inaccessible and had no accessible washrooms. The same applied to the library, administrative buildings, and lecture halls:

The hostels have nothing like ramps or elevators. As I told you, even the accountant is carried up the stairs. The library used to have lifts (elevators) but they are not functional anymore. The classes are sometimes held in the lower buildings and others in the tall buildings over there which have no lifts either. (Hereni – Physical disability, Bachelor of Education, Khafee University).

Ongozi University respondents noted that their halls of residence were fairly accessible but there were some challenges that needed to be addressed, too. Dhahabu explained:

I think there is also discrimination in the hostels, like these ones for the ladies. The rooms that are reserved for the visually impaired or the disabled in general are now being given to these university students’ organization officials. So, visually impaired students who are supposed to be in single rooms, we are meant to stay two or three, like here it should be one person but we are two; room six is a [university students’ organization] official and they are not willing to come out; they should at least do something about it. And have you reported this to the dean of students or to any other official? Yeah, we have tried so much but they are not willing to come out, we don’t know what is happening up there [meaning administration].

There is favoritism in offering accommodation services. Students are put into hierarchies and those in positions of power (i.e., student union officials) are given preference when it comes to allocation of single rooms, which are meant to be reserved for students with disabilities. This shows how power operates at the expense of disability.

With regard to transportation, study participants from Khafee noted that there were no such services organized by the university, whereas those at Ongozi remarked that the university was trying, even though these services had been deteriorating over the years:

There is nothing like transportation for disabled students in Khafee. (Zumaridi- Physically disabled, Bachelor of Education, Khafee).

The tuk-tuks are very few, only two and we are about 50, so they cannot help all of us. They are not always there. They have been breaking down with no replacements because they say there are no spare parts in the market. Subsequently, they are not reliable that much, especially when going to class. (Dhahabu - Ongozi) - [Tuk-tuks are motorized rickshaws (three wheeler motor vehicles) commonly used as a mode of transportation (especially for taxi business) in India and Thailand. They are popular amongst tourists for their novelty value. Tuk-tuks are occasionally faster than taxis in heavy traffic as weaving in and out is easier, but generally about the same or slower (http://www.into-asia.com/bangkok/tuktuk/)].

In the above responses, participants are concerned
about lack of or continued deterioration of transport services for students with disabilities. It is clear that the universities have failed to make the institutions accessible to students with disabilities. During a discussion with one of the officials at Khafee University, she indicated that “no one really cared about students with disabilities” and that services such as transportation were not a priority for the university (Sauda – University Officer). This shows that the universities do not recognize that inaccessibility further disables students with disabilities (Holloway, 2001). It also shows how, within the universities, “physical access means provision of ‘minimum’ facilities rather than ‘optimal’ facilities which are required to enable students with disabilities participate equally in the learning process” (DES, 1984, p. 1 cited in O’Connor & Robinson, 1999, p. 92).

**Discussion and Conclusion**

This article has examined barriers to the participation of female students with disabilities in university education in Kenya. Study participants identified five categories of factors that limited their participation in university which included poverty, sexual abuse and harassment, discrimination, lack of sufficient learning resources, and a constraining physical environment. In spite of these challenges, the female students with disabilities in this study persisted. Many demonstrated that disability is not inability. Such a positive attitude and resilience is worth emulating especially by those thinking of furthering their education.

With regards to poverty, participants pointed to financial constraints and talked of the high tuition costs for self-sponsored students compared to regular students. The differences in fee charges have implications on transitions from high school to university, persistence, and completion rates on the part of women with disabilities. The introduction of the HELB loan programs by the Ministry of Education and scholarships in an attempt to assist needy students is to be hailed. However, policies governing the awarding of these loans and scholarships need to be reviewed. Students with disabilities incur additional disability-related expenses in their pursuit of higher education compared to non-disabled students. The ministry should take into account these additional costs and consider providing additional funding to enable these students meet their educational expenses with lesser strain. Additionally, there is the constituency development fund (CDF) which is supposed to assist students in need. Although students with disabilities applied for these funds, only a few were successful. The government should review the rules governing these funds to ensure that they more fully benefit deserving students, especially those with disabilities. Research should also be done to evaluate the successes and/or failures of the CDF in addressing the challenge of limited access to education due to financial constraints and explore the possibility of free secondary education. Future research should also explore possibilities of allowing students with disabilities to join university as JAB students as part of the affirmative action policy and assess the implications of such a move to both disabled and non-disabled students.

It is clear that disability discrimination persists not only in the university system but also in the Kenyan society as a whole. For example, having a disability and being older exacerbated the marginalization that respondents experienced. Younger non-disabled students found it a bit “odd” studying with mature students. What is happening in higher education institutions is a reflection of the wider society. Changes focusing on government and universities or other educational institutions alone are not sufficient. The problem of ableism should be redressed, starting at the family level, through disability awareness campaign programs and other strategies that debunk ableist ideologies and sensitize society that disability is by no means inability. Research examining how such campaigns can be implemented would be helpful.

The women also talked about inaccessible campus buildings and lack of transportation. They recommended a reevaluation of in-campus transportation so as to serve students with disabilities adequately. The slow response of the university to addressing physical access issues made these students feel that the university was neglecting them, putting the needs of students with disabilities as a low priority to the university, or unable to understand their needs (O’Connor & Robinson, 1999). These findings challenge the universities to look at improving physical access as an institutional responsibility.

Sexual abuse and harassment of women with disabilities needs to be addressed. Abuse leads to emotional distress, anxiety, and anger, all of which have implications for academic outcomes. Fighting this vice requires that universities develop a comprehensive
approach that takes into account the socio-cultural factors that contribute to sexual abuse. This approach must be supported by legislation and policies to protect women with disabilities and to ensure that their learning environment is risk-free. The women should continue taking precautions especially walking at night on campus and also pressure the university to offer walk-safer programs.

Additionally, research findings confirm that lack of sufficient learning resources affect the learning experiences of women with disabilities at the university. Efforts should be made to ensure there are sufficient library materials, accommodation services, curriculum, extra-curricular support services and other facilities. The university should also ensure that distribution of these resources is carried out in an equitable manner free of favoritism.

Lastly, this paper acknowledges the limitations of reflecting on the experiences of women students with disabilities who have been successful in attending university and who were able to stay in university and continue with their studies. This focus left out important voices of women who were perhaps unable or discouraged and, therefore, did not get to attend university or those who got into university and dropped out for different reasons. Future studies should consider including these women’s experiences, too.

References


**About the Author**

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PRACTICE BRIEF
Lessons Learned from a Disabilities Accessible Study Abroad Trip

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Abstract
In the summer of 2009, a two-week study abroad program was specifically designed and executed to include students with disabilities. Recruitment efforts resulted in 11 student participants, six of whom were identified as having a disability by the University’s Office of Disability Services. Students participated in a two-course academic program; one course took place on campus prior to the actual study abroad experience and included academic content to prepare students for the follow-up course. The second course entailed a study abroad experience in Switzerland. This article describes the lessons learned.

Keywords: Study abroad, accessibility

In an increasingly global world, study abroad programs and international education are seen as important offerings on university campuses. Each year, approximately 240,000 students study abroad (Blumenthal & Gutierrez, 2009). However, based on a review of the literature and reports from experts in study abroad programs and disability services (T. L. Kinsley, personal communication, August 12, 2009) opportunities for students with disabilities to participate in international educational experiences are limited.

Students with disabilities make up 11% of students enrolled at U.S. colleges and universities (U. S. Department of Education, 2006). A paucity of peer-reviewed literature exists related to students with disabilities participating in study abroad programs. This suggests that the practice of serving students with disabilities in study abroad programs is still in its infancy. Matthews, Hameister, and Hosley (1998) interviewed students with disabilities about their attitudes toward study abroad programming. Students indicated that “being part of a program for non-disabled and disabled students as opposed to one for students with disabilities” was the most important accommodation. McLean, Heagney, and Gardner (2002) reviewed the implications for international students with disabilities who studied in Australia and concluded that students with disabilities who wished to study abroad may receive some accommodation services, but they may be less than they are accustomed to receiving in the U.S. or Great Britain.

Limited programming for students with disabilities may occur for several reasons. First, it is unclear whether relevant disability laws require universities to provide accommodations abroad (Hebel, 2002). Another reason college students and other adults with disabilities may not travel is because of the additional challenges that must be negotiated (Jo, Koscuilek, Huh, & Holecek, 2004; Turco, Stumbo, & Garncarz, 1998). Daniels, Rodgers, and Wiggins (2005) studied leisure travel by people with physical disabilities and found that travel constraints and their negotiations were interrelated and ongoing, rather than hierarchical.

Course Description and Administration
In the summer of 2009, a study abroad program specifically designed to be accessible to students with disabilities was offered. The courses took place over seven weeks and included a 15-day travel-abroad component. The international education office was concerned that students with physical disabilities had been turned away by other campus study abroad programs because of a combined lack of accessibility...
in host countries and lack of willingness by faculty to explore and make accommodations for all students. The university’s international education office provided funding for a pre-course planning trip for the faculty, helped create brochures to recruit students, handled all financial issues associated with the study abroad program, and provided a general orientation for students enrolled in all study abroad programs occurring during the summer of 2009.

Special recruitment efforts targeted students with disabilities through the Disability Services (DS) office. They publicized the travel-abroad opportunity with posters and brochures for students who visited their office and sent an email to all students registered with DS promoting this campus’ first study abroad program designed for all students. As a result of the combined recruiting efforts of DS, the international education office, and the faculty, 11 students, six of whom were identified as having a disability by DS, enrolled. Students participated in two academic credit courses. The first was a five-week on-campus course that included academic content and preparation for foreign travel. The second follow-up course was the two-week study abroad experience in Switzerland.

**Students Enrolled**

Eleven students enrolled in the course. Six of the students were registered with and received services through DS. One of these students was blind; one was paraplegic and used a wheelchair; one was diagnosed with spinal bifida and used leg braces and a wheelchair; one had a psychiatric disorder and cerebral palsy, which caused hearing and balance impairment; one student, who was diagnosed with Neurofibromatosis, was deaf and blind and used a wheelchair; and one student had a visual impairment. The remaining five students did not have identified disabilities.

Ten of the eleven students were female. The students’ ages ranged from 17 to 61. All students were Caucasian. Nine students were enrolled at the authors’ campus and were traditional college-aged students. One student was a high school senior and enrolled in the class for credit and to be the personal assistant (PA) for a sibling who was also a member of the course. Another participant was a 19-year-old first-time college student planning to attend another regional university.

**Course Description**

The course was facilitated over two summer terms. The first five weeks of the summer course occurred on the home campus. Class was scheduled to meet four days a week for 105 minutes per day. The academic content of the course was delivered on Mondays and Tuesdays in a traditional classroom setting. Course content focused on self and society (social psychology), Swiss culture, basic lessons in German (to facilitate travel in Switzerland) and American Sign Language (to facilitate communication with a student participant), and preparations for travel. Additionally, an DS staff member led the class in an awareness and accommodation discussion about traveling with a disability or with a companion with a disability. As needed, students used classroom accommodations in order to assist them (e.g., adaptive technology, an assigned note-taker, and a sign language interpreter). Wednesdays and Thursdays were designed for students to become acquainted with each other and identify through experience the accommodations needed to travel in a group with people with disabilities. As such, students and faculty ventured into the community to participate in tourist activities which would provide a comparison for cultural and other travel-related experiences when in Switzerland.

In the second summer term, students traveled to Switzerland for 15 nights. Two faculty (one from sociology and one from social work) who taught the course content while stateside also traveled with the students to Switzerland. While in Switzerland, the group was based in Zurich and Lenk. This provided experiences in urban and rural settings. The course content focused on cultural comparisons of Switzerland and the U.S. Day trips to cities and destinations like Geneva, Luzern, Interlaken, the Jungfraujoch, Kandersteg, and Rapperswil provided the backdrop for cultural immersion experiences. The group variously lodged in a hotel, a sports/vacation center, and an urban scout lodge. Swiss Rail Passes provided nearly all forms of public transportation including trains, buses, trams, boats, and gondolas, all of which proved quite accessible.

**Methodology**

Leading a study abroad program that is accessible for students with disabilities is an emerging practice in international education and was a new study abroad opportunity at our university. As such, the faculty and
students charted new territory and learned many valuable lessons in the process of planning and execution. While the study abroad program was successful in many ways, this article will also report on some miscalculations and mistakes made in the piloting of this new type of programming.

Data were collected through several sources and are used to make recommendations. The first source was the authors’ notes from the trip. These included personal reflections as well as recorded comments from conversations with students. Further information came from a meeting that occurred 11 days after the students and faculty returned to the U.S. Questions about personal and professional growth were explored and students were asked for suggestions for improving the course and the study abroad experience. The notes taken by one of the authors during this session were reviewed for the writing of this paper. Third, information from the students’ final reflection papers was used to develop recommendations. Finally, this paper was reviewed by three students who participated in the study abroad experience. Their feedback was incorporated in order to assure that attitudes and opinions were correctly captured and accurately related.

**Lessons Learned**

The sentiment, “I had no idea what I was getting myself into” was expressed by nearly every participant. However, what students were “getting themselves into” varied widely based on their abilities and preparation for the study abroad experience. Some of the expressed concerns are universal to any student studying abroad, such as “being away from my friends and family,” “managing my money,” and “worrying about what to eat.” However, participants also expressed issues related to physical and psychiatric disabilities. Students with disabilities expressed a wider range of concerns, from being “accepted by others” to “medical issues” that occurred during the study abroad experience, compared to students without disabilities. Students without disabilities reported feeling unprepared to travel with people with disabilities and “being forced by guilt” to attend to or accommodate their needs.

**Pre-planning Improvements**

The most important lesson learned was that increased assessment of needs during the application process would have improved the ability to provide appropriate accommodations. A more thorough assessment would have created a better study abroad experience for all students. The only screening conducted by the faculty advisors was a 60-minute interview as a prerequisite for accepting students’ study abroad applications. It is typical for study abroad applicants at our university to meet faculty who are teaching the course and facilitating the travel. In this brief interview, students may have been overly optimistic about their ability to be an independent traveler. Likewise, the faculty operated from a strengths perspective and accepted students’ own personal assessment of needs. As this was the first trip of this type for this university, the protocol and application procedures were those designed for only able-bodied students. Mobility International (2011), however, provides guidance for students with disabilities who wish to study abroad. Accommodation forms and checklists are provided to assist in planning and preparation. The University of Minnesota’s (2011) Access Abroad organization shares information linking international education staff, DS staff, and faculty in order to facilitate successful international experiences for students with disabilities.

Ultimately, this underestimation of needs resulted in students’ under-preparation for the demands of travel on a study abroad experience. Students reported their independence in their home comfort zone. We did not take into account independence in the absence of parental assistance, familiar routines, or other stressors associated with travel. For example, because of familiarity, one student did not need physical description of the scenery or way-finding while on campus; however, in the unfamiliar surroundings of a foreign country and a new environment, that same student required verbal descriptions from fellow students of the setting and continual assistance in navigating pathways, buildings, and transportation. Further, a more comprehensive interview process could have identified potential resources in the university’s DS or other disability support agencies that could have enhanced a student’s study abroad experience. An example of a resource that DS could have provided was a hand-held, portable reader that could allow a student with a visual impairment to scan and magnify a brochure, sign, or menu. It may have been helpful to have a DS staff representative participate in the initial interviews. Short of that, DS professionals could provide a list of questions or an inventory tool regarding common daily-living skills likely in a travel or foreign environment that could be used to identify and accommodate individual student needs.
Two additional assessments are recommended. First, students who are served by DS should meet with DS personnel and the faculty advisors to assess how accommodations can be made to facilitate a safe and successful study abroad experience. One student with disabilities voluntarily coordinated a meeting with DS staff and her personal assistant (PA) in advance of the trip to discuss possible accommodations. This meeting led to appropriate accommodations that allowed the student to fully participate in the course. Reflections included, “I loved having my sister along. She made it possible for me to do everything.” The student’s PA added, “Since her [sister’s] diagnosis, we’ve been so focused on her medical care. It was fun to be together with [my sister] and the other girls to laugh and travel. It felt like we were normal again.”

Next, all students interested in the study abroad program should engage in a 24-hour, overnight weekend travel experience if possible to more accurately assess the realities of travel than we were able to do during the Wednesday and Thursday pre-travel course activities. This would allow participants to experience the demands of being away from home and traveling. Faculty often lack expertise in the areas of disabilities and accommodations and, as such, it is recommended that a member of the DS staff attend the weekend experience and contribute their professional insights to individual strengths and weaknesses. We suggest this take place six months before the travel-abroad experience and simulate an approximate level of stress of a typical study abroad experience (e.g., moving luggage, eating group meals, sharing close living quarters, having long active days, using public transportation, carrying a day pack, not having parents or their usual assistance/support network nearby). For example, a particular student struggled with personal care issues during the study abroad experience. She said, “How was I supposed to know I had to be responsible for all this stuff [e.g., cutting my own food, washing clothes, hygienic disposal of catheter supplies]. My mom always does that for me.”

Participating in the weekend experience would have brought such issues to light and allowed ample time for the student to learn a new skill or, if necessary, arrange to use a PA. Following such an experiential weekend, DS staff, the student, and the faculty could meet to discuss what accommodations or service could facilitate a successful study abroad experience.

Such a weekend is equally as important for the students without disabilities who will be participating in the study abroad program. For example, one student without a disability said, “I had no idea of all the things we had to think about when we travel with people with disabilities. I learned about the things I take for granted that might make it impossible for [students with disabilities] to participate.” Another reported, “I wish I would have known more about [student’s] disability. The things she did frustrated me, but then I learned more about why she did them. It did not bother me then… it made me more compassionate.” These quotes suggest that further pre-course content related to disabilities could enhance student learning, facilitate travel accommodations, and increase the awareness of others’ abilities and differences, all of which are goals of study abroad programming.

This weekend experience is not intended to screen or disqualify students but, rather, increase the awareness of appropriate accommodations needed to study and travel abroad. Requiring all students to participate in this practice travel experience would have the benefit of facilitating interpersonal connections, bonding, and team-building prior to the actual travel abroad-event. Disability Services staff who participate would bring an expertise to helping students evaluate their needs. Likewise, DS staff would be in a position to advocate for the student with the disability as some faculty may have little knowledge or experience of how to make appropriate accommodations. Efforts to keep the time and cost burden of such a weekend to a minimum should be made. This could be done by traveling to a city nearby, spending only one night in a hotel, and some creative financial support from a sponsor.

Based on the information gained from the facilitated meeting and the travel weekend, we recommend that faculty err on the side of caution and recommend that a student bring a PA if needed. In assessing the need for a PA, consider the travel destination and the anxiety that a foreign environment may cause. Students who may be independent on their home campus because of established routines and a support system should evaluate their independence based on the absence of those resources. Unlike the campus setting where students can test their abilities and independence by foregoing an accommodation, the study abroad experience may be logistically beyond the reach of timely intervention by DS staff and other support services. It would be better for a student to have an accompanying
PA and be able to test out the need for the amount and types of assistance needed rather than be without one and be unable to have a full learning experience, or, more significantly, experience medical consequences because of lack of appropriate assistance. Proactive work on the part of DS, the international education office, faculty, and students helps clarify needs and accommodations.

PAs are considered a “personal service” by universities and funding for them is typically a responsibility of the individual student. Case law has yet to clarify the extent of universities’ responsibility for providing accommodations while studying abroad. As such, students who need a PA to successfully participate in a study abroad program will be responsible for this cost. This essentially doubles the cost of a study abroad program. In the case of this program, it would have a combined cost exceeding $5,000 for the student and PA to participate. Universities are encouraged to consider the additional cost burden and seek funding sources to offset economic barriers. For example, our university sought and received foundation funding that was used for study abroad scholarships for students in this program. Additionally, students were encouraged to apply for other department and college study abroad scholarships and highlight the additional travel costs encumbered by a person with a disability in their applications. Two students received $1,000 each from such scholarships that were used to offset costs.

Pre-planning that Worked

The Office of International Education does several things for all students who participate in study abroad programs. It promotes study abroad programs and engages in recruitment efforts, processes payments for the program, and provides travel insurance. Additionally, it hosts a two-hour orientation related to studying abroad topics like personal safety, overseas laws, and the code of student conduct. None of the orientation content focused on traveling as or with a student with disabilities.

Some of the pre-planning done by the faculty was successful and aided students in having a safe and educational study abroad experience. This course was taught over two terms in the summer. Teaching the course over two terms was necessary to achieve course objectives and to prepare students for study abroad travel demands. The unique characteristics and accommodations needed by several of the participants required additional time and effort to build trust, interaction skills, and group cohesion. Students had to disclose personal information to the faculty members and their classmates in order to ensure a safe and successful study abroad program. Often, while abroad, the additional length of time it may take people with disabilities to complete daily living tasks, the slower pace of visiting tourist sites with a large group, and the logistical issues of wheelchair mobility reduces the time available to deliver course content while in the country. Course content was limited to experiential learning and connecting the experience to the information already learned in the first term course.

One of the best pre-planning activities was to invite parents to a class session to meet the faculty and other participants. All but one student brought parents to that orientation class. This gathering provided parents with assurance and reduced the level of anxiety about their son’s/daughter’s travel, as it opened lines of communication and allowed parents to learn about the course and faculty expectations. At such a meeting, it is recommended that faculty discuss policies and procedures related to phone calls and cell phone usage, medical emergencies and health insurance coverage, packing requirements, and the level of assistance that students can expect to receive from or render to classmates. Parents also shared planning tips with each other. One parent suggested that they work with their student’s doctor to provide medical records saved on a CD-ROM disk or pen drive data storage device, which the students could carry and provide to medical personnel in the event of an injury or health issue. Two other parents and students agreed and prepared a complete set of medical records and physician contact information. This measure eased student and faculty concerns about the “what if’s” of a medical emergency in another country. Mobility International (2011) and the University of Minnesota (2011) offer additional resources that may aid faculty and students and their families in developing contingency plans for medical emergencies abroad.

Conclusions

If universities believe that competing in a global world is important for students, then that commitment and opportunity must extend to and include students with disabilities. The authors believe that offices of international education, offices of disability services, and faculty members can successfully plan and execute...
meaningful and accessible study abroad programs. Comprehensive assessment of needs and time-intensive work with students before the study abroad experience will enhance successful programs. We must consider realistic accommodations within the context of the ADA, specifically the fact that the funding of personal assistants is not covered by DS and the added financial burden this may create for students with disabilities can make travel and study abroad prohibitive. Efforts should be made to share lessons learned with others who promote travel for students with disabilities. Doing so can help create more accessible study abroad programs for students with disabilities that have the potential to be unique, life-changing, and transformative educational experiences.

References


About the Authors

Sarah Twill received her BA degree in criminal justice from California State University, Fullerton and a MSW and Ph.D. from The University of Georgia. As a social worker, she has experience working with children with severe emotional disturbances, acting as the assistant director of a non-profit poverty outreach center, and working with individuals involved with the criminal justice system. She is currently an associate professor in the Department of Social Work at Wright State University. Her research interests include juvenile justice sentencing and programming and college student success. She can be reached by email at: sarah.twill@wright.edu

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PRACTICE BRIEF
Classroom Strategies for Teaching Veterans with Post-Traumatic Stress Disorder and Traumatic Brain Injury

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Abstract
Postsecondary institutions currently face the largest influx of veteran students since World War II. As the number of veteran students who may experience learning problems caused by Post-Traumatic Stress Disorder and/or Traumatic Brain Injury continues to rise, the need for instructional strategies that address their needs increases. Educators may unwittingly expose these students to uncomfortable or distressing situations. Equipped with basic knowledge about the brain and memory, college faculty can provide instruction and assessment in ways that allow all students in the classroom to feel successful, including “wounded warriors.” This article provides suggestions for research-supported strategies that postsecondary faculty can use to promote wider access for an increasingly diverse student population.

Keywords: Veterans, traumatic brain injury, post-traumatic stress disorder, classroom strategies, teaching, learning

Postsecondary institutions currently face the largest influx of veteran students since World War II, with over 564,000 veterans from the wars in Afghanistan and Iraq receiving educational benefits (Cook & Kim, 2009). In addition to the leadership and experience these students bring to the classroom, many must overcome the challenges created by post-traumatic stress disorder (PTSD) and traumatic brain injury (TBI) (Department of Veterans Affairs 2010). In a study conducted by the American Council on Education, veteran students reported problems meeting academic expectations while managing service-connected injuries, including bodily injuries, TBI and PTSD (Steele, Salcedo, & Coley, 2010). As Brunning, Schraw, and Ronning (1999) noted, “There are very few educational decisions to which the cognitive issues of memory, thinking, and problem solving are not relevant” (p. iv).

Many colleges and universities are rapidly adding new support services specifically geared to veteran students transitioning to academic settings, but these efforts need to extend into the classroom (Madaus, Miller, & Vance, 2009). Unfortunately, dismal graduation rates persist as these “wounded warriors” transition from military to civilian life on college campuses (National Survey of Student Engagement [NSSE], 2010). Equipped with the knowledge of the impact of PTSD and TBI on memory and learning, educators can incorporate teaching and learning strategies that will assist returning veterans with these disorders while meeting the needs of all students in the writing classroom.

Researchers have found a significant association between PTSD and impairments in cognitive functioning (Bremner, et al, 2003; Geuze, et al, 2007; Samuelson, et al, 2009, DeBellis, Hooper, Spratt, & Woolley, 2009), specifically with tasks requiring attention, verbal memory, and new learning even after controlling for IQ and attention deficits. In a meta-analysis of 32 prior studies examining PTSD and verbal memory, Johnsen and Asbjørnsen (2008) found that PTSD and impairment in verbal memory are strongly associated, particularly in the population of war veterans. In 2009, Johnsen and Asbjørnsen studied the role of encoding strategies in learning new material in patients with PTSD and found evidence of impaired use of organizational strategies, suggesting that the disorder interfered with executive processes used while learning new material. The researchers suggested that specific interventions geared towards these verbal memory impairments may provide veterans with a better educational prognosis.
In addition to problems caused by memory and learning impairments, traumatic brain injuries (TBI) can cause physical, perceptual, and sensory difficulties that present uniquely for each individual (Church, 2009). Vision may be reduced, hearing impaired and coordination loss experienced -- all creating a unique set of challenges for veterans in a traditional classroom setting. Again, research has indicated cognitive interventions utilizing memory strategies focused on attention, encoding, storage, and retrieval, as well as environmental accommodations within the classroom, increase academic success (Barker-Collo & Feigin, 2008; Church, 2009).

Research indicates that ineffective learners benefit from instruction on strategy use (Ceci, 1987; Harris & Qualls, 2000). Furthermore, studies indicated strategy instruction benefits all students in the classroom (Pressley & Harris, 2008). In the past, research focused primarily on memory strategies using mnemonics, a system of elaborate encoding and memory traces used to add information to a set of to-be-remembered facts (Ceci, 1987; Sharifian 2002). Additionally, empirical support has been found for the “generation effect” in which students experience increased recognition and recall of learned information when they develop their own strategies (Kinjo & Snodgrass, 2000; Moshfeghi & Sharifian, 1998; Sramecka & Graf, 1978; Snodgrass & Kinjo, 1998). More recently, research has focused on elaborative self-generated strategy use to improve memory for patients who experience brain disorders such as TBI. Chiavaralli and DeLuca (2002) identified improved performance of tests of recall and recognition with self-generation of verbal information. Building on elaborate self-generation, Active Learning strategies is an instructional approach that encourages students to create personal connections to new material that increases retention of material frequently addressed in postsecondary disciplines (Odem, Glenn, Sanner, & Canella, 2009).

Classroom Applications

The physical layout of the classroom can play a large role in any student’s learning experience, exponentially so for veteran students. PTSD and TBI contribute to a “sensitized hyper arousal response” (Perry, 2001) where an extreme bodily stress response results from a generalized reminder of the initial traumatic event often referred to as a “trigger” (Schor, 2002). When a veteran diagnosed with PTSD becomes triggered, his/her body’s stress system reacts as it has been trained to do in the past in order to survive. After repeated exposures to extreme stress, the body no longer requires the full onset of a traumatic experience to develop the “fight or flight” response. It may simply take a reminder of the original traumatic experience to have a full-blown stress reaction. The body reacts in survival mode – primed and ready to run away or fight off the attacker. Blood is pumped away from the brain and into the major muscle groups. These reactions can significantly impede the student’s ability to learn (Nijenhuis, Van der Hart, & Steele, 2004; Schore, 2002; Perry, 2001; Perry, 1997).

Holding this extreme physiological reaction in mind, the physical experience of the classroom itself may be a potential trigger for a returning veteran (desks crammed together or student backpacks, books, and personal belongings block the aisles, etc.). This situation can prevent a quick exit and trigger an extreme stress response in veteran students. In a war zone, blocked pathways could mean potential death for a soldier needing rapid escape from enemy fire. To clear aisles, ask students to store belongings beneath desks or behind the instructor’s podium or desk. Many schools employ a safety officer responsible for ensuring safe egress from classrooms and hallways. If possible, enlist the help of the safety officer to help structure a safe classroom. Additionally, the experience of loud, sharp noises or aggressive and domineering body movements could trigger veterans with PTSD or TBI. Notify students before making loud noises or sudden movements when possible. If it is necessary to physically touch a student, always ask permission first. For example, “May I touch your arm in order to demonstrate the correct way to handle that cuvette?” Avoid hovering above a student sitting in a desk. Either squat next to the desk or roll a chair next to the desk. Lighting may also trigger stress responses or overload sensory responses in students with an injured brain. Consequently, an educator should avoid leaving the classroom in complete darkness.

Another consideration is assigned student seating, which may interfere with learning for veteran students. Assigned seating can position a veteran in a seat where he or she feels exposed and unsafe. A veteran student might also experience hearing or vision impairments (Church, 2009) that require preferential seating. Allowing freedom of choice in seating avoids potential problems. Additionally, the educator should explicitly
note at the beginning of the semester that, if a student needs to leave the classroom, he/she may simply do so. Reading body language for obvious signs of stress can prove to be a useful skill for any educator. Upon detecting signs of stress, the educator may move quickly to diffuse the situation by redirecting the classroom discussion or altering the activity. As noted in, From Soldier to Student (Cook & Kim, 2009), very basic training can be provided to faculty as professional development to provide a “veteran friendly” environment. Providing a calm and comfortable classroom environment helps all students focus on learning and academic success.

**Academic/Content Strategies**

Research on learning and cognition suggests that instructors can utilize self-generated learning strategies to better aid the process of encoding new learning into long-term memory for effective recall (Lengenfelder, Chiaravelloti, & DeLuca 2002). Activating prior knowledge before introducing a new concept or reading allows students to generate ideas from their existing body of knowledge. The self-generated knowledge allows the student to create a “hook” on which to hang new information. Retrieval clues help categorize the placement of the new information in the student’s long-term memory, enabling better access to the material (Pressley & Levin, 1987; Vallar & Papgno, 1996; Sharifan, 2002). Experiential learning “hooks” new material for storage by pairing the new learning with a project related to the concept or by physically visiting the location, either by a field trip or a multi-media visual experience (Washbourn, 1996) (See Appendix C).

Veterans may experience problems learning new information due to memory, visual, or auditory problems. It becomes important to add auditory and visual stimuli to important information. In an era of readily available internet video, tidbits of visual stimuli are easy to add to any lesson. If discussing methods for planning a written assignment, present a video of a student utilizing a graphic organizer to plan the compare and contrast essay. Textbook publishers provide multimedia resources for instructors including short instructional videos, graphically interesting PowerPoint presentations that incorporate audio narration, and podcasts that assist auditory learners (See Appendix A). These formats are easily uploaded to Blackboard and other course-management platforms or academic classroom websites. Software programs allow students to generate mind maps, concept webs, and graphic writing planning maps (See Appendix B). Graphic organizers assist students with note taking, organizing information, connecting information to self and procedural directives by visually presenting information in a hierarchical fashion (Dye, 2000). Researchers have indicated that both technology use and graphic organizers assist students with TBI (Arroyos-Jurado & Savage, 2008). Educators can use graphic organizers tailored for specific use in the classroom. For example, writing instructors can create a partially filled-in reading guide that requires the student to add specific material found in the text or ask students to create their own using a software program (See Appendix B).

Evidence also suggests classroom assignments connected to daily life enhance student interest and comprehension (Odom et al, 2009). Again, this instructional approach provides a “hook” all students can use for new learning and memory encoding. Allowing students to choose topics of interest encourages more engagement throughout the research process. A service learning component can put student driven-research to work, helping the community or campus (See Appendix C).

Due to problems with executive processes (Johnsen & Asbjørnsen, 2009), recalling rules for writing or decoding may be difficult when writing lengthy papers. Students with PTSD or TBI may have difficulty correctly formatting written language. This problem also applies to remembering assignment instructions and formatting requirements. While students may understand an assignment on the day it was given, they may have problems remembering the steps or procedures for completion several days later (Arroyos-Jurado & Savage, 2008). Providing step-by-step directions and task lists can help not only students with PTSD or TBI but all students in the classroom reorient themselves to assignments while working independently. Creating a series of deadlines for smaller chunks of a large writing assignment helps students organize their tasks without facing the sometimes daunting challenge of writing a 10-page research paper. For example, the research question and keywords first, the working source list second, followed by the thesis statement and planning document (See Appendix D). Each step constitutes movement toward the complete assignment, helping students who find themselves paralyzed by large tasks.

An instructor’s assessment strategies might require re-evaluation in regards to returning veterans with PTSD or TBI. While asking students direct questions
during class can promote learning, questioning students in this spontaneous manner might cause extreme stress for individuals with memory problems or anxiety issues. In order to facilitate classroom discussions, students can take notes using graphic organizers (See Appendix B) that facilitate greater critical thinking about the readings being discussed. Students can use such a form to take notes about items they wish to discuss further, question, or comment on during class. During discussions, students then have a visual prompt for the points they wish to make. Alternatively, digital audio recorders allow students to record lectures and discussions to cue later reminders. Instructors can also provide students with specific questions about the topic or concept that will be discussed during the next class meeting (See Appendix C). The questions serve as a pre-reading activity and aid the student’s preparation for classroom discussions.

Conclusion

Equipped with basic knowledge about the brain and memory, college instructors can provide content and assessment in ways that accommodate the needs of an increasingly diverse student body, including the growing number of veteran students with PTSD and/or TBI. Unfortunately, many veterans experience difficulty transitioning back to civilian life. A variety of decisions and practices can help educators create a learning environment that is believed to help “wounded warriors” as they begin or renew their postsecondary experiences. Successful adaptation of both the physical and cognitive aspects of the classroom experience can be of great assistance to many students, including returning soldiers.

References


### About the Author

Jennifer Blevins Sinski received her BA degree in liberal studies from Bellarmine University, an MAT in Education/Special Education from Bellarmine University, an MA in English Literature from Murray State University and has been accepted in the PhD in Applied Sociology program at University of Louisville. Her experience includes teaching high school students with learning and behavioral disorders. She is currently an instructor in the Department of English at Elizabethtown Community & Technical College and teaches a course on the Impact of Trauma on Development at Bellarmine University. Her research interests include the impact of trauma and PTSD on learning. She can be reached by email at jsinski0001@kctcs.edu or jwilliams@bellarmine.edu
Appendix A

Free Multimedia Resources

**YouTube** (www.youtube.com)
Many videos and video clips that can be used for instructional purposes

**TeacherTube** (www.teachertube.com)
Videos and clips; many other instructional tools, as well.

Up-to-date news and lesson plans

**Atomic Learning - Windows Movie Maker 2 Training** (http://www.atomiclearning.com/moviemaker2)
Tutorial series on Windows® Movie Maker 2. Windows Movie Maker 2 lets you create, edit, and share your movies on your PC.

**Windows Live Essentials: Photo Gallery** (http://www.microsoft.com/windowsxp/using/digitalphotography/photostory/default.mspx)
Create slideshows using your digital photos.

**Audacity, Free Cross-Platform Sound Editor** (http://audacity.sourceforge.net/)
Audacity is an easy-to-use audio editor and recorder for Windows, Mac OS X, GNU/Linux, and other operating systems.

**Skype** (http://www.skype.com/)
Use Skype to bring guest speakers into the classroom without any travel arrangements.

Podcasting information and tools.
Appendix B

Graphic Organizer Resources

**English Companion - Tools for Teachers** ([http://englishcompanion.com/classroom/notemaking.htm](http://englishcompanion.com/classroom/notemaking.htm))
Graphic organizers for notetaking, reading comprehension, and the organizer I use for discussion notes - available free.

Inspiration software for creating graphic organizers, mind maps, writing process planning.

Helps you create process flows, organization charts, network diagrams, and technical drawings.

**Mindomo** ([http://www.mindomo.com/](http://www.mindomo.com/))
Mindomo is a versatile Web-based mind mapping tool.
Appendix C

Active Learning for the College Classroom

California State University - Active Learning for the College Classroom
(http://www.calstatela.edu/dept/chem/chem2/Active/)
Links to activities, lesson plans and assessment.

Penn State - Schreyer Institute for Teaching Excellence
(http://www.schreyerinstitute.psu.edu/Tools/Rubric/)  
Links to rubric makers and ready-made rubrics for many types of writing and presentation assignments.
Appendix D

Isearch Essay & Digital Narrative Project Checklist
(Created by Jennifer Blevins Sinski)

Name: ________________________    Days: _______      English 102

Essay #1 - How I chose my topic, what I already know about my topic, what I want to learn about my topic, my specific research question/statement, and possible search terms and locations for informational sources. See Essay #1 Detail Planning Sheet Detail Planning Sheet & grading rubric. Don’t forget to collect digital images, screen shots and/or video along the way.

Peer Review #1 – 10 pts – Due: __________ Use checklist #1
Peer Review #2 – 20 pts – Due: __________ Use checklist #2
Submit for grading – 100 pts: ____________ After grade is received, may revise and resubmit

Essay #2 - Write a composition describing your research process; in it you will address the following topics - List and describe the sequence of steps in your search. Analyze problems in locating information and your response to these problems. Describe breakthroughs—when the research really got interesting. Describe the best sources of information for your topic. Write about how you changed, expanded, or revised your research question/ statement. Acknowledge others who helped you carry out your search. See Essay #2 Detail Planning Sheet & grading rubrie. Don’t forget to collect digital images, screen shots and/or video along the way.

Peer Review #1 – 10 pts – Due: __________ Use checklist #1
Peer Review #2 – 20 pts – Due: __________ Use checklist #2
Submit for grading – 100 pts: ____________ After grade is received, may revise and resubmit

*** You may begin recording your completed essay #1 & 2 for voice over narration – See me to check out headphones/microphones. See Moviemaker/Audacity tutorials.

Essay #3 - Write a composition comparing what you thought you knew and imagined with what you actually discovered and offer some personal commentary and/or draw some conclusions. See Essay #3 Detail Planning Sheet & grading rubric. Don’t forget to collect digital images, screen shots and/or video along the way.

Peer Review #1 – 10 pts – Due: __________ Use checklist #1
Peer Review #2 – 20 pts – Due: __________ Use checklist #2
Submit for grading – 100 pts: ____________ After grade is received, may revise and resubmit

*** Finish recording your completed essay #3 for voice over narration. – See me to check out headphones/ microphones. See Moviemaker/Audacity tutorials.

Create Movie – Using moviemaker, combine audio with visuals to create final movie.
BOOK REVIEW

Rebecca Daly Cofer
Abraham Baldwin Agricultural College


In a crowded room, filled with people from diverse backgrounds ranging from parents of students with disabilities to professionals like myself and my colleague, Temple Grandin walked up to the podium and began to speak about her experiences as an individual with autism. Midway through the lecture lunch, plates began clinking and utensils started to drop. It was at this point that the audience realized that Grandin was a very high-functioning person with autism, but that her autism still affected her every day. Unable to concentrate due to the background noise as waiters picked up plates, Grandin’s personal assistant made a very specific noise to focus her on the speech she was trying to give. Although I knew that this invited speaker at a Texas Tech University presentation had autism, I did not fully appreciate what it meant for her on a daily basis until this precise moment.

In her recently revised book, *The Way I See It*, Temple Grandin plainly states, “I think it is OK to be eccentric” (pp. 282). However much she has worked to fit in to what she refers to as a “neurotypical” society, Grandin still exists in the world as a person with autism. In her very personal memoir, Grandin does not apologize for her disorder. In fact, she credits much of her professional success to autism, stating that we should not “limit the lives of these children and adults by our own preconceived notions based on the label” (p. 10). I believe that *The Way I See It* proceeds in very much the way that Grandin’s mind works. She orders her chapters by categories and then subcategories within these. While the book appears to be a personal account of her experiences through diagnosis and adulthood, the text really serves as an excellent resource for the field of autism.

Chapter topics range from a lengthy discussion of nonverbal autism to alternative medicine to treat the disorder. Although I savored the tiny personal details Grandin offers while reviewing a slew of autism research and information, I largely found this text to be a tool for my understanding what a person with autism lives with every day. One chapter that is extremely important to the field and changed my opinion on disabilities is Chapter 4, “Understanding Nonverbal Autism.” In this as in many other chapters, Grandin recommends specific texts for further reading. She repeatedly refers to Tito Mukhopadhyay’s *How Can I Talk if My Lips Don’t Move*. Not only did I enjoy reading another autism account, I appreciated the references to further understand this disorder.

The reader encounters many of Grandin’s own hard-held beliefs in regards to disabilities. In terms of nonverbal autism, she is of the firm opinion that the inability to speak does not necessarily limit a person’s ability to understand. Having seen her speak in October of 2008, I knew as I began to read this book that her opinions would be direct and honest. This chapter on nonverbal autism truly reflects her unvarnished passion. She writes in Chapter 4, “As a society, we equate intelligence with language. Smart people are verbal people… People who can’t use language well are perceived as dumb” (p. 109). Even for those who may disagree with such ideas, Grandin’s book is a good resource for those working in the field to become aware of such opinions. This chapter definitely altered my perception of nonverbal people with a disability.

Beyond offering her opinions about various topics within the field of disabilities, Grandin’s text also presents tips for those working with people with autism. One chapter deals specifically with Autism/Asperger’s culture. Within this and many other chapters, she offers pragmatic insights and practical advice, even going so far as to cite some of her own life lessons. Struggling with personal hygiene issues, Grandin recounts the time her boss handed her a bar of soap and told her
that she stunk. Although upset at the time, she states, “Today I thank that boss for forcing me to change” (p. 281). In what seems like a politically correct world, Grandin challenges those with autism and Asperger’s to understand that change may be required in order to succeed. Her genius is the brutal honesty with which she offers advice in this book. She argues that the current trend for discipline and child-rearing is a bad thing for those with autism. She recalls, “Adults in the world of my youth…believed in a stricter social behavior code than do adults in today’s world” (p. 139). Many of her opinions in this book center on the fact that her success as an adult with autism is because of the normalcy and structure forced upon her as a child.

Although much of The Way I See It covers the research and biology behind autism and Asperger’s, Grandin’s anecdotes and honest opinions lighten the text and allow it to take on a more personal tone. Many of the opinions Grandin offers in this book may not be popular, but her views are refreshing in a way that someone who does not have the disorder may not be able to match. She knows the negatives of her disorder, but also offers hope to those on the spectrum. In an interview with Dr. Tony Atwood, Temple explains the duality involved in the diagnosis of autism. When asked about the historic prevalence of autism and Asperger’s, she explains:

It’s a continuum - there’s just no black and white dividing line between the computer techie and say, an Asperger’s person. They just all blend together. So, if we get rid of the genetics that cause autism, there might be a horrible price to pay (pp. xxxii).

Temple Grandin’s The Way I See It is an honest, well-researched text for anyone inside or outside of the field wanting to delve deeper in to the minds of people with autism to develop a better understanding of how they view the world.

About the Author

Rebecca Daly Cofer received her BA degree in English and History from Virginia Tech and MA degree from Virginia Tech. Her experience includes working as an academic counselor for Student Disability Services at Texas Tech and serving liberal arts and nursing students at Abraham Baldwin Agricultural College. She is currently an Academic Support Counselor and the Study Abroad Coordinator in the Office of Academic Support at ABAC. Her research interests include professional development for new academic advisors and retention rates for students with disabilities. She can be reached by email at: rcofer@abac.edu
The *Journal of Postsecondary Education and Disability* welcomes submissions of innovative and scholarly manuscripts relevant to the issues and practices of educating students with disabilities in postsecondary educational programs. Manuscripts must be submitted electronically via email to jped@ahead.org

**Guidelines for authors:**

**Content**
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.
- Include 3-5 keywords.
- 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 email 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.

**Manuscripts must be submitted as email attachments in Microsoft Word format to jped@ahead.org**

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For manuscripts that are accepted for publication, the following items must be provided to the Executive Editor:

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- Title page
- Abstract (no more than 60 words)
- Literature Review (no more than two paragraphs, cite references using APA 6th edition style)
- Problem (one paragraph)
- Students and Location Information
- Strategy
- Observed Outcomes
- Implications
- References
- Tables and Figures (if needed)

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