

Association on  
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# Journal of Postsecondary Education and Disability

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# Journal of Postsecondary Education and Disability

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## FROM THE EDITOR

### DAVID R. PARKER

In times of change, what remains the same? As schools and campuses roar back to life after summer's relative quiescence, the cyclical nature of our work begins anew. This issue of JPED includes a literature review, three research studies, and two Practice Briefs. The authors of these works bring insightful perspectives to our continuing efforts to minimize barriers, promote access, enhance effective learning and equitable test-taking, and build strategic partnerships. As we welcome new students into our academic communities, we must also say goodbye in this issue to a beloved colleague.

Thoma, Lakin, Carlson, Domzal, Austin, and Boyd review key findings from a decade of literature about postsecondary options for students with intellectual disabilities (ID). They broaden our understanding of who these students are and how growing numbers of campuses address their needs, often through special services outside the scope of degree programs. A new AHEAD White Paper offers another perspective (<http://ahead.org/resources>). This complex topic can generate strong reactions. Readers are invited to share reactions via letters to the editor.

Buchanan explores life inside and out of the classroom for students with ADHD. In his study of psychological well-being, the author found that undergraduates who self-reported ADHD identified greater difficulties with the organizational and goal-oriented demands of college life compared to peers without self-regulation impairments. More broadly, students with ADHD reported lower levels of well-being than peers who did not report an ADHD diagnosis. Buchanan's survey research results in thoughtful considerations about the social life of students with ADHD.

Rao and Tanners present an innovative study of how college faculty can deliver online instruction with consideration of Universal Instructional Design (UID) and Universal Design for Learning (UDL). The authors also describe the use of technology such as Elluminate *Live!* to enhance access in online courses. Read what graduate-level students valued most about this pedagogy.

Bush, Hux, Zickefoose, Simanek, Holmberg, and Henderson invite us to reconsider the life experiences of postsecondary students with traumatic brain injury (TBI). This article seems particularly timely in an era of "wounded warriors." The authors' use of quantitative and qualitative data highlights the need for accurate self-awareness when students self-advocate.

In lieu of a book review, this issue concludes with two practice briefs that underscore the importance of partnerships between faculty, staff, and students. In the first, Trammel describes how to enhance the validity of multiple choice (MC) exams when assessing what students have learned. Read how a DS provider can consult with faculty and teach students MC strategies to achieve this goal. Humphrey, Woods, and Huglin report on the creation of a campus-wide partnership in their practice brief. They describe a unique collaboration between a DS office and faculty mentors to meet students' needs while also influencing campus policies and procedures.

Finally, we must say goodbye to Lydia Block, who suddenly passed away this summer after living a most extraordinary life. Many JPED readers knew Dr. Block through her frequent presentations at AHEAD conferences, regional trainings, and long-time leadership on the National Joint Committee on Learning Disabilities (NJCLD). Lydia's untimely passing stands in sharp contrast to the lasting legacy she leaves behind. On the next few pages, read a poignant tribute from Loring Brinckerhoff.



## **LYDIA S. BLOCK REMEMBERED (1951- 2011)**

### **LORING C. BRINCKERHOFF**

In 1981, Lydia Block was hired as a disability counselor at The Ohio State University (OSU). These were the very early days of postsecondary support services for students with learning disabilities (LD). At that time, the Disability Services Office at OSU was referred to as the Office for the Physically Impaired. Lydia was a trailblazer. For the next thirty years she opened doors to postsecondary opportunities for thousands of teenagers and young adults with learning disabilities and/or Attention Deficit/Hyperactivity Disorders (ADHD). Lydia became one of the foremost authorities in the country on students with LD and ADHD at the postsecondary level.

Lydia and I were on parallel career tracks back in 1983, when we first met. We were both enrolled in doctoral level programs and I had recently been hired at the McBurney Resource Center at the University of Wisconsin-Madison to tutor two or three newly identified students with dyslexia. We soon became close friends and our work intertwined with the Association on Handicapped Student Services in Postsecondary Education (AHSSPPE) in Columbus, OH along with Dr. Jane Jarrow. Jane, Lydia, Dr. Christy Lendman and I worked closely in organizing countless TRiO training workshops for service providers and counselors regarding first-generation college students with LD.

While at OSU, Lydia moved on to become the Coordinator and then Assistant Director of the University's LD Services before establishing her own private consulting business in 1995 -- Block Educational Consulting. In this capacity, Lydia was able to reach-out to a national audience where she evaluated LD support services on college campuses, presented at countless "LD College Nights" at high schools, and helped high school guidance counselors and teachers see the opportunities and possibilities that were available to students with LD.

Lydia presented at workshops, webinars, and audio conferences as a contract employee with AHEAD and with other professionals, including Jane Jarrow. In 2004 she became the Director of the Disability Services Office at Capital University in Columbus, OH. In 2006, Lydia was hired at Ohio Wesleyan University in Delaware,

OH to serve as the Director of the Learning Resources Center. Recently, Lydia formed a service (Grade 13) through which she was able to provide her college search and guidance to parents and students via technology.

Lydia will always be remembered as a pioneer in our field who gave us three decades of leadership and dedication to enhancing the lives of persons with LD. Her practical writings, newsletters, and conference presentations gave high school parents new hope that their son/daughter might in fact be able to succeed in a competitive college setting. She promoted self-advocacy in students and became a crusader for students with LD who were often misconstrued as being "lazy" or "not college material." Her research regarding foreign language learning and accommodations for students with LD in the postsecondary setting was groundbreaking. Her willingness to collaborate with others and her availability to answer questions about life after high school was renowned.

Lydia Block de-mystified learning disabilities for the layperson and expanded the knowledge base for countless colleagues and professionals. She also served on the Professional Advisory Board for the Learning Disability Association of America (LDA), the Board of Directors for AHEAD, as a representative to the National Joint Committee on Learning Disabilities (NJCLD), and for the last twelve years as one of the review panel members at Educational Testing Service (ETS). In addition, she was a founding member, along with Patty Carlton and Wayne Cocchi, of the Transition and Communication Consortium on Learning Disabilities, an Ohio organization developed to provide resources, training and support to high school special education administrators and teachers.

Lydia leaves behind her parents, a brother, a sister, two daughters and her granddaughter, as well as countless friends and colleagues who looked to her for love, guidance and inspiration.

*Loring C. Brinckerhoff, Ph.D., is Director of the Office of Disability Policy at Educational Testing Service (ETS) and a consultant to Harvard Medical School and Columbia University. Dr. Brinckerhoff is also a past president of AHEAD.*



# **Participation in Postsecondary Education for Students with Intellectual Disabilities: A Review of the Literature 2001-2010**

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## **Abstract**

Various forms of participation in postsecondary education by students with intellectual disabilities have received increased attention from the field of special education over the past decade. This review of literature from 2001 through 2010 builds on a similar review conducted by Neubert, Moon, Grigal and Redd (2001) to determine whether there have been changes in the types of programs offered, whether participation in various degrees of postsecondary education results in improved outcomes for individuals with intellectual disabilities, and whether the evidence indicates that postsecondary education is a preferred outcome to other transition outcomes. This review found that postsecondary education for individuals with intellectual disabilities has increasingly been defined as programs for students in the 18-21 year old age range who continue to receive educational services from their local school districts. The literature provides more details about program design and implementation and describes services across state, regional, and national levels. Few studies to date have attempted to determine participant outcomes. A discussion of the strengths and limitations of this body of literature are provided as well as recommendations for next steps for the field.

*Keywords: postsecondary education; transition; intellectual disability*

The senior year of high school is full of anticipation for students and parents alike as they plan for adult life. More and more students plan to continue their education as the necessity of working toward and obtaining a college degree becomes more evident. In fact, the economic value of a two-year or four-year degree from a college or university is well-established. In 2005, the median annual earnings of persons 25 years or older with a two-year associate degree (\$40,600) or bachelors degree (\$50,900) were greater than for persons completing high school only (\$31,500) (Baum & Ma, 2007). Persons with associate and bachelor degrees were also

more likely to have employer-provided pensions and health insurance and were less likely to be unemployed (Baum & Ma, 2007; Bureau of Labor Statistics, 2010; Mischel, Bernstein & Allegretto, 2007).

In addition to the long-term economic benefits of postsecondary education (PSE), other important benefits have been documented. Higher education is associated with long-term benefits such as better health and longevity, higher reported happiness, and more participation in civic, charitable, and democratic institutions (McMahon, 2009). Participation in PSE also has been associated with development of independence, lifelong friendships

and professional relationships, and higher self-esteem (National Center for Educational Statistics, 2006).

Unfortunately, individuals with disabilities, and in particular individuals with intellectual disabilities (ID), lag behind in these critical adult outcomes. Longitudinal studies have found that this group of individuals is more likely to be unemployed, to work at lower wages, and to be isolated from their communities and friends once they exit high school (National Longitudinal Transition Study-2, 2003). Students with ID are least likely to participate in PSE and experience some of the most dismal adult outcomes (Blackorby & Wagner, 1996; Neubert, Moon, Grigal, & Redd, 2001). Compared with their age peers, youth with ID typically earn less, are engaged in lower skilled jobs, experience higher rates of poverty, and have limited access to employee benefits (Stodden & Dowrick, 2000; Wagner, Cameto, & Newman, 2003).

Given such generally poor outcomes for youth and young adults with ID and the strong evidence that PSE education is generally associated with improvement in those outcomes for other groups of students, there has been a growing commitment to providing access to PSE for youth with ID. Recent descriptions of programs in more mainstream publications such as the *Chronicle of Higher Education* and the *U.S. News and World Report* have increased public awareness of the options available for individuals with ID to transition to some form of PSE (Schmidt, 2005; Calefati, 2009). In addition to the mainstream media, professional journals published a number of opinion pieces calling for changes in transition planning to provide more opportunities for individuals with ID and other significant disabilities to go to college and/or participate in PSE (Hughes, 2009; Rusch & Wolfe, 2009; Talis & Will, 2006).

In 2003, in anticipation of the reauthorization of the Higher Education Act, the National Council on Disability released a report that identified factors that influence the preparation, access, participation, and retention of students with disabilities in PSE (National Council on Disability, 2003). This report called for a number of changes, including the coordination of supports and services across agencies that facilitate the transition to PSE for students with disabilities, increasing access to financial assistance to make higher education more affordable, increasing the awareness of the options for higher education, and improving the preparation of personnel necessary to support student access to and

retention in higher education settings.

In the latest amendments to the Higher Education Act, the federal government granted greater flexibility to colleges and universities in determining eligibility for Pell Grant assistance for students with ID (Higher Education Opportunity Act, 2008). This was just one component of a bill that sought to assure that a college or university education is affordable to the majority of Americans. It marks the first time that students with any type of disability were included in the wording of this legislation. Clearly, the federal government has been willing to invest federal resources into increasing the percentage of youth with ID participating in PSE, which was only at 8% in the late 1990's (NLTS-2, 2003).

Postsecondary educational experiences for students with ID include a range of different options, some of which can be very different from what one associates with typical college experiences. Hart and Grigal (2009) presented preliminary results of a national survey of PSE programs for students with ID to begin to understand the different delivery models, support services, and characteristics of individuals who attended these programs. They identified 250 programs located in 41 different states across the country. Of those programs, 38% were located in two-year colleges, 51% in four-year institutions, and 12% in trade or technical schools. These programs have been in existence for different lengths of time, from one to thirty-five years with an average of ten years. Other important characteristics of these programs include:

- 53% of the students with ID who attend these programs access courses through the typical registration process compared to 43% who do not (4% of respondents did not know).
- 45% received academic advising from college faculty compared to 52% who did not (3% of respondents did not know).
- 56% offered programs for adults with 22% providing dual enrollment programs and 22% offering both types of programs. Dual enrollment programs for students with ID could include educational programs run by the local education agency that are physically located on a college or university campus to make full use of college/university facilities. Programs for adults are targeted to those who have completed their K-12 education. In some cases, students can participate in a PSE expe-

rience run by their school and then transition to a PSE adult program at the same campus, if they offer both dual enrollment and adult programs.

- 65% provided services for students with ID not provided to other students compared to 31% which did not (and 4% did not know) (Hart & Grigal, 2009).

As these data indicate, PSE experiences for students with ID can look very similar to those for other students or they can differ significantly. Programs identified as PSE programs for students with ID offered a range of different services through their program, using a range of delivery methods provided by PSE staff, local education agency staff or a combination of the two. Given this range of options and the increase in funding for and attention to the development of these programs, an updated review of published literature in this area was warranted.

### **Purpose of the Review**

Neubert et al. (2001) conducted a review of special education literature, finding that the majority of published works consisted of program descriptions or policy briefs. They reviewed 27 published works, spanning three decades, and summarized these program descriptions into three different categories: substantially separate, individualized inclusive, and hybrid/mixed. They reported that, during the 1970s, limited PSE programming for students with ID focused on “basic remedial education, personal and social skill development, recreational opportunities, employment readiness skills, and vocational training” (p. 160).

The 1980s saw an emphasis on compliance with Section 504 of the Rehabilitation Act of 1973, as amended, that protected otherwise-qualified persons with disabilities from exclusion, denial of benefits, or discrimination by PSE institutions or programs that received federal benefits. In general, however, individuals with ID continued to be viewed largely as not being qualified for PSE and so most did not take courses and typical tests that PSE institutions require for admission. Because of this lack of academic preparation and lower expectations, PSE services for students with ID were primarily segregated programs designed specifically for this group of students, with supports and services provided by staff hired for that purpose. Because of this, fears that students with ID coming to campus

would significantly impact the already stretched resources of college/university offices for students with disabilities did not become the reality in most instances. However, this question persisted and in some instances increased as the number of programs, particularly those that were more inclusive, increased.

The 1990s brought increased support of postsecondary options for students with ID. The literature from this era described two emerging trends. The first was the design of programs that served students between the ages of 18 and 21: those who still qualified to receive local education agency services, but whose peers had moved out of the high school setting and were most typically enrolled in PSE institutions. The other trend in the literature from the 1990s was the description of an individual support model in which supports for individual students were based on each student’s interests and needs, rather than based on a specific disability label or to all who participate in a specific program. This model was an extension of the full inclusion model for school and community (Stainback, Stainback, & Forest, 1989), whereby individuals with disabilities were expected to be in environments typical for their peer group and the services that he or she needed to be successful in that environment were provided. Instead of evidence documenting the impact of participation in PSE programs, Neubert et al. (2001) found that the literature focused on describing an evolution of types of programs, defined by the underlying philosophical approach to program development. They called for further research on outcomes, supports and/or accommodations, personnel training needs, as well as the best location(s) for providing PSE.

Neubert et al. (2001) categorized PSE programs for students with ID based on a level of inclusion with their peers without disabilities. They described programs as fitting into three categories: inclusive, hybrid/mixed, or substantially separate. However, in reading the articles included in their review as well the results of the Hart and Grigal survey (2009), it is important to note that PSE experiences for students with ID vary in other ways as well. The research questions that guided this follow-up review, as listed below, were developed to be broad enough to capture the range of programs available while the review process helped to delimit those that were included in the review. The review and discussion further highlights the similarities and differences in the experiences of PSE students with ID.

This review of the literature focuses on works-

published between 2001 and 2010 with the purpose of discerning the answers to three basic questions: Have there been changes in the types of PSE education programs for individuals with ID since 2001 (does it mirror PSE for students with other disabilities and/or students without disabilities or is it something very different)? Does participation in PSE experiences result in positive outcomes for individuals with ID as it does for students with other disabilities? Does the type of experience make a difference (is there evidence to warrant this transition outcome over other outcomes)? This review seeks to answer those questions for the field.

### Methodology

The authors conducted a broadly-defined review of the research, program, and policy literature on PSE for students with ID from 2001 through 2010. Since one purpose was to build on the earlier literature review (Neubert et al., 2001), similar definitions and keywords were used when possible in conducting this review. Articles included in this literature review focused on students with ID. This a relatively new term for the field, and there are different definitions in the literature depending on whether it is singular (intellectual disability) or plural (intellectual disabilities). “Intellectual disability” is the newer term and has become the preferred replacement terminology for an individual who in the past had been identified as a person with mental retardation (Schalock, Luckasson, & Shogren, 2007).

However, many use the term “intellectual disabilities” to refer to a broader group of individuals who have more pervasive support needs including individuals with mental retardation, autism, traumatic brain injury, and multiple disabilities (U.S. Department of Education, 2004; U.S. Equal Employment Opportunity Commission, 2004). Intellectual disabilities in this article include this broader definition, which explains why this review of literature included articles with participants who had autism and other developmental disabilities. The decision to use this broader definition was made because it (a) provides an opportunity to make further comparison between this literature review and the earlier review completed by Neubert et al. (2001) that focused on individuals with significant disabilities, and (b) reflects a trend in the literature of using the term “intellectual disability” to describe students with a broad range of significant needs (Schalock et al., 2007).

For the purposes of this review, PSE for persons with ID was defined as “a program that provided education or vocational training to individuals with mental retardation or other severe disabilities within two- or four-year colleges or universities, or adult education programs. Programs for adults who had exited the public schools were included, as well as for those students who were 18 to 22 years old, enrolled in the public schools, and receiving services or instruction within a post-secondary setting” (Neubert et al., 2001, p. 156).

### Focus areas

For this review, published articles and dissertation studies were divided into three focus areas: single program descriptions or studies; state/regional/national program overviews; and student-initiated PSE options. Single program descriptions/studies provided information about one specific program located at a specific college or university setting. State/regional/national program overviews focused on gathering a larger perspective than from one individual program, by either describing the programs in a given state or conducting a study across multiple programs and/or states. Student-initiated postsecondary options focused on individually-designed options that were not necessarily part of a pre-existing PSE program, a new development in the range of PSE experiences for students with ID that emerged during this time.

### Review procedure

The fourth author conducted an initial, comprehensive search of literature related to PSE of youth with ID within the education and social sciences literature. An electronic search was conducted using the major relevant research data bases, including ERIC’s Index to Education Materials, Dissertations Abstracts Online, eBary Educational Research Complete, PsychArticles, Academic Search Complete, and Applied Social Sciences Index and Abstracts (ASSIA). Keywords included *postsecondary*, *college*, *dual enrollment*, *inclusive postsecondary education*, *intellectual disability*, *mental retardation*, *developmental disabilities*, *significant disabilities and outcomes*. In addition, the authors conducted a secondary search for articles and published papers by examining the reference lists included in retrieved articles (i.e., the “ancestry approach”) as well as through websites of programs described in published articles or national groups that promote PSE for youth with disabilities.

This initial search yielded over 1050 articles, policy documents, conference proceedings, book chapters, dissertations, and technical assistance papers. Only those studies that successfully passed a peer-review process were included, which was defined as being published in a peer-reviewed journal. In addition, three unpublished but committee-approved dissertation studies were included. Many articles focused on practices in other countries, including Canada, the United Kingdom and Australia, where PSE opportunities for students with intellectual disabilities have been in existence for years. Only peer-reviewed articles from the United States were included in this review due to the differences in laws, entrance requirements, and/or program requirements. In addition to the differences in these requirements, definitions of disabilities can also vary between countries as well, making comparisons difficult and resulting in a decision to eliminate those articles from the review of literature.

After the initial review, the first and last authors then read through the remaining 68 articles and eliminated any that either did not focus solely on individuals with ID (as defined above) or those that did not provide sufficient differentiation between supports, services, or outcomes for individuals with ID compared to other participants. This resulted in the elimination of another 43 published works. Twenty-four remaining articles and/or dissertation studies were then divided into three different groups: (a) single program descriptions/evaluation studies; (b) cross-program or national studies; and (c) single-student initiated case studies or studies.

## Results

### Authors

In all, 37 authors contributed to the research literature published on PSE for students with ID during the last decade. The impact of particular authors was of interest in this review to help with determining whether authors were writing about their own programs or conducting more objective research about the programs with which they were not associated. While published literature can and has been conducted by those who are also responsible for providing services and/or training, the credibility of such work is increased when done by neutral observers as well as when it is replicated by multiple researchers in multiple settings with different participants. Author order was not taken into consideration; thus, if a researcher was a primary

author on one article and a secondary author on two articles, their total number of articles was three. Most authors contributed to only one publication (25). Three of the authors of the 2001 literature review were among the authors with the most published work. Neubert co-authored seven articles, while Grigal co-authored six, and Moon five. One other author, Hart, contributed to four articles, while Zimbrich and Zafft each contributed to three, and Blumberg, Carroll, Petroff, Weir, Redd, and Kamens each contributed to two articles. Those authors who published the majority of the extant literature (Neubert, Grigal, Moon, and Hart) were more likely to have multiple sites/participants in their articles and to take a statewide, regional and/or national perspective. Those who published fewer articles were more likely to be publishing works that focused on one program.

### Methodologies

A variety of methodologies were included in the studies reviewed, including qualitative, quantitative, and mixed methods. The majority of studies included a qualitative component, using case study, program evaluation, or constant comparison methodologies. Data collection strategies included participant observation, interviews, focus groups, document analysis, and/or a combination of the above. A number of the articles used quantitative methods but none employed true group experimental design. Seven articles used surveys to collect their information; five were survey plus a pretest/posttest assessment of knowledge gained, and one was a secondary analysis of a longitudinal database. Only one of the studies was quasi-experimental, describing a between-group comparison of the employment outcomes for those who attended a PSE program for students with ID versus those who stayed in high school until age 21.

### Focus Areas

Neubert et al. (2001) grouped articles, papers, and studies by decade and type of postsecondary program. A different categorization of focus areas was used in the present review since only one decade was included and many of the included articles described more than one type of program model. The majority of program models were physically located on a university or college campus. However, two articles were included that were listed as PSE, although the education took place in community settings. These were included, however, since they included (a) PSE as part of their

description/keywords; (b) many of the same components as the majority of the PSE programs for students with ID including employment, the development of friendships with same age peers; and/or (c) inclusion in age-appropriate environments and activities. Of the 24 articles/studies in this literature review, 10 (42%) were program descriptions/evaluations, nine (37%) were regional or national studies and five (21%) were focused on individual student-initiated involvement in inclusive PSE.

### Program Descriptions

Blumberg, Carroll, and Petroff (2008) provided a qualitative description of the inclusive liberal arts-based program at the College of New Jersey, serving students with ID who are still eligible to receive supports from their local school system (18-21 years old). Information was provided about the design of a four-year certificate program by an institution of higher education, including program goals, program design, the use of universal design to modify existing liberal arts courses so that students with ID could participate meaningfully, the development of instructional modules designed to accomplish program goals, and the qualitative program evaluation process. No limitations were identified in this article.

Carroll, Blumberg, and Petroff (2008) focused on the same program as the Blumberg et al. (2008) article, but this one expanded on program information by providing a qualitative description of the curriculum design and development process from the perspective of faculty who oversee and teach courses in the inclusive liberal arts-based program. The curriculum consisted of three elective courses designed for college freshman and/or sophomores, including *Human Abilities: Unplugged*; *The Psychological Development of Children and Adolescents*; and *Great Conversations*. The authors highlighted strategies that were used to meet program goals, student learning goals, and provide inclusive learning opportunities. No limitations were identified in this study.

Dolyniuk, Kamens, Corman, DiNardo, Totaro, and Rockoff (2002) described the development of a transition program based at a different liberal arts college in New Jersey for students with ID in the 18-21 year old range. This program was developed by a university professor and the parent of a youth with ID, who collaborated to design a program to teach functional and social skills to students who were participating in

job sampling at the university. Qualitative program evaluation data were collected, analyzed, and reported. Results of the data found that students with ID did not experience gains in levels of self-determination, self-advocacy, or social skills. They also did not seem to form friendships with peers without disabilities. They did express a willingness to go to the college campus and reported that they enjoyed their work experiences. Authors listed limitations that focused on the lack of improvement in social skills.

Eskow and Fisher (2004) provided a program description of an inclusive university-based program for young adults with ID (17-21 years old). This program focused on providing social and functional skill training for the young adults (called "outreach" students) and opportunities for university students to provide training and support in a small group dynamics class required for their program in occupational therapy. The program consisted of three phases, described in this article. Outreach students were in high school during the first two phases of the program, participating in university events and activities. By phase 3 they had "relocated" to the university and were identified as "outreach" students. Authors reported that program goals were met for outreach students and university students. Very little information was provided to describe the program evaluation methods and no limitations were listed by authors.

Hafner (2008) used qualitative case study methodology to describe the development and implementation of a PSE program at Edgewood College in Minnesota as her dissertation study. This program served seven students with ID on the college campus. Twenty-five peer mentors provided support to the students with ID and 10 faculty used universal design for instruction to make course instruction and materials more accessible to the diverse population of students. Multiple methods for data collection were used including participant interviews and documentation review (reflective papers of peer mentors; focus group interviews of faculty and peer mentors; surveys of classmates). Limitations were listed as small sample size, limited geographic area and role of researcher.

Kirkendall, Doueck, and Saladiano (2008) wrote a qualitative study of a college-based residential transition program designed to provide youth with ID an opportunity to live on a college campus and receive instruction in independent living skills. Pre- and post-intervention data were collected through interviews

with students and their parents. Participants were enrolled in a youth transition program offered by a local adult services agency, a component of which was a summer residential program. Participants included six young adults with ID, ranging in age from 20 to 23, who had been receiving day services for a minimum of one year from the Young Adult Life Transition (YALT) program. The program goal was to teach independent living skills in a “normal environment” for a short period of time. Researchers reported that both youth with ID and their parents felt that students’ involvement in the program was helpful in addressing independent living skill development. The study’s limitations included limited geographic area, use of an interview protocol developed for the study rather than a standardized set of questions, and self-report data.

Neubert and Redd (2004) provided a description of a public school program on a community college campus for students with ID. This case study used a variety of data collection methods including observations, focus groups, and interviews of students, parents, other key informants (including special educators, administrators, paraeducators, rehabilitation counselors). Interview protocols (Grigal, Neubert & Moon, 2001) used in other studies and based on recommended practices in transition were used in this study. Information about trustworthiness and content analysis were provided and indicated a strict adherence to recommended practices for assuring the trustworthiness and credibility of qualitative research. Information about program components and student satisfaction regarding those components was provided, including employment, community-based instruction, self-determination, student involvement in IEP meetings, parent involvement, collaboration, career education and assessment, functional academics, social skills, campus inclusion, and independent living skills. This study documented that a mixed model provides an opportunity to be in a more “normal” or age-appropriate environment but did not necessarily result in having experiences that were typical of others on the college campus. Limitations indicated by the authors included the small sample size, limited geographic area, and the participant-observer role of the researcher.

Pearman, Elliott, and Aborn (2004) provided a program description of a partnership between the Southwest Special Education Local Education Plan of the Greater Los Angeles County School District and El Camino College as a model for serving students with

ID on community college campuses across California. They used program evaluation methodology to collect and analyze data based on the program goals, objectives, and overarching guiding theoretical framework. Students participating in this program developed individualized goals in the areas of employment, independent living, social/recreational, education, and transition outcomes. Individualized programs and goals were then developed, making use of the resources of the community college (e.g., courses, counseling services, recreational activities). Individualized schedules, activities, and goals were identified for each student to help meet his/her goals for the future. No limitations were listed by the authors regarding their work.

Redd (2004) completed a dissertation study that was summarized by Neubert and Redd (2008). This was a qualitative case study of a program for students with ID located on a community college campus. Paraprofessionals were used to provide training in daily living, functional, and social skills. They also provided support for students with ID who enrolled in college classes. Students worked in enclaves or mobile work crews and participated in an e-buddies program. Many of the students reported that they enjoyed the program, although a few wanted more individualized supports. The students also reported that they did not have enough interaction with students without disabilities. More detail about the study’s findings and methodology were included in the full dissertation compared to the published manuscript. The authors listed the single case study nature of the research as a limitation.

### **State/Regional/National Studies**

Fisher (2008) conducted a national study to determine the perceptions of faculty regarding PSE for students with ID, including beliefs about meaningful participation in campus life and their ability to accommodate students’ diverse learning needs. This study found that faculty perceptions about PSE for students with ID did not differ regardless of their exposure to the concept (either through training or experience with a program at their university). Overall, faculty felt that students with ID had a right to participate in PSE so long as accommodations did not lessen the academic rigor of the coursework. In addition, faculty wanted to be sure that they had the appropriate resources to successfully identify and provide those accommodations. For example, if students needed to have digital versions of texts so they could be heard in addition to

read, then faculty wanted assurances that those versions existed. Another theme was that faculty felt they were already stretched too thin to be able to accommodate this new group of students if it meant that they would ultimately need to be solely responsible for providing accommodations in the classroom. This dissertation study listed the use of self-report data as a limitation.

Grigal and Neubert (2004) conducted a survey of 234 parents of students with disabilities who attended one of two urban school systems in one state regarding “their in-school values and post-school expectations related to their child’s transition from school to adult life” (p. 71). In this study, the parents of students with low incidence disabilities were more likely to rank life skill instruction as most important compared to parents of students with high incidence disabilities and were more likely to rank academic instruction as least important than parents of students with low incidence disabilities. The majority of parents of students with low incidence disabilities desired a four-year college outcome while the majority of parents of students with high incidence disabilities desired a community college. Limitations of the study were listed as low response rate, limited geographic area, and self-reported data.

Grigal, Neubert, and Moon (2001) described public school/PSE programs in Maryland for individuals with ID between the ages of 18 and 21. Information was collected by conducting interviews with program staff/teachers. In Maryland in 1999, nine of the twenty-four local school systems had at least one program in postsecondary settings for students with ID and other significant disabilities. The majority of these programs were located on 2- or 4-year college/university campuses but some used community settings such as a sheriff’s office, a local adult service agency, or an administrative office of the school system. Students received a range of services including job training, participating in college courses and activities, self-determination skill development, functional skill instruction, and community based instruction. Challenges identified included college/university policies and procedures that prevented students from taking desired courses, space limitations, transportation, staffing issues, and scheduling. The authors did not indicate any limitations in their data collection or reporting efforts.

Grigal, Neubert, and Moon (2002) provided an overview of PSE for students with ID/significant disabilities, describing types of programs and steps for developing a new program. They identified the

strengths and challenges of basing these programs at a community college, a four-year university or a community site such as a mall or service site. Data were collected through observations, interviews, and experience the authors gained through their role in providing technical assistance to programs in Maryland. No limitations to this method of collecting and/or analyzing data were provided.

Hart, Grigal, and Weir (2010) provided a broad overview of PSE, describing the rationale for as well as the challenges of providing PSE for youth with ID and autism spectrum disorder. They outlined PSE models for students with ID and autism spectrum disorder, expanding models reported in earlier literature (Neubert et al., 2001). They described three different paths to PSE: dual or concurrent enrollment, college-initiated programs, and individual or family-initiated supports. They listed a variety of practices that are used in supporting students with ID and autism spectrum disorder, including instruction in natural environments, person-centered planning, local, regional, and/or state-level cross-agency coordinating teams, universal design, mentoring, educational coaching, engagement in competitive employment, social pragmatics and communication skills, self-determination/self-advocacy, and evaluation activities. Short case descriptions of six different paths to PSE were included in the appendix. This article did not provide detailed information about how data were collected, analyzed or synthesized, nor did it list any methodological limitations.

Hart, Mele-McCarthy, Pasternack, Zimblich, and Parker (2004) conducted a survey-based study designed to describe the characteristics of transition/dual enrollment programs for students with ID on college campuses. The authors identified the common challenges, barriers, and program components of these types of programs. Besides survey data, this article described six representative national programs. Examples of funding sources for different types of services/supports were provided as well as details regarding barriers to implementing these types of programs. Attitudes of university faculty and staff were identified as the biggest barrier to implementation.

Katsiyannis, Zhang, Woodruff, and Dixon (2005) conducted a secondary analysis of NLTS-2 data. Their research compared transition services provided to and outcomes for students with ID, LD, or emotional/behavior disorder. They found that students with ID were less likely to have PSE (including vocational

education) as a transition goal than students with LD or emotional/behavior disorder, were less involved in their transition planning, and were more likely to report little or no progress toward achieving transition goals. The authors listed the use of secondary data analysis as a limitation of this study. Although the data came from a large national sample, it provided minimal information about individual student characteristics.

Neubert and Moon (2006) provided an overview of different models for transition services for students with ID located on college/university campuses. After summarizing these models, they discussed policy issues that would need to be addressed to sustain these models. In addition, they provided information about resources available to school districts attempting to implement their own programs or improve those already in place. Lastly, they outlined future research questions. A description of methods used to collect and analyze this information was not included, nor did the authors identify any other limitations to their work.

Neubert, Moon, and Grigal (2004) conducted a descriptive study to determine how students spent their time in programs on campus. In a survey of teachers working in 13 postsecondary sites in Maryland, serving high school students with ID ages 18-21, their goal was to identify the activities in which students were participating. They found that 87% of the 137 participating students were employed on campus or in the community while 61% did not participate in credit or noncredit college courses. None of these programs provided housing or instruction in independent living skills. Limitations to this study included the use self-report employment of a survey developed for this study rather than a validated, standardized instrument.

Neubert, Moon, and Grigal (2002) provided information about PSE programs designed to provide services and education to students with ID of transition age. They summarized the literature about effective transition planning and services and described how those promising practices could be based on college campuses. No information is provided about the methods used to collect and/or analyze the data. In addition, limitations were not listed for this study.

### **Individual Student-Initiated Involvement.**

While many PSE programs are designed or delivered by an individual PSE institution or a local education agency, a new finding in the literature describes PSE experiences that were instead initiated by the

student, often through a person-centered planning or transition IEP meeting process. The following studies were grouped by this initiation process.

Casale-Giannola and Kamens (2006) conducted a case study of a young woman with Down syndrome who took a course in speech communication at a local four-year university as part of her high school transition program. Rather than attend a program designed by local education agency personnel, this student identified PSE as a preferred transition outcome and initiated her participation in a course as part of her high school program (dual enrollment option). This student received support from mentors (teacher candidates) and facilitators (faculty in the department of special education). This qualitative study used multiple researchers, multiple data collection procedures (interviews, journals, and observations) and multiple data sources (student, faculty, mentors, and faculty facilitators) as methods of triangulation. The case study described multiple benefits for the student, including gaining a better awareness of PSE options, opportunities to interact with age-appropriate peers, and establishing a mutual learning experience (for the young woman with ID as well as the peers and mentors). Challenges identified by this study included limited meaningful experiences, inconsistent goals for the young woman, and challenges with assessing her progress in class. The authors listed the small sample size, limited geographic area, and researcher bias as limitations of the study.

Hamill (2003) conducted a similar case study of an individual with ID who audited college courses. Unlike the subject of Casale-Giannola and Kamens' (2006) case study, however, this individual was 26. She lived in her own apartment and was an advocate who worked as co-editor of a newsletter for individuals with ID. Hamill used a variety of data sources to triangulate the collected data. Although the student reported that she enjoyed her PSE experience, it did not result in long-lasting friendships. Identifying clear expectations for student goals and measuring/assessing student progress in classes were challenges for faculty and mentors. The author identified the preparation of peer mentors, faculty, and university personnel as an important consideration to successful experiences. The author did not list any limitations to the research methodology.

Weir (2004) focused on the use of person-centered planning to identify the needs of students with ID who are interested in pursuing PSE. This qualitative study used participant observer data collection to describe

the diverse experiences of eight individuals with ID in college. Some of the participants were in high school and dually enrolled in one or more college classes (for credit or audit) while others had exited from high school and were pursuing college coursework through support from VR or other agencies. This study did not list any limitations.

Zafft (2006) reported a qualitative case study of three high school aged students with ID who attended college through the College Career Connection, a project based at the Institute for Community Inclusion in Boston, MA. Semi-structured interviews were conducted with students, parents, a faculty member chosen by the student, and the coordinator of disability support services. Since no validated instrument/interview protocol existed, interview questions about accommodations and supports were developed by the researcher. Supports provided to students with ID included person-centered planning to identify supports, goals, and accommodations. Accommodations provided to the students included additional time for tests, assistance in course selection, tutoring, and notetakers. Tutoring was identified as the most helpful service provided to participants in programs for students with ID. The author listed the difficulty in interviewing students with ID as a limitation of her study. In addition, she listed self-reporting as a limitation, particularly since she was the direct supervisor of those providing information about the accommodations they provided.

Zafft, Hart, and Zimbrich (2004) conducted a matched cohort follow-up study of 40 youth with ID who did and did not participate in PSE. Participants were high school students with ID from high schools in Massachusetts; 20 participated in PSE opportunities coordinated through the College Career Connections program and 20 stayed in high school, enrolled in life skills programs. The study used a follow-up survey to determine outcomes for these 40 individuals. Participation in PSE was positively correlated with independent and competitive employment, earning a high school diploma, and taking more courses at college. Students who stayed in high school were more likely to work more hours per week than those who attended PSE. Limitations to this study were not listed.

### **Limitations of Reviewed Literature**

Limitations of reviewed articles were coded as (a) no limitations discussed; (b) self-reported data; (c) small number of participants; (d) small geographic

area; (e) no reliability/triangulation information; and (f) other. Half of the articles (12; 50%) did not meet rigorous academic standards or discuss any limitations. The other published works addressed limitations to their research, most indicating more than one. In all, 28 limitations were identified by the authors of the remaining 12 articles (range of 1 to 5). The frequency of reported limitations was small geographic area (9), small number of participants (7), use of self-reported data (6), other limitations (4), and no triangulation (2). Other limitations indicated by authors included the use of survey instruments developed for the study that were not validated (three authors listed this limitation). Another study identified the secondary analysis of an existing database as a limitation.

## **Discussion**

### **What Do We Know?**

These 24 works, published or completed between 2001 and 2010, provide a more detailed description of the nature of PSE experiences for students with ID than the literature described in the review conducted by Neubert et al. (2001). While the majority of these articles continue to be program descriptions, they provide more detail about specific program features than in the past. They also reveal a great difference in program features, supports, and admission requirements. Included in this group are descriptive details of how faculty and program developers design programs, clearly articulating their program goals and guiding program philosophies. For example, rather than just describe a program as “inclusive” by saying that participants are able to take college courses for credit or audit them, these articles list the courses that students attended and how faculty made changes to existing courses to enhance access to instruction, materials, and assessment for students with and without disabilities (Blumberg et al., 2008; Carroll et al., 2008).

Similarly, some of the articles identified steps staff members followed to implement the programs under scrutiny and, in many cases, described the evolution of a program over several years. Challenges as well as strengths were discussed with recommendations to avoid or at least minimize challenges for the next group (Kirkendall et al., 2008; Pearman et al., 2004). These types of programmatic details are important to help the field build on the successes as well as avoid the missteps of others while improving educational

services delivered to students with ID. In fact, too often the field fails to learn from the past or from related developments that should inform their practice and research rather than replicate past mistakes in new settings. Lastly, these details help those who attempt to translate research to practice without having access to observe the program and ask questions of those involved in implementing it.

There are other ways that the literature of the past 10 years has changed from that of the preceding decades. First, there were a number of published articles that attempted to identify trends in the field or in a specific state or region, rather than one program. National studies attempted to describe transition services and outcomes more broadly (Katsiyannis et al., 2005). Other articles focused on the perspectives of parents (Grigal & Neubert, 2004), faculty (Fisher, 2008) or a range of PSE program developers (Neubert & Moon, 2006; Weir, 2004).

In addition, published works about PSE for students with ID over the past decade have focused on the students themselves. Several researchers used individual case studies to better understand and report on students' experiences. One such study was a dissertation (Redd, 2004) that was later summarized in a published article (Neubert & Redd, 2008). Others were published studies that described a different approach to PSE: students initiating the connection with a college outside of a formal "program" (Casale-Giannola & Kamens, 2006; Zafft, 2006). Zafft et al. (2004) and Hart et al. (2010) described this newer pathway to PSE as more closely associated with that of a typical dual enrollment student (that is, a student enrolled in both high school and college simultaneously). While the authors of these articles acknowledged the challenges of implementing this approach for a large number of students, they also indicated that it could assist with individualizing the supports and services needed by a specific student with ID.

### **Does PSE Result in Improved Outcomes?**

Another goal of this literature review was to determine whether PSE experiences for students with ID resulted in improved outcomes compared to other options. Despite the fact that much of the literature published prior to 2000 recognized the need to study such outcomes, the literature has offered little in the form of actual findings. Only one study in the present review attempted to compare employment outcomes

for students with ID who stayed in high school versus those who participated in a PSE program on a college campus (Zafft et al., 2004). They found improved employment outcomes for students who participated in the PSE program but also indicated that the comparison school had poor outcomes overall related to employment. Further research is necessary to learn more about the outcomes of students with ID who participate in some form of PSE experience.

The descriptions of the PSE experiences of students with ID indicate that such programs have produced a range of positive outcomes (Casale-Giannola, 2005; Dolyniuk et al., 2002; Hamill, 2003). These students reported that they learn more in academic, social, and functional domains compared to what they learned in high school settings. Not only did students with ID identify positive experiences as a result of their participation in PSE programs, others who interact with students with ID report that they benefitted from these interactions. They did not feel that their presence detracted from the academic or social experience of the college setting as some may have feared (Eskow & Fisher, 2004; Hafner, 2008).

Two primary reasons have been cited for offering PSE experiences for students with ID: to provide instruction in a more inclusive environment and to improve employment outcomes. Students with ID are eligible to continue to receive public school supports and services through the age of 21 under the Individuals with Disabilities Education Improvement Act ([IDEA], 2004). However, their peers without disabilities are no longer in high school, limiting the opportunity for them to be educated in an inclusive setting. As noted in the literature, programs for this group of students are being offered on college and university campuses to facilitate their opportunities to learn alongside and interact with their peers without disabilities. The reviewed literature provided little evidence, however, that all of these programs used empirically-effective strategies for supporting inclusive education and/or the interactions with same age peers without disabilities. While some articles indicated that students with ID were forming relationships with peers, auditing university courses, and having other PSE experiences with their peers, other studies indicated that students with ID reported that they wanted more interaction and friendships with their peers. Further investigation will be necessary to determine which program features, supports, services, and experiences if any result in

positive inclusive educational opportunities as well as interactions with same age peers (Casale-Giannola & Kames, 2006; Dolyniuk et al, 2002; Eskow & Fisher, 2004; Hafner, 2008).

Another rationale for providing postsecondary programs for youth with ID comes from the improved employment outcomes that have been linked to PSE for individuals without disabilities as well as for individuals with learning disabilities (Baum & Ma, 2007). Only one study attempted to answer the question of whether students with ID who participated in PSE experiences had improved employment outcomes. Zafft et al. (2004) compared the employment outcomes of two matched groups of students with ID; one group received their educational services in the high school, the other in a PSE setting. This study found that the group who participated in PSE experiences did have improved employment outcomes. This is a promising finding but one that calls for further study. In addition to this study, many of the program descriptions indicated that students had work experiences and/or exited the program with jobs. Although these articles did not directly link participation with employment outcomes, they described programs that often contained components such as paid work experience that have been linked to improved employment outcomes (Eskow & Fisher, 2004; Hartman, 2009; Pearman et al., 2004).

Future research should build on cross-program studies and seek to make comparisons in outcomes for students who participate in PSE programs or experiences and those who participate in other high quality programs for students with ID in the 18-21 year age range. Such studies would benefit from being conducted by multiple researchers, both those who are closely associated with programs to provide insight and depth, as well as those who are outside the program who could bring a fully objective perspective to the studies.

Lastly, future researchers should describe their methodologies more completely, including their limitations. There may be many reasons why the limitations of studies and articles were so often missing from the published literature, including the challenges inherent in translating a large qualitative study into the size of a published manuscript. However, the fact that the limitations to these studies were not included in the published articles hurts rather than helps the credibility of this emerging practice.

### **Is There Evidence to Warrant This Transition Outcome Over Other Outcomes?**

This literature review did not provide sufficient evidence to answer this question, particularly since participation in PSE for students with ID may not be a transition outcome but can also refer to a type of transition service or transition education. PSE for students with ID can refer to education on a college/university campus that occurs after high school (Blumberg et al., 2008), a program located on a college/university campus for students who are still receiving education as mandated by IDEA (2004) through the age of 21 (Neubert & Redd, 2004), or a program that supplements other education and/or transition services being provided by a local school district or adult service agencies (Kirkendall et al., 2008). Youth with ID are referred to as postgraduates, PSE students, outreach students, or transition students, depending on the nature of the program design and age of the young adults with ID. This makes comparisons across programs and studies difficult. Further complicating the analysis of this literature is the fact that a range of different supports, services, and strategies are described. Indeed, one article did not even include experiences on a PSE campus but was still referred to as a PSE program because it focused on individuals who were in the 18-21 age range. For some students with ID, it appears that only the location where they receive the educational supports and services has changed rather than the services, supports, or instructional strategies themselves.

### **Limitations of this Literature Review**

The conclusions of this literature review must consider the limitations, delimitations, as well as strengths of its methodology. First, the keyword search used to identify the pool of possible articles may have been insufficient. Since many of these programs were designed for transition-aged students still receiving secondary education services, the literature on transition services in general could have been included and would have further assisted with the analysis of effective practices, programs, and services for students with ID between the ages of 18 and 21. Second, some of the programs included components delivered in settings other than colleges and/or universities. Community-based instruction, service learning, and/or employment supports and services (i.e., job coaching, supported employment, community living) could have provided a more comprehensive pool of articles

to use for comparison purposes. Lastly, some of the goals of the programs described should have been used to determine the quality of the supports and educational services provided. For example, many of these programs listed such supports as self-determination, inclusion, friendships, and independent living skills as part of their program goals. This review did not include a summary of the impact of these skills on student transition outcomes or improved quality of life.

### What Questions Remain?

A number of new research questions have emerged from this review of the literature regarding the PSE experiences of students with ID. First, this group of students is small, making large scale, randomized research studies difficult or impossible to conduct. Wherever possible, however, we must attempt to understand what works from research on secondary and PSE of students with disabilities in general, such as universal design for learning, self-determination, and the use of technology. As stated by Katsiyannis et al., (2005) “identifying and implementing public school practices that are likely to result in improved post-school outcomes in areas such as independent living, employment, post secondary education and training, and community involvement is needed to meet both legal mandates and professional responsibilities” (p. 115). Not only does the field need more information about what works to prepare students with ID for postschool outcomes, additional information is needed to determine what works in these alternative settings. Very little of this information was present in the published works reviewed in this literature search.

There is a limited amount of information about how many students with ID are currently participating in the various types of PSE programs, how they participate, and with what results. The lack of basic data on this phenomenon derives in part from the challenges of conducting research that fully describes the experiences of students and programs in such a way that comparisons can be made. Based on our review of the current literature, we conclude that progress in establishing an evidence base for PSE and training for persons with ID is hampered by three fundamental limitations:

- There is no taxonomy or common terminology by which PSE programs, participants and/or outcomes are consistently described.

- There is little detail and shared understanding of the nature, goals, and objectives of the various PSE approaches and/or pathways.
- There has been a limited effort to develop and test instrumentation for gathering valid, reliable, and sufficiently comprehensive objective data on the desired outcomes of PSE programs.

In building a knowledge base about the PSE experiences of persons with ID, a more systematic approach to organizing, gathering, and analyzing data is needed. The variety of programs, participants, and experiences are simply too great to be able to improve knowledge without improving its systematization. The field will benefit from increased support for model programs that are studied systematically using high quality research methodology and published widely. We suggest three broad areas to address in future research. The areas are 1) creating a taxonomy for describing PSE programs, participants, and outcomes; 2) understanding program models in terms of the nature, goals, and objectives of individual programs; and 3) developing and testing instrumentation for gathering valid and reliable objective data on the outcomes of PSE programs.

### Conclusion

The opportunity for individuals with ID to participate in PSE programs was strengthened considerably in the Higher Education Opportunity Act of 2008 as well as through promising practices for transition services as required by the IDEA (2004). The opportunity to participate in any program is by no means a guarantee of benefit from it, however, either for the individual or for society. The PSE experiences of individuals with ID remain relatively rare, particularly as described in the limited research literature of the field. In the instances where these experiences are available, they vary widely along dimensions such as social inclusion, academic integration, academic and social supports, and cost of participation. The field has made advances in categorizing the types of experiences that students with ID have reported in the past ten years as well as gathering broader perspectives about the implementation, development, and evaluation of these programs. Additional efforts to further measure outcomes and to find ways to compare implementation, models, and outcomes in a systematic way are warranted for the upcoming decade.

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\*Indicates a study or published article included in this review of literature.

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## **Authors' Note**

This paper is intended to promote the exchange of ideas among researchers and policy makers. The views expressed in it are part of ongoing research and analysis and do not necessarily reflect the position of the U.S. Department of Education.



# Attention Deficit/Hyperactivity Disorder and Well-being: Is Social Impairment an Issue for College Students with ADHD?

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## Abstract

In this study, the psychological well-being of college students with Attention Deficit/Hyperactivity Disorder (ADHD) was analyzed. A survey was administered to a convenience sample of undergraduates aged 18-25 at a Southern university (N=317). Well-being was measured using Ryff's (1989) 6 likert scales of psychological well-being. Students with self-reported ADHD had lower scores on total well-being, environmental mastery, personal growth, and purpose in life. They reported comparable levels on autonomy, self-acceptance, and positive relations with others. Findings suggest that college students who reported an ADHD diagnosis were similar to other college students in their perceptions of well-being, but perceived more difficulties in their organizational and goal-oriented competencies compared to peers who had never received an ADHD diagnosis. Recommendations for university administrators and disability professionals are discussed.

*Keywords: ADHD; college students; psychological well-being; social functioning*

Although estimates vary greatly, approximately 4% of college students report a diagnosis of Attention Deficit/Hyperactivity Disorder (ADHD) (Heiligenstein, Conyers, Berns, & Miller, 1998). In the broader population, the prevalence rate for adults in the United States is 4.4% (Kessler et al., 2006). These rates are considered a conservative estimate of the number of people with this disability due to the possibility of undiagnosed cases (Cuffe, McKeown, & Moore, 2009; Scituito & Eisenberg, 2007). While extant research focuses on the difficulties faced by those with the disability, very little is known about the overall well-being of university students with ADHD.

The focus of this research was to examine different aspects of well-being among college students with ADHD compared to their peers without disabilities. The college atmosphere represents a particularly interesting life stage for the individual with ADHD. Examining different aspects of well-being is critical to understanding these students as they move into later adulthood. Existing research suggests individuals with ADHD experience a broad range of problems ranging from academic performance to peer relations (Barkley, 2006). The research suggesting social impairment of college students with ADHD is mixed

(Norwalk, Norvilitis, & MacLean, 2009; Shaw-Zirt, Popali-Lehane, Chaplin, & Bergman, 2005). In this study, the focus was on Ryff's (1989) measure of psychological well-being, which consists of six distinct subscales of well-being ranging from mastery of one's environment to having positive relations with others. Examining a broader picture of the difficulties facing university students with ADHD can inform campus efforts to address evidence-based supports that address the comprehensive range of services they may need to persist and graduate.

## ADHD and College Students

Attention Deficit/Hyperactivity Disorder (ADHD) is a condition that is most likely detected in childhood, according to the U.S. National Institute of Mental Health (2006). Estimates suggest approximately 3-5% of children in the United States have been diagnosed with ADHD (National Institute of Mental Health [NIMH], 2006). The prevalence rate of college students who have ADHD is less consistent. One study has the estimates for American college students currently ranging from 0.5% to 5.0% (Farrell, 2003). In a review of six studies, DuPaul, Weyandt, O'Dell, and Varejao (2009) suggest the prevalence is somewhere

between 2% and 8% of all university students. Part of this discrepancy is due to the various methods by which ADHD is measured.

The *Diagnostic and Statistical Manual of the American Psychiatric Association DSM-IV-TR* (American Psychiatric Association, 2000) suggests three behavioral subtypes based on two groupings of symptoms (impulsivity/hyperactivity and inattentiveness). The three subtypes include ADHD Predominantly Inattentive, ADHD Predominantly Hyperactive-Impulsive, and ADHD Combined type. Research increasingly supports the belief that ADHD results primarily from neurobiological rather than environmental factors (Comings, 2000; Levy, Hay & Bennett, 2006; Spencer, Biederman, Wilens, & Faraone, 2002). Despite this research, the ADHD diagnosis remains controversial (Malacrida, 2004). ADHD is perceived by some as the result of parenting style or poor character of the individual (Singh, 2004). In addition, ADHD is particularly controversial as its overt symptoms represent common behaviors that are exhibited to an uncommon degree (Gordon & Murphy, 1998). Russell Barkley (2002), a leader in ADHD research, assembled the *International Consensus Statement on ADHD*, which cited research by leading international scientists in order to clarify the legitimacy of ADHD as a culture-free disorder found across many types of societies. Yet, controversy remains even among those who are well-informed about the diagnosis and treatment of ADHD. One area of debate concerns the diagnosis of ADHD being based on a heterogeneous set of symptoms which professionals often interpret differently. Also, the behavioral and pharmacological approaches to treatment of the disorder often conflict (Parens & Johnston, 2009).

The population of students with disabilities attending public universities is steadily increasing. According to the National Longitudinal Transition Study 2, 45% of youth with disabilities continued to postsecondary education after leaving high school (Newman, Wagner, Cameto, & Knokey, 2009). Nearly 17% of all postsecondary students in the United States report having a disability (National Council on Disability [NCD], 2000). This growing population warrants a better understanding of its specific needs. For particular disabilities such as ADHD, the transition to the university setting can be especially challenging due to the increased need to develop time management skills (Meaux, Green, & Broussard, 2009). Research suggests that approximately one quarter of the students

utilizing disability services on campus are diagnosed with ADHD (Wolf, 2001). However, recent research suggests that only about half of the college students with ADHD who are aware of disability services such as accommodations actually utilize these services (Chew, Jensen, & Rosen, 2009). One reason for this avoidance is society's emphasis on college being a place where students navigate difficulties alone as part of growing up (Graham-Smith & Lafayette, 2004).

Many studies have reported that college students with ADHD experience a range of impairments. Much of this research focuses on academics. For instance, Reasor, Prevatt, Petscher, and Proctor (2007) found that students with ADHD had poorer time management skills and deficient test-taking strategies compared to other students. An earlier study found that students with ADHD had lower grade point averages and were more likely to be on academic probation (Heiligstein, Guenther, Levy, Savino, & Fulwiler, 1999).

Additional research examines both academics as well as outcomes related to social functioning. Shaw-Zirt et al. (2005) suggested that college students with ADHD experienced poorer academic, social, and personal-emotional adjustment as well as lower self-esteem. Lower self-esteem was also found among individuals with ADHD by Dooling-Liftin and Rosen (1997). Additional researchers have found that individuals with ADHD perceive a lower quality of life (Chao et al. 2008; Greenwald-Mayes, 2002). Greenwald-Mayes (2002) found that family dynamics played a more prominent role in the quality of life for students with ADHD compared to their non-ADHD peers. In a more recent study of college students, Rabiner, Anastopoulos, Costello, Hoyle, and Swartzwelder (2008) found no group differences for social satisfaction among college students with ADHD compared to other students. Norwalk et al. (2009) examined students reporting ADHD symptoms compared to others on social and academic functioning. More specifically, they separated those reporting hyperactivity symptoms from those reporting inattentive symptoms. Interestingly, these researchers did not find that hyperactivity symptoms were predictive of any of the outcomes. However, symptoms indicative of the inattentive subtype of ADHD were predictive of lower academic adjustment, career decision-making self-efficacy, and poorer study skills. On the other hand, neither hyperactivity nor inattentive symptoms predicted lower levels of social adjustment or grade point averages.

College represents a particularly difficult setting for students with ADHD. Compared to high school, when most students live with parents, college is extremely less structured. Parents and teachers play a reduced role in setting boundaries and providing structure (Swartz, Prevat, & Proctor, 2005). This environmental shift poses a double dilemma. Students with ADHD lose the structure provided by the secondary school schedule but they are also further removed from people who have helped them manage their innate difficulties with self-regulation. In addition, compared to the high school context in which students are living with parents, campus life offers more opportunities to overindulge in activities coupled with a greater necessity to manage one's academic responsibilities (McCormick, 1998).

These issues are particularly relevant to ADHD students who have problems with executive functions. Brown (2005) and Barkley (1997) have written extensively on the interrelated facets of executive function that are impaired in persons with ADHD. Persons with this disorder are often aware of, but unable to begin, necessary routine tasks such as completing homework assignments. They may also have more difficulty properly estimating the amount of time specific tasks will take to complete. Not only are persons with ADHD more likely to get distracted from a task, they also have the opposite problem of focusing on one task excessively while neglecting others. In social situations, persons with ADHD are less capable of monitoring and self-regulating their behavior. They tend to pay too much attention to certain details and not enough to others (Brown, 2005). These impairments can potentially result in problems of social functioning for students with ADHD. Meaux et al. (2009) suggest the following strategies for helping college students with ADHD: learning from consequences, adherence to alarm clocks and reminders, removing distractions, and staying busy with proper scheduling. Quinn, Ratey, and Maitland (2000) suggest that life coaching can be a very effective method of keeping the ADHD college student on track.

### Well-being

Growing numbers of studies about well-being have been published in recent years (Abbot et al., 2006; Huta & Ryan, 2010; Land, Lamb, & Zheng, 2011; Rath & Harter, 2010; Springer, Pudrovsk, & Hauser, 2011). In many disciplines, well-being is typically handled as a concept associated with happiness, qual-

ity of life, and life satisfaction. In the psychological tradition, well-being research can be divided into subjective well-being and psychological well-being. Subjective well-being measures life in terms pleasure and happiness (Ryan & Deci, 2001). Ryff's (1989) conceptualization of psychological well-being offers an alternative to measures focusing only on happiness. *Eudamonia* is Greek word, the translation of which has been incorrectly limited to mere happiness. Ryff suggests that eudaimonia goes beyond happiness in that it measures a person's perceptions of potential, thriving, and functioning. Ryff's six distinct dimensions of well-being attempt to capture the challenges people experience as they pursue efforts to thrive and function. These dimensions of well-being are *environmental mastery, personal growth, purpose in life, autonomy, self-acceptance, and positive relations with others*. The first three address aspects of well-being related to organizational functioning while the last three dimensions address social comparison, relating with others, and acting independently when faced with disagreement by others.

Several demographic measures have been found to be related to psychological well-being, including gender, race, and socio-economic status. Two studies found that women reported higher levels of positive relations with others, personal growth, and purpose in life (Schwartz, Keyl, Marcum, & Bode, 2009; Ryff, 1989). Using models controlling for age, employment, and marital status, Ryff, Keyes, and Hughes (2003) found women lower on autonomy and environmental mastery and higher on positive relations with others. Another study found respondents reporting traditionally female expressive traits were higher on positive relations with others while those reporting traditionally male instrumental traits obtained higher scores on personal growth (September, McCarrey, Baronowsky, Parent, & Schindler, 2001). Minority status has been found to be a positive predictor of well-being (Ryff, Keyes, & Hughes, 2003). In a study of first year students at selective colleges, African American students reported as high or higher levels of social psychological well-being (Massey, Charles, Lundy, & Fischer, 2003). Finally, higher socio-economic status was linked to higher levels of self-acceptance, purpose in life, environmental mastery, and personal growth (Ryan & Deci, 2001). Ryff, Keyes, and Hughes (2003), using education as an indicator of socio-economic status, found that education level was a positive predictor of all dimensions

of well-being with the exception of autonomy.

College represents a context in which students are striving and expected to develop independence from their family of origin. Unfortunately, these expectations come at a time when many students need extra support and guidance to achieve this developmental life task (Kadison & DiGeronimo, 2004). One important factor related to a student's ability to manage the impact of stress in college is self-differentiation. Self-differentiation pertains to an individual's capacity for developing autonomy and emotional regulation while maintaining positive ties to family connections (Skowron, Wester, & Azen, 2004). In a study of first year college students, Bowman (2010) found that the development of positive peer interactions contributes positively to well-being while adverse social relations have a negative impact on well-being. College students' well-being is also influenced by their academic achievement, which can be a more challenging accomplishment compared to their high school years when their peers reflected a greater range of academic ability (Kadison & DiGeronimo, 2004). Ruthig, Haynes, Perry, and Chipperfield (2007) found a positive correlation between cumulative grade point average, perceived success, and well-being in college students using measures of positive and negative emotions, health behaviors, and future optimism. Additional research by Chow (2007) confirmed that college students with more positive self-images and lower academic stress levels reported significantly higher levels of psychological well-being.

### Method

Examining the well-being of college students with ADHD across a number of domains can provide critical information for predicting and facilitating student achievement. Not only does the college experience represent a difficult and unique life stage for those with ADHD, but the functional limitations of this disorder may be much different for college students than for younger populations. Given that much of ADHD research focuses on children, a more thorough analysis of university students with ADHD is warranted. Few studies focus on the social functioning of college students with ADHD. This study was designed to investigate the well-being of college students with ADHD using Ryff's (1989) multi-dimensional conceptualization of psychological well-being. The main focus of

this study was to address two specific questions. First, how do college students reporting an ADHD diagnosis compare to other college students on all dimensions of psychological well-being? Finally, are the psychological well-being differences less pronounced for the dimensions of psychological well-being most related to social functioning?

### Participants

Prior to data collection, a research proposal was approved by the institutional review board at the author's university. The data came from a convenience sample of general education classes of a medium-sized, public university in the South. Participants completed a survey that included questions relating to psychological well-being, demographic information, and one item related to a prior ADHD diagnosis. By definition, general education classes are courses required for all the degrees offered by the university. The sampling frame was comprised of the total enrollment for the targeted classes ( $n=414$ ). From this frame, 330 students completed the survey resulting in a response rate of 80%. Non-response was almost entirely a result of absence from class on the day the survey was administered. As age increases beyond 25, it becomes increasingly difficult to argue the sample represents traditional college students. In order to ensure that differences among students in similar life stages were analyzed, 12 students older than 25 and one case not completing the age question were removed. The final sample consists of 317 college students. Of the 317 respondents, 34 self-reported a prior diagnosis of ADHD.

### Measures

**Well-being.** The main outcome measure is psychological well-being. Ryff (1989) created a survey instrument to measure this construct, consisting of six subscales: autonomy, positive relations with others, environmental mastery, personal growth, purpose in life, self-acceptance. For an overall measure of well-being, the 29 items used for the subscales are combined. The reliability coefficient for global measure of well-being is 0.82. In the Ryff (1989) initial formulation, each subscale consisted of approximately 20 items. The theoretical structure of the well-being dimensions has been supported using shorter forms of these scales in a study using a nationally representative sample (Ryff & Keyes, 1995). Reduced versions of the well-being scales have been used in the Midlife in the United

States Survey (Ryff, Keyes, & Hughes, 2003; Keyes, Shmotkin, & Ryff, 2002). A direct comparison of these reliabilities is presented in Appendix B. Appendix A contains the complete list of items used for each subscale.

Given the large size of the survey, reduced versions of the six well-being subscales were used for this study by selecting 4–6 items from the original version (approximately 20 items) of each scale. This resulted in an adapted survey instrument that included 31 items. The selected items were most indicative of a non-specific context. For instance, the following item was not selected due to contextual wording not suited for the college experience, “I have been able to build a home and a lifestyle for myself that is much to my liking.” The response set for all of the well-being items in this study was as follows: 1=strongly disagree, 2=disagree, 3=slightly disagree, 4=slightly agree, 5=agree, 6=strongly agree. For the computation of the scale score, each respondent’s item scores were summed and divided by the number of items constituting the scale. This computation returned scale scores to the same metric as each item.

*Environmental mastery.* Environmental mastery pertains to an individual’s ability to participate in his or her environment successfully. A representative statement used for this five-item scale is, “I am quite good at managing the many responsibilities of my daily life.” The reliability coefficient for this subscale of well-being was 0.44.

*Personal growth.* Personal growth addresses an individual’s perception of his or her ability to maintain continual growth in life (Ryff, 1989). A representative statement used for this five-item scale is, “I have the sense that I have developed a lot as a person over time.” The reliability coefficient for this subscale of well-being was 0.60.

*Purpose in life.* Purpose in life represents the perception that one has goals and a sense of directedness is a sign of maturity and well-being. A representative statement used for this four item scale is, “I am an active person in carrying out the plans I set for myself.” The reliability coefficient for this subscale of well-being was 0.60.

*Autonomy.* Autonomy addresses an individual’s ability to stand alone in the face of opposition as a self-determining, authoritative individual (Keyes et al., 2002). A person with high levels of autonomy should also have a greater internal locus of control.

A representative statement used for this six item scale is, “My decisions are not usually influenced by what everybody else is doing.” The reliability coefficient for the autonomy subscale of well-being was 0.55.

*Self-acceptance.* Self-acceptance is considered an important part of development, mental health, and self-actualization. Self-acceptance attempts to measure one’s acceptance of one’s past and in comparison with others. A representative statement used for this five item scale is, “The past had its ups and downs, but in general I wouldn’t want to change it.” The reliability coefficient for the autonomy subscale of well-being was 0.59.

*Positive relations with others.* Having positive relations with others demonstrates that a person is mature and developmentally healthy (1989). This measure attempts to capture that social aspect of well-being. Having positive relations with others has been found to be related to the lowered stress levels and increased autoimmune functioning (Ryff & Singer, 2000). A representative statement used for this six item scale is, “People would describe me as a giving person, willing to share my time with others.” The reliability coefficient for this subscale of well-being was 0.63.

**Attention Deficit/Hyperactivity Disorder.** Respondents were provided with a survey question asking them to indicate whether or not they had ever been told by a doctor or a psychologist they had attention deficit disorder (ADD) or attention deficit hyperactivity disorder (ADHD).

**Demographic and academic measures.** Several demographic measures were included in the analysis as controls. These variables have been found to be related to well-being in previous studies (Ryff, Keyes, & Hughes, 2003). Also, the two groups (students with ADHD and their non-ADHD peers) potentially differ on these measures. Therefore, these measures became control variables in the regression analyses. Race was measured as a dummy variable that indicates whether the respondent is Caucasian {1=yes, 0=no}. There were 20 respondents reporting their race as other than white or black (6 reported they were black and white; 5 did not specify; 7 reported they were Hispanic; 1 reported Indian (from India), and one other respondent reported Asian as race. The non-Caucasian respondents were all included in one category. The final measure compares Caucasians to all other respondents. Sex was also measured as a dummy variable that indicates whether the respondent is female {1=yes, 0=no}. Household income was measured categori-

cally. Respondents were asked to check the annual income that best describes the family they grew up in. The categories were defined using \$10,000 increments: less than \$19,000=1, \$20,000 - \$29,999=2, \$30,000 - \$39,999=3, \$40,000 - \$49,999=4, up to \$100,000 or more=10. For the regression analysis, eleven missing values were replaced with the mean of 6.21.

**Social activities.** Respondents were asked if they were college athletes {1=yes, 0=no}. Also, respondents were asked if they were members of a sorority or fraternity, or Greek organization {1=yes, 0=no}. For the frequency of going out with friends, the following response was used: 0= never, 1= a few times a month, 2= once a week, 3= several days a week, 4= everyday.

## Results

### Analysis Plan

The first objective of the analysis was to examine initial characteristics differentiating college students who self-report a prior ADHD diagnosis from their non-ADHD peers (*t*-tests for mean differences; Chi-squared ( $\chi^2$ ) tests for percentages). Next, initial well-being differences between the two groups (*t*-tests) were examined. Finally, well-being differences were examined after controlling for demographic differences between the two groups using ordinary least squares (OLS) regression.

### Descriptive Analysis

In order to explore differences between students with ADHD and all other students, means were compared on all the measures. Chi-squared ( $\chi^2$ ) tests were performed for categorical variables and independent samples *t*-tests were performed on the continuous measures and ordinal measures with a sufficient number of categories. Students with ADHD were similar to their non-ADHD peers in terms of age and class standing (results not displayed). The results of this descriptive analysis are displayed in Table 1. Thirty-four respondents self-reported a prior diagnosis of ADHD.

A higher percentage of students with ADHD (88.2 compared to 66.8) were white ( $\chi^2(1) = 6.5, p = .01$ ) and male (64% compared to 38%) ( $\chi^2(1) = 8.5, p < .01$ ). Students with a prior ADHD diagnosis came from households with incomes over \$80,000, on average, whereas the other students came from families with incomes of \$60,000 - \$70,000 ( $t(303) = 4.6, p < .001$ ). In terms of social activities, the students with ADHD were sur-

prisingly similar. These measures were self-reported estimates of social activity. However, the possibility of reporting bias notwithstanding, the students with ADHD were more likely to belong to a fraternity or sorority (35% compared to 13%) ( $\chi^2(1) = 10.93, p = .001$ ) and more likely to be college athletes (21% compared to 9%) ( $\chi^2(1) = 4.2, p = .04$ ). Finally, the students with a prior ADHD diagnosis were significantly higher on the reported frequency of going out with friends (3.1%, when 3= several days a week compared to 2.7%) ( $t(315) = 2.2, p = .03$ ).

For the bivariate analysis of psychological well-being, the total well-being differences are displayed as well as the means for the six subscales of eudaimonic well-being. Students reporting a prior ADHD diagnosis were significantly lower on total well-being ( $t(315) = 3.6, p < .001$ ) and four of the six specific well-being areas. Students with ADHD were significantly lower on perceptions of environmental mastery ( $t(315) = 2.3, p = .02$ ), personal growth ( $t(314) = 3.4, p = .001$ ), purpose in life ( $t(315) = 4.6, p < .001$ ), and self-acceptance ( $t(315) = 2.1, p = .04$ ). Students reporting a prior ADHD diagnosis were not significantly lower on perceptions of autonomy ( $t(315) = 0.7, p = .47$ ) or positive relations with others ( $t(315) = 1.3, p = .18$ ). The mean differences are displayed in Figure 1. The largest differences were present for measures of well-being related more to organizational rather than social functioning. Self-acceptance entails some amount of social comparison. However, in order to thoroughly examine these differences, the ADHD group differences need to be analyzed while controlling for the other differences between the groups.

### Multivariate Analysis

To examine the impact of ADHD on well-being, the other measures differentiating the ADHD from the non-ADHD peer group were included in the models as control variables. In order to examine the group differences more thoroughly, a number of ordinary least squares regressions (OLS) were performed. The rationale for including these controls was to ensure that the impact of ADHD on the well-being measures was not just a result of differences between these two groups, other than ADHD. For the control variables, sex of respondent (female = 1), race of respondent (African-American = 1), and level of household income (in the respondent's family growing up) were included. The former control variables represented significant group differences in the earlier analysis (see Table 1).

Table 1

*Descriptive Statistics by College Students Reporting ADHD Compared to All Others on Demographic Measures and Social Activities (N = 317).*

<u>Variables</u>	<u>Students Reporting ADHD</u>		<u>Other Students</u>		<u>p</u>
	<u>Mean</u>	<u>Percent</u>	<u>Mean</u>	<u>Percent</u>	
Demographics					
female		38.2		64.0	.00**
white		88.2		66.8	.01*
household income (growing up)	8.3		6.0		.00***
Social Activities					
college athlete		20.6	9.2		.04*
fraternity or sorority member		35.3		13.4	.00**
frequency of going out with friends	3.1		2.7		.03*
N		34		283	

Notes: \* $p \leq .05$ , \*\* $p \leq .01$ , \*\*\* $p \leq .001$ ; Two-tailed  $t$ -tests for continuous variables,  $\chi^2$  test for categorical.

Table 2

*Means Comparing Students Reporting ADHD to Other Students on Total Well-Being and Well-being Subscales (N = 317).*

Variables	Students Reporting ADHD	Other Students	<i>p</i>
Total Well Being	4.3	4.6	.00***
Environmental Mastery	4.1	4.4	.02*
Personal Growth	4.5	4.9	.00**
Purpose in Life	4.2	4.8	.00***
Autonomy	4.2	4.3	.47
Self-acceptance	4.4	4.6	.04*
Positive relations with others	4.5	4.7	.18
<i>N</i>	34	283	

Notes: \* $p \leq .05$ , \*\* $p \leq .01$ , \*\*\* $p \leq .001$ ; Two-tailed *t*-tests for continuous variables,  $\chi^2$  test for categorical.

Additional control measures were initially included, but were not significant in any of the models, nor did their inclusion change the findings presented in any substantive way (results not displayed). These variables included family type growing up (single parent family or not), age, class standing (recoded as freshman or not), and high school grade point average. They were removed from the analysis.

A summary of the regression analysis results are displayed in Table 3. Recall that Table 2 displays the differences between the ADHD and non-ADHD peer group *without* controls. In each of the seven regression models, the *B* column represents the non-standardized regression coefficient, which is the mean difference in well-being (or subscale of well-being). The  $\beta$  column represents the standardized coefficient and is the relative contribution of the variable to the model. The statistically significant findings are italicized in Table 3. For total well-being, the difference remained significant after the addition of the control measures ( $B = -0.24$ ,  $\beta = -0.16$ ,  $p = .01$ ). This suggests that even with the inclusion of the control variables, students reporting a prior ADHD diagnosis were 0.24 lower on total well-being compared to their non-ADHD peers. Caucasians were slightly lower and females were slightly higher on

total well-being. The model explained approximately 7% of the variation in total well-being.

For environmental mastery, students reporting a prior ADHD diagnosis remained lower than others after the inclusion of controls ( $B = -0.25$ ,  $\beta = -0.12$ ,  $p = .04$ ). Environmental mastery represents the respondent's ability to participate and manage his or her environment. The change in the variation explained ( $R^2$ ) was not statistically significant.

For the well-being measure of personal growth, the results were similar for students reporting a prior ADHD diagnosis. The students reporting a prior ADHD diagnosis were significantly lower on perceptions of personal growth ( $B = -0.33$ ,  $\beta = -0.17$ ,  $p = .01$ ). The control measures did not contribute to additional explanation of variation in personal growth. The model explained approximately 5% of the variation in personal growth ( $R^2 = 0.05$ ).

Finally, purpose in life represents a person's level of agreement with statements such as: "I enjoy making plans for the future and working to make them a reality." Again, students reporting a prior ADHD diagnosis were significantly lower than their non-ADHD peers ( $B = -0.46$ ,  $\beta = -0.20$ ,  $p < .01$ ). Females were slightly higher and Caucasians slightly lower on purpose in

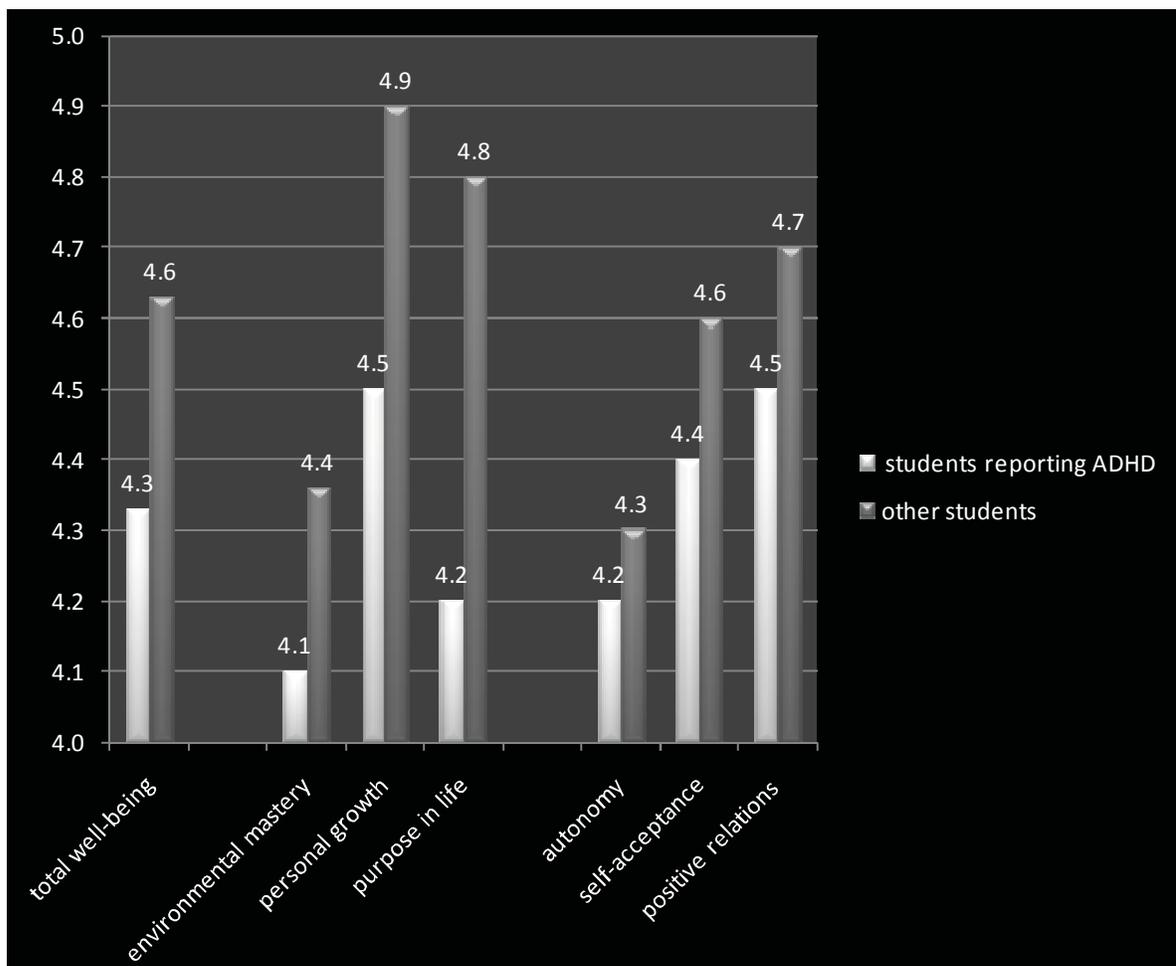


Figure 1. Means for Students Reporting ADHD Compared to Other Students on Total Well-being and Subscales.

life. The coefficient for the ADHD was slightly smaller with controls, which suggests part of the initial group difference between the groups (see Table 2, Figure 1) was related to the smaller proportion of non-whites and females in the ADHD group. The second model explained approximately 10% of the variation in personal growth ( $R^2 = 0.10$ ).

In the next set of analyses, the models predicted differences on the well-being subscales more related to social aspects of well-being, or self-concept in relation to others. The autonomy subscale of well-being measured a person's ability to be independent amidst others that might disagree. One of the items representing this scale was the following: "My decisions are not usually influenced by what everybody else is doing." For this regression, students reporting a prior ADHD diagnosis were not significantly lower than the non-ADHD peer group ( $B = -0.01$ ,  $\beta = -0.01$ ,  $p = .92$ ).

This suggests that ADHD was not a predictor of lower perceptions of autonomy for this sample. The results showed a significant negative relationship for whites. The model explained approximately 6% of the overall variation in autonomy ( $R^2 = 0.06$ ).

The self-acceptance subscale of well-being measured the level of agreement with items such as: "When I compare myself with friends and acquaintances, it makes me feel good about who I am." Students reporting a prior ADHD diagnosis were significantly lower on this scale before the inclusion of the control measures (see Table 2). After the addition of the block of control variables, they were no longer significantly lower ( $B = -0.15$ ,  $\beta = -0.07$ ,  $p = .23$ ). Race (white = 1) was negatively related to self-acceptance ( $\beta = -0.17$ ,  $p < .01$ ). This suggests the initial difference between the groups can be attributed to the higher percentage of whites in the group reporting an ADHD diagnosis.

Table 3

*Summary of Ordinary Least Squares (OLS) Regression Results*

<u>Dependent Variable and Predictor Variables</u>	<u>B</u>	<u>SE B</u>	<u><math>\beta</math></u>	<u>p</u>	<u>Model R<sup>2</sup></u>
Total Well-being					0.07*
ADHD (reporting diagnosis = 1)	-0.24	0.08	-0.16	0.01	
Sex (Female = 1)	0.10	0.05	0.11	0.05	
Race (Whites = 1)	-0.14	0.06	-0.14	0.02	
Household Income (family growing up)	0.00	0.01	0.00	0.99	
Environmental Mastery					0.02
ADHD (reporting diagnosis = 1)	-0.25	0.12	-0.12	0.04	
Sex (Female = 1)	-0.03	0.07	-0.02	0.72	
Race (Whites = 1)	-0.11	0.08	-0.08	0.18	
Household Income (family growing up)	0.00	0.01	0.01	0.84	
Personal Growth					0.05*
ADHD (reporting diagnosis = 1)	-0.33	0.12	-0.17	0.00	
Sex (Female = 1)	0.12	0.07	0.09	0.10	
Race (Whites = 1)	-0.04	0.08	-0.03	0.60	
Household Income (family growing up)	0.00	0.01	-0.02	0.80	
Purpose in Life					0.10*
ADHD (reporting diagnosis = 1)	-0.46	0.13	-0.20	0.00	
Sex (Female = 1)	0.19	0.08	0.13	0.02	
Race (Whites = 1)	-0.21	0.09	-0.13	0.03	
Household Income (family growing up)	-0.01	0.02	-0.05	0.37	
Autonomy					0.06*
ADHD (reporting diagnosis = 1)	-0.01	0.13	-0.01	0.92	
Sex (Female = 1)	0.04	0.08	0.03	0.58	
Race (Whites = 1)	-0.36	0.09	-0.24	0.00	
Household Income (family growing up)	0.01	0.02	0.02	0.71	
Self-Acceptance					0.06*
ADHD (reporting diagnosis = 1)	-0.15	0.13	-0.07	0.23	
Sex (Female = 1)	0.04	0.08	0.03	0.57	
Race (Whites = 1)	-0.26	0.09	-0.17	0.00	
Household Income (family growing up)	-0.02	0.01	-0.07	0.23	
Positive Relations with Others					0.03
ADHD (reporting diagnosis = 1)	-0.22	0.13	-0.09	0.11	
Sex (Female = 1)	0.12	0.08	0.08	0.14	
Race (Whites = 1)	0.11	0.09	0.07	0.23	
Household Income (family growing up)	0.02	0.02	0.09	0.14	

Notes: \* $p \leq .01$  for  $R^2$

The model explained approximately six% of the overall variation in autonomy ( $R^2 = 0.06$ ).

Positive relations with others is a measure of a person's perception of his or her ability to positively interact with others. The ADHD measure was not a significant predictor of positive relations with others ( $B = -0.22$ ,  $\beta = -0.09$ ,  $p = .11$ ).

### Discussion

In this study, students who self-reported ADHD also reported lower perceptions of total well-being. When total well-being was broken down into its subscales, the lower well-being was particular to certain aspects of eudaimonic, or psychological, well-being. On the subscales that represented purpose in life, mastery of one's environment, and personal growth, individuals reporting a prior ADHD diagnosis rated themselves significantly lower than their non-ADHD peers. However, on the more social and self-image aspects of well-being, there were no significant differences. In addition, students with self-reported ADHD were not statistically different in terms of socializing with friends. Also, significantly greater percentages of the students who reported an ADHD diagnosis belonged to fraternities and participated in college athletics.

The findings should lead to a more critical examination of the socially related self-concepts of ADHD for young adults. This research replicates earlier findings that suggest college students with ADHD have a difficult time mastering their environments and organizing their lives (Reasor et al., 2007). On the other hand, this study's findings do not support the idea that ADHD hinders an individual in more socially-oriented aspects of life. Rather, these findings reinforce Hallowell and Ratey's (1994) observation that adults with ADHD are often overachievers, gregarious, and very social. Impairment with peer relations is a fairly consistent finding in research focusing on children with ADHD (Hoza et al. 2004; Mrug et al. 2009). However, extant research on college students report either a lack of psychological impairment or comparable levels of social satisfaction between students with ADHD and their non-ADHD peers (Rabiner et al. 2008; Heiligenstein et al. 1999). This suggests that college administrators and service providers should continue to provide services that help students manage the task-oriented aspects of the college experience. Life coaching has been identified as an effective method of keeping the

college student with ADHD on track (Quinn et al., 2000). Colleges should also consider encouraging students with ADHD to access qualified medical providers to manage their use of prescription medications, which can have a substantial impact on their academic success. Many college students with ADHD are more apt to use these medications when alone (i.e. studying) than when socializing. Therefore, managing the appropriate use of medication could potentially contribute to overall functioning for college students with ADHD.

While the finding that college students reporting a prior ADHD diagnosis are similar in terms of their perceptions of their social functioning to the non-ADHD peers is promising, there is also cause for concern. One of the issues facing college students is a need for time management (Meaux et al., 2009; Swartz et al., 2005). Strategies such as keeping a strict calendar, prioritizing, keeping deadlines at the forefront, and creating start and stop times for all academic activities can help students with ADHD succeed in college in addition to utilizing a life coach (Quinn et al., 2000).

Without the structure provided by parents and secondary school, college students with ADHD may be less aware of their need to limit social activities. If they perceive fewer deficits in the area of social functioning but experience academic difficulties, they may gravitate to social activities and neglect academics. Research has found that college students with ADHD may overindulge in social activities (McCormick, 1998). Quinn et al. (2000) suggest several tactics related to appropriate social interactions such as self-monitoring and self-awareness. However, this study did not identify self-reported concerns about social interactions as a problem area for this sample. The respondents in this study were more likely to be in a sorority or fraternity and socialized with their friends more frequently than their non-ADHD peers. This could mean that students with ADHD were not having trouble thriving socially, but may be socializing too much. Alternatively, students with ADHD may select fraternities, sororities, and college athletics as an adaption to college life. These activities may provide both structure and improved social functioning. However, they may continue to experience difficulties beyond the social realm as they try to manage a busy college life while coping with their executive functioning weaknesses.

College professionals may need to focus more on helping students balance their social activities with academic demands. Consciously addressing the

social-academic balancing act may be an area totally missed by campus offices designed to provide support to students. Time management workshops and individualized sessions provided to all college students may need to enhance attention devoted to skills students need to live a productive, balanced life. There should *not* be a movement away from strategies focusing on academic success. However, these strategies should be examined within the context of the student's social life. College students with ADHD should not be encouraged to cut back on social activities. Rather, they should be provided with strategies to create more structure in those parts of their lives for which they have little external structure.

### Limitations

Several limitations need to be considered when examining the findings of the present study. One limitation pertains to the use of a convenience sample of undergraduate students. Because the sample was not a random probability sample, the findings must be interpreted with caution. The sample consisted of classes of undergraduates that were classified as general education courses. Students from the entire university are required to take a certain number of general education classes. Therefore, the classes sampled potentially contained students from all majors. Also, due to the convenient nature of the sample and the overall sample size, the size of the group reporting ADHD is very small. A final limitation of the sample is that it comes from an institution in the Southern United States. This Southern data may not generalize to other regions in the United States in terms of well-being. Therefore, the differences may vary when examined in more nationally representative samples.

There are some methodological limitations to this study. In Ryff's (1989) original formulation, her subscale measures yielded higher reliability-coefficients than these data yielded. Part of this difference is a result of the higher number of items that her study included for each subscale (approximately 20 for each scale in Ryff, 1989). The well-being scales in the present study consisted of fewer items (4-7 per scale). However, earlier studies have used shorter versions of each dimension and yielded similarly reduced reliabilities (Ryff et al. 2003; Keyes et al. 2002). A direct comparison of these reliabilities is presented in Appendix B.

Another limitation relates to the use of a self-reported prior diagnosis of ADHD and well-being. First,

it was not determined when the diagnosis occurred for the individual. Also, the method of diagnostic evaluation as well as the credentials of the evaluator may have varied dramatically across respondents. An alternative would have been to use only those students with documented ADHD via the office of students with disabilities. However, this would have only captured those students with ADHD who were utilizing accommodation services on campus. As Chew et al. (2009) reported, only about half of those students with ADHD on campus who are aware of services utilize them. The self-report method also did not distinguish sub-types of ADHD. Norwalk et al. (2009) found more difficulties among students with the Inattentive subtype compared to the Hyperactivity/Impulsive subtype. There may be differences in the well-being of students with hyperactivity versus inattentiveness.

In addition, the questions in this survey did not measure additional types of disabilities such as dyslexia, anxiety, or physical impairments. It is quite possible that a number of the students not reporting an ADHD diagnosis may have other disabilities not captured. Respondents were not asked about co-morbid conditions or the use of campus-based or private therapy. Students who reported ADHD may have had co-morbid conditions or used therapy, which could have had an impact on their well-being. Respondents also self-reported their levels of well-being. Based on the literature related to positive illusory bias, there is reason to believe that individuals with ADHD may not be the most accurate self-reporters (Owens, Goldfine, Evangelista, Hoza, & Kaiser, 2007).

Finally, limitations of the study are similar to those reported by Rabiner et al. (2008). Students with ADHD who achieve admission to a university setting may represent a select group. They may be the students with the most support from their parents in terms of guidance and economic resources. Therefore, they may not be representative of typical young adults with ADHD. There is also no information in this study about the utilization of the disabilities services office on campus. Those students willing to self-report their ADHD may represent a subgroup of undergraduates who are more comfortable with the disability and possibly more likely to be utilizing services on and off campus. Future research about the well-being of college students with ADHD could gather data about students' use of support services to further understand these issues.

## Conclusion

While there are many limitations to the present study, the results can be interpreted as encouraging. College students with ADHD do not perceive themselves any differently than their non-ADHD peers in terms of the social aspects of psychological well-being. However, they reported lower levels on the psychological well-being measures not related to social functioning. This is an important initial step in the investigation of well-being among college students with ADHD. Future research should focus on the interplay between the social and non-social aspects of well-being. For instance, engagement in social activities on campus may either promote or inhibit academic functioning and life management. University professionals and students with ADHD would benefit greatly from a better understanding of these dynamics.

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# Appendix A

## Items Used for Each of Ryff's (1989) Six Scales of Well-being

### Environmental Mastery

1. I am quite good at managing the many responsibilities of my daily life.
2. I generally do a good job of taking care of my personal finances and affairs.
3. I have difficulty arranging my life in a way that is satisfying to me (reverse-coded).
4. I do not fit very well with the people and the community around me (reverse-coded).
5. I often feel overwhelmed by my responsibilities (reverse-coded).

### Personal Growth

1. I am not interested in activities that will expand my horizons (reverse-coded).
2. I don't want to try new ways of doing things – my life is fine the way it is (reverse-coded).
3. I do not enjoy being in new situations that require me to change my old familiar way of doing things (reverse-coded).
4. I think it is important to have new experiences that challenge how you think about the world.
5. I have the sense that I have developed a lot as a person over time.

### Purpose in Life

1. My daily activities often seem trivial and unimportant to me (reverse-coded).
2. I don't have a good sense of what it is I am trying to accomplish in life (reverse-coded).
3. I am an active person in carrying out the plans I set for myself.
4. I enjoy making plans for the future and working to make them a reality.

### Autonomy

1. I tend to worry about what other people think of me (reverse-coded).
2. My decisions are not usually influenced by what everybody else is doing.
3. It is difficult for me to voice my own opinions on controversial matters (reverse-coded).
4. I often change my mind about decisions if my friends and family disagree (reverse-coded).
5. I am not afraid to voice my opinions even when they are in opposition to the opinions of others.
6. Being happy with myself is more important than having others approve of me.

### Self-Acceptance

1. In general, I feel confident and positive about myself.
2. My attitude about myself is probably not as positive as most people feel about themselves (reverse-coded).
3. I have made some mistakes in the past, but feel that all in all everything has worked out for the best.
4. The past had its ups and downs, but in general I wouldn't want to change it.
5. When I compare myself with friends and acquaintances, it makes me feel good about who I am.

### Positive Relations with Others

1. It seems to me that most other people have more friends than I do (reverse-coded).
2. Most people see me as loving and affectionate.
3. I enjoy personal and mutual conversations with family members and friends.
4. People would describe me as a giving person, willing to share my time with others.
5. I often feel lonely because I have few close friends with whom to share my concerns (reverse-coded).
6. I know that I can trust my friends and they know that they can trust me.

## Appendix B

### Reliability Comparison of Revised Well-being Scales

Well Being Subscale	Ryff (1989) (20 Items)	Ryff, Keyes, Hughes (2003); Keyes, Shmotkin, Ryff (2002) (3 Items)	Present Study (4-6 Items)
Environmental Mastery	.90	.52	.44
Personal Growth	.87	.55	.60
Purpose in Life	.90	.37	.60
Autonomy	.86	.48	.55
Self-Acceptance	.93	.59	.59
Positive Relations with Others	.91	.58	.63

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Note. Internal consistency reliability alphas for present study compared to earlier work on subscale measures of psychological well-being.

# Curb Cuts in Cyberspace: Universal Instructional Design for Online Courses

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## Abstract

College courses that include universal design features can minimize the need to provide accommodations for students with disabilities and make courses accessible to students from diverse backgrounds. This article examines how principles of Universal Instructional Design (UID) and Universal Design for Learning (UDL) can be incorporated into an online course to accommodate an increasingly diverse body of students in postsecondary institutions. The authors designed and implemented a graduate-level online course that incorporated UID guidelines and met UDL principles. To evaluate the universally-designed course elements, students were surveyed and interviewed during and after the course. This case study describes the universal design features that can be included in an online course and highlights the features that students valued. The authors conclude with considerations for course designers who seek to include universal design features in online courses.

*Keywords: online course, universal design, UID, disability*

The number of postsecondary institutions offering distance learning courses grew from 34% in 1997 (Wirt et al., 2004) to 66% in 2006-2007 (Parsad & Lewis, 2008). A report by the Sloan Consortium (Allen & Seaman, 2010) describes the steady growth in online course enrollments in the past seven years. According to the report, between 2008 and 2009, there was a 21% growth for enrollments in online courses, which far exceeds the overall growth of the number of students in higher education at less than 2%. With more students choosing distance education options, enrollments in online courses will increasingly reflect the diversity of postsecondary populations, including students with disabilities.

For students with disabilities who attend college, legislation such as Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act Amendment Act (ADAAA) of 2008 guarantee access to all classes, including online classes. The technology-rich environment of online learning provides natural opportunities to create accommodations and accessible environments for students with disabilities (Kinash, Crichton, & Kim-Rupnow, 2004). For instance, mul-

timedia technology can support various modalities, providing options for representing and expressing information in textual, auditory and visual formats.

Instructors are wise to design courses that address the learning preferences and diverse abilities of students who are choosing distance education options. Educational models stemming from universal design (UD) principles provide frameworks for designers of online courses who seek to create accessible learning environments. The term “universal design” was coined by architect Ron Mace to describe the process of designing physical environmental features to be functionally accessible to a range of users, with and without disabilities. Educational models based on UD relate this idea of universal access to pedagogical practices, applying them to the processes of teaching and learning (Rose, Harbour, Johnston, Daley, & Abarbanell, 2006).

Three educational models adapt UD principles for purposes of curriculum and instruction — Universal Instructional Design (UID), Universal Design for Learning (UDL) and Universal Design of Instruction (UDI). Table 1 lists the main principles of each of the

Table 1

*Universal Design Educational Models*

Educational Model	Main Principles or Guidelines
UID: Universal Instructional Design (Goff & Higbee, 2008)	<ol style="list-style-type: none"> <li>a. Creating welcoming classrooms</li> <li>b. Determining essential components of a course</li> <li>c. Communicating clear expectations</li> <li>d. Providing timely and constructive feedback</li> <li>e. Exploring use of natural supports for learning, including technology</li> <li>f. Designing teaching methods that consider diverse learning styles, abilities, ways of knowing, and previous experience and background knowledge</li> <li>g. Creating multiple ways for students to demonstrate their knowledge</li> <li>h. Promoting interaction among and between faculty and students</li> </ol>
UDL: Universal Design for Learning (National Center on Universal Design for Learning, 2010)	Principle I. Provide Multiple Means of Representation Principle II. Provide Multiple Means of Action and Expression Principle III. Provide Multiple Means of Engagement
UDI: Universal Design of Instruction (Burgstahler, 2009)	<ol style="list-style-type: none"> <li>1. Class climate</li> <li>2. Interaction</li> <li>3. Physical environments and products</li> <li>4. Delivery methods</li> <li>5. Information resources and technology</li> <li>6. Feedback</li> <li>7. Assessment</li> <li>8. Accommodation</li> </ol>

three educational models – UID, UDL, and UDI.

These three approaches to incorporating UD can be complementary, providing a range of strategies and approaches for instructors to consider as they design courses. The principles can be applied to overall design of a course as well as specific instructional elements such as materials and instructional strategies. Burgstahler (2006) notes that incorporating UD principles may not eliminate the need for accommodations for a student with a specific disability, but it does create an environment that is accessible for a range of students

and minimizes the need to create accommodations. For instance, providing audio versions of class readings can support students with learning disabilities, students with visual impairments, students for whom English is a foreign language, and students whose preference is to learn through auditory input.

Silver, Bourke, and Strehorn (1998) initiated the concept of UID as a model appropriate for postsecondary settings. In a study designed to create a working definition of UID, they stated, “with UID, students may find that many of the instructional accommodations

they would request are already part of the faculty members' overall instructional design. Furthermore, these approaches may benefit all students in the class" (p. 47). Berger and van Thanh (2004) note that UID is consistent with goals of equity and inclusion of students with disabilities and creates campus environments that respect and value diversity. Goff and Higbee (2008), in a guidebook for postsecondary faculty, list eight guidelines for the UID approach, based on Chickering and Gamson's (1987) principles for effective practices in undergraduate education. The guidebook translates UID principles into concrete course elements that instructors can consider while designing courses.

### **Case Study: Universal Design for an Online Course**

This paper describes a case study of an online course that incorporated elements of two UD approaches, UID and UDL. The two-fold purpose of the study was to: a) examine how UID and UDL guidelines can be considered during the instructional design process and applied in an online course environment, and b) determine which elements of UD were most valued by and useful to students enrolled in the online course. In this case study, we describe the process in three phases – course design and development, implementation, and evaluation.

### **Formats for Online Courses**

While the term "online course" implies a certain type of instructional offering, the form and structure of online courses can vary greatly. Some courses are delivered fully online while others are "hybrid" or "blended." Hybrid/blended courses use some combination of face-to-face instruction and online instruction (Allen & Seaman, 2010). With increasing access to synchronous technologies, such as web-conferencing software, "real time" meetings can also take place online in virtual classrooms, creating opportunities for interactions similar to those that take place in traditional face-to-face classes.

There are two major factors to consider when designing an online course – technology and pedagogy. Instructors can begin by considering the combination of technologies and methods best suited to their instructional objectives. Instructors should consider the course delivery methods they will use, determining how to combine the asynchronous and synchronous technologies that are available. Asynchronous technologies include course management systems (CMS), discussion forums, blogs, and email. Synchronous

technologies include web-conferencing, chats, and videoconferencing.

Instructors should then consider the instructional materials and strategies they will use in conjunction with the technologies they select. In a synchronous environment, instructors can emulate some of the interactions that take place in a face-to-face class, using the virtual meeting space for lectures, small and large group activities, and interactions between students and instructor. Concurrently, asynchronous technologies can be used to post instructional resources, assignments, and conduct online discussions.

With the array of options for online instructional design, there is no blueprint for incorporating UD principles into an online course. Instead, as with a traditional course, instructors can apply UD principles to their online courses in a variety of ways to create environments that accommodate a range of student needs and learning preferences. Research on the use of UD principles in online and hybrid/blended courses has only recently been reported in the literature. Researchers have described ways in which higher educational environments, including distance education programs and courses, can be proactively made more accessible (Anderson & Litzkow, 2008; Burgstahler, 2008). Parker, Robinson, and Hannafin (2007) described how they utilized an online CMS within a face-to-face course to create a "blended learning environment" that integrates UDI guidelines.

The Institute for Higher Education and Policy ([IHEP], 2000) identified benchmarks for excellence in distance learning environments. Researchers have examined ways to translate these benchmarks into instructional practices (Dukes, Waring, & Koorland, 2006). Many of these instructional practices are consistent with UD guidelines. While there is overlap between established benchmarks and UD frameworks, the UD models provide guidelines that proactively address disability and diversity.

The present case study adds to this literature base by examining how UD guidelines can be applied to instructional design decisions about technology and pedagogy for an online course and evaluating the students' opinions of the UD-based course elements in order to identify the features valued by students.

## Method

### Phase I: Course Design

The course design team, the co-authors of this paper, consisted of the course instructor (an assistant professor) and a doctoral candidate in the Special Education Department in the College of Education. Both course designers had extensive experience in technology-enhanced instructional design and delivery, including converting traditional face-to-face courses into online formats. The course, "Collaboration in School and Community Settings," was required as part of the program sequence for teacher licensure candidates in the Special Education department.

To begin planning this course, we chose to focus on two of the UD models. We relied primarily on Goff and Higbee's (2008) UID implementation guidebook for faculty and staff in postsecondary environments. The UID framework includes eight guiding principles that can be considered during the instructional design and course implementation process (see Table 1). The Goff and Higbee guidebook contains concrete scenarios and case studies written by instructors of various courses, providing examples of ways in which the principles were applied to face-to-face courses. Based on our prior experiences converting traditional courses into online formats, we discussed which of these UID-based strategies could be effectively translated to an online course. We subsequently developed the elements of our course, practices and strategies aligned to each of the eight UID principles. As we discussed and developed our course elements, we noted that they also aligned to the three UDL Principles of Multiple Means of Representation, Action and Expression, and Engagement (<http://www.udlcenter.org/aboutudl/udlguidelines>). Thus, we refer to UDL as the secondary model for our course design. Table 2 provides an overview of how the selected course elements mapped to both UID and UDL principles. We organized the elements into four categories: a) course materials, b) instructional strategies, c) asynchronous technologies, and d) synchronous technologies.

We began designing this course several months prior to the start of the semester when it would be taught. As a result, we did not have any information about the disability status of the students who would eventually enroll in the course. As course designers, we saw this as an authentic environment in which to add UD elements. As instructors at a large public state uni-

versity, we anticipated enrollment of a diverse population in this course. The university we work at typically serves students of diverse ethnic and socioeconomic backgrounds. Students include Pacific islanders and students who speak English as a foreign language. Teacher-training programs attract many non-traditional students returning to school for a change in vocation or certification. As special educators and instructional designers we were cognizant of the potential for diversity in learning style, preference, and disability status. One member of the design team (the second author) has experience working in postsecondary disability support services. This background helped the design team make determinations on developing materials and strategies that address the needs of students with some high incidence disabilities (e.g., print-related disabilities).

### Phase II: Implementation of Course

This 16-week course was implemented in the Fall 2009 semester. This section details how the UD-based course elements and practices were incorporated by the instructor (the first author) during implementation of the course. Goff and Higbee's (2008) guidebook includes a case study section in which several instructors list the UID-based elements of their courses. Since we relied heavily on this guidebook as we made our instructional design decisions, we followed the format in the guidebook for reporting case studies. Under each of the eight UID guidelines, we provide a narrative about the course elements and instructional strategies we used.

**Creating a welcoming classroom.** Prior to the course start date, the instructor regularly checked the course enrollment online and sent an email message to each student as he or she registered in the course. This message was individualized and addressed each student by first name. This direct contact from the instructor was intended to establish rapport and set expectations. The message provided information to orient students to the course and to establish expectations about how to get started during the first week of instruction.

**Determining essential components of a course.** The course syllabus listed a set of core objectives, determined by the Special Education Department. The instructional design team considered how each objective could be addressed in an online environment, using the distance learning technologies available to the students.

Table 2

Mapping Course Elements to UID and UDL Principles

		A: Welcoming Classrooms	B: Essential Course Components	C: Clear Expectations	D: Timely, Constructive Feedback	E: Diverse Teaching Methods	F: Natural Supports	G: Demonstrate Knowledge	H: Interaction - Students / Faculty	I: Representation	II: Action and Expression	III: Engagement
	Course Elements	UID							UDL			
Course Materials	Syllabus: <ul style="list-style-type: none"> <li>Included disability statement</li> <li>Included rubrics for all assignments</li> <li>Included an overview of the weekly schedule for the whole semester</li> </ul>	•	•	•						•		
	Textbook: <ul style="list-style-type: none"> <li>Gave students the option of purchasing a text or electronic version</li> </ul>					•				•		
	Additional Readings: <ul style="list-style-type: none"> <li>Provided audio versions (MP3s) of articles for students</li> </ul>					•	•			•		•
	Web-based instructional modules: <ul style="list-style-type: none"> <li>Videos and audio on this website were closed captioned</li> <li>Text transcripts were available for each video or audio file.</li> </ul>					•	•			•		•
Instructional Strategies	Assignments: <ul style="list-style-type: none"> <li>Assigned short weekly assignments for 10 out of the 16 weeks of class</li> <li>Provided handouts and worksheets to guide each assignment</li> <li>Had a consistent time and day of the week when assignments were posted and due</li> </ul>			•	•		•	•		•	•	
	Final Project: <ul style="list-style-type: none"> <li>Students were given the choice of writing a traditional final paper or creating a multimedia project; detailed guidelines and rubrics were provide for each option.</li> </ul>			•			•	•		•	•	•

Table 2 continued on next page

		A: Welcoming Classrooms	B: Essential Course Components	C: Clear Expectations	D: Timely, Constructive Feedback	E: Diverse Teaching Methods	F: Natural Supports	G: Demonstrate Knowledge	H: Interaction - Students / Faculty	I: Representation	II: Action and Expression	III: Engagement
	Course Elements	UID							UDL			
Asynchronous	<b>Elluminate Live! Sessions:</b> <ul style="list-style-type: none"> <li>Recorded each session and made resources from the session available to students to review afterwards</li> <li>Used a visual presentation during the session</li> </ul>	•				•	•	•	•	•	•	•
	<b>Course Management System:</b> <ul style="list-style-type: none"> <li>Selected a few tools within the CMS and used them consistently</li> <li>Listed each week's assignment in a consistent place on the CMS</li> <li>Responded to each student's assignment submission with comments; posted responses within 5 days of due date</li> </ul>	•	•	•			•		•	•		
	<b>Voicethread:</b> <ul style="list-style-type: none"> <li>Used Voicethread as a class "discussion" forum. Students watched multimedia presentations and responded using text, audio or video.</li> </ul>					•	•	•	•	•	•	•
	<b>Email:</b> <ul style="list-style-type: none"> <li>Interacted with students who had individual questions and concerns via email (or phone).</li> </ul>								•		•	

A CMS is available university-wide for asynchronous delivery of course content. In addition, the College of Education has purchased licenses for a synchronous web-conferencing system known as *Elluminate Live!* (see Appendix for overview of features). The instructional design team considered how these asynchronous and synchronous technologies could be used to meet the objectives of this course. The CMS was used for particular purposes, such as making resources available and posting assignments. The web-conferencing system was used to foster interactions by providing a means for synchronous group meetings periodically during the 16 weeks of the semester.

**Communicating clear expectations.** The instructor developed a simplified syllabus, formatted in way that provided quick visual access to key information that students needed to know to succeed in the course. Course requirements, grading, and expectations were clearly demarcated and separated from other areas of the syllabus. Text-heavy areas of the syllabus, such as course objectives and alignment to national and state standards, were placed on separate pages. The syllabus included a description of the grading system, the points assigned to each assignment, a weekly overview of course topics, and due dates for all major assignments. Rubrics were provided for all assignments.

To increase clarity and organization, the instructor selected and consistently used particular areas of the CMS to minimize extraneous information and use the interface in a consistent manner each week. Students were asked to visit the Announcements and Assignments area each week to find all the information and resources needed to complete the weekly assignments (see Figure 1). The title of each week's assignment had the date span for which the assignment was "active" (for example, "Week 3: September 7-13"). Students could scan the list of assignments and quickly orient themselves to the assignment they should be working on by looking for the current date (see Figure 2).

Every Monday morning the week's assignment was posted in the Assignments area, and the instructor sent an email to each student with a summary of the assignment. The email included an attachment that contained all the information that was posted in the Assignments area of the CMS. This provided a personalized note to the students each week and reminded them that a new assignment was awaiting them.

**Providing timely and constructive feedback.** During the course, students were assigned short weekly

assignments, related to content covered during the week. The weekly submissions were consistently due on Sundays at midnight. The instructor read and responded to each student's assignment within five days after submission. Students submitted their assignments in the "Assignments" area of the CMS; the instructor typed comments into their submissions and returned these comments in the same CMS area. The instructor's comments were designed to create a personalized instructional dialogue with each student about his/her assignment.

Students often emailed the instructor with questions and comments during the week. The instructor responded to all student emails within 24 hours of receiving a question or comment.

**Exploring use of natural supports for learning, including technology.** Students were provided with options for receiving and responding to course content in audio, video, and text format. The course textbook was available in print and digital formats and students were told before the course started that they could choose either one. The instructor also provided audio versions (mp3 files) of all additional assigned readings. During the course, students accessed a few web-based modules to learn course content. These modules, designed by the IRIS Center at Vanderbilt University (<http://iris.peabody.vanderbilt.edu/resources.html>) were designed to be accessible, with closed captioning and text transcripts available for all audio and video materials.

Instead of using the text-based discussion board within the CMS, the instructor used a web-based collaborative multimedia environment called Voicethread (see Appendix A for an overview of features) as the course discussion environment. The instructor uploaded videos and narrated presentations of "guest presenters" on Voicethread and students commented on these presentations within the website. Students could choose to leave a comment using the text, audio, or video features built into the Voicethread website interface.

The varied digital formats through which students could receive and respond to course content also aligned with UDL principles. Giving students the options to receive and respond to course content in text, audio, and video formats provided multiple means of representation and expression. In addition, the multimedia presentations by guest speakers on Voicethread provided multiple means of engagement, giving students authentic contexts and real life stories connected to course content.



Figure 1. Screen shot of main page for the course in the Course Management System. Two areas, Announcements and Assignments, were consistently used throughout the course.

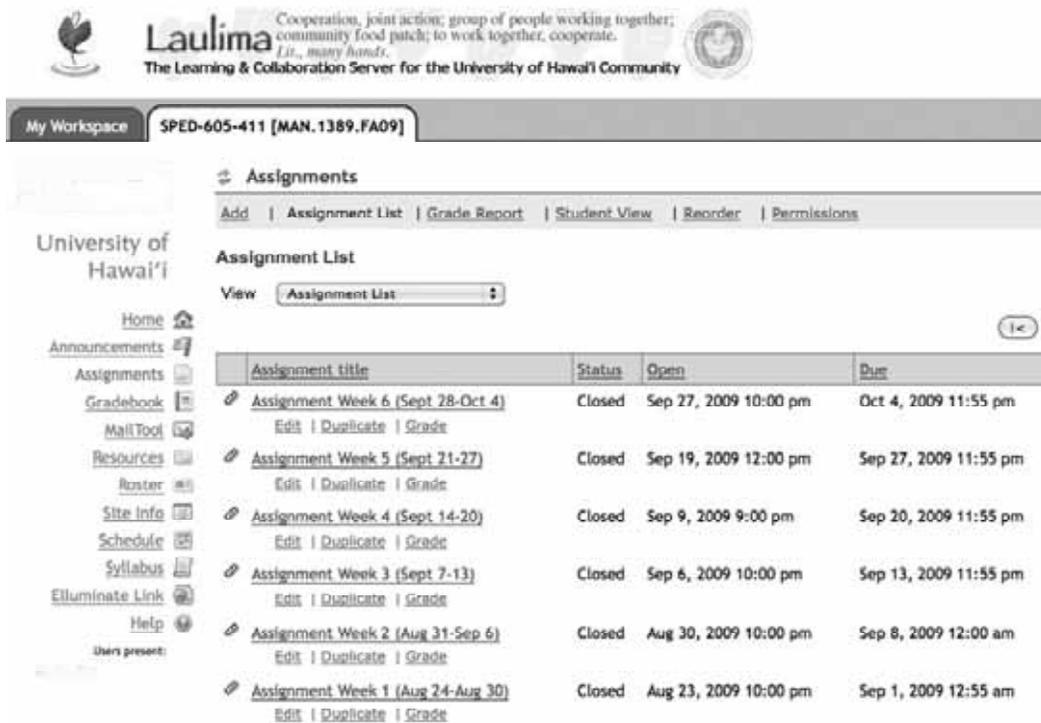


Figure 2. Screen shot of the listing of weekly assignments. The date span that each assignment was “open” was listed in the title of the assignment, making it clear for students to determine which assignment they should be working on each week.

**Designing teaching methods that consider diverse learning styles, abilities, ways of knowing, and previous experience and background knowledge.** Assignments were designed to help students connect course content to their experiences and opinions. The students in this class had diverse backgrounds and experiences. They ranged greatly in age, experience, and cultural background. All assignment prompts gave students the opportunity to bring in their own personal experience and relate it to content. For instance, while most students were teaching in some capacity and chose to answer questions based on their current school or classroom experiences, some students chose to discuss issues from their perspective as parents of children with disabilities.

The use of multiple technologies and the combination of systems (such as the CMS, Elluminate *Live!* and Voicethread) created an environment that addressed diverse learning styles. The CMS provided a consistent place to access information. Elluminate *Live!* helped to create an environment for interaction with peers and the instructor, and also provided a way in which students could absorb and interact with course content in varied ways, through the instructor's live presentation, group discussions with other students, and visual and audio supports. Voicethread provided students the choice to respond to content using text, audio, or video while simultaneously creating a forum in which other students could read or listen to their opinions. Students had multiple ways to connect with the content, interact with peers and the instructor, and demonstrate their knowledge throughout the course.

**Creating multiple ways for students to demonstrate their knowledge.** During the course, students were given options for demonstrating knowledge and completing assessments. Rather than having just a few "high value" tests or assignments, students were assigned several smaller weekly assignments. The purpose of the weekly assignments was to provide students with multiple opportunities to convey their knowledge as an alternative to using "high stakes" exams to assess student mastery of content. Most weekly assignment prompts were accompanied by a worksheet with guided questions. These questions helped students focus on key areas of course content as they reflected on its meaning.

Rather than continuing the practice of requiring a final paper as the culminating course assignment, students were given the option of submitting a paper or

a multimedia project. The assignment listed all criteria for a paper or a project and provided grading rubrics for both types of submissions. The multimedia project option included criteria that required an equivalent demonstration of course content mastery and rigor as the final paper.

**Promoting interaction among and between faculty and students.** The course incorporated four synchronous "meetings" over Elluminate *Live!* web-conferencing software, spaced approximately three weeks apart. The main objective of these synchronous sessions was to bring the class together online periodically in order to promote interactions between peers and the instructor. Another objective was to use an online environment that provided visual, auditory, and interactive supports for learning in collaboration with others. These objectives aligned with other UID principles, such as creating a welcoming classroom environment and incorporating teaching methods that considered diverse learning preferences.

The instructor purposefully used strategies to ensure that these sessions were an effective use of students' time and provided added value that could not be achieved asynchronously. The sessions lasted between 1 and 1.5 hours. For each synchronous session, the instructor began with an overview of the session's topics, led a short discussion of the week's content and then gave students an activity to do within small groups in the "breakout room" feature of Elluminate *Live!* Groups of three or four students discussed a topic and completed an activity designed by the instructor. Each session ended with a large group discussion of the concepts that students had talked about in their breakout rooms. The instructor incorporated interactive features of Elluminate *Live!* such as online polling and the whiteboard on which students shared comments and thoughts. Universal design features used in the Elluminate *Live!* sessions included visual PowerPoint slides, preparatory handouts for the breakout room sessions posted in the CMS prior to the Elluminate *Live!* meeting, and an archived recording of each session for students to review later if desired.

### **Phase III: Evaluation**

**Participants and setting.** The 25 students enrolled in the course were part of a cohort in their third semester of a Master's degree program. The students were located on several islands in the state of Hawai'i, including O'ahu, the big island of Hawai'i, Maui,

Kaua'i and Moloka'i. Twenty-four of the 25 students were enrolled in the program to get a Master's degree in special education and obtain licensure to teach in the Hawai'i Department of Education. One student had her teaching license from another state and was taking the course to obtain a Master's degree. Twenty-three of the 25 students were working in educational settings, as teachers (on "emergency hire" contracts) or paraprofessionals in the schools, while enrolled in the course.

**Data collection and analysis.** To evaluate the students' opinions and perceptions of the UD elements of the course, we used qualitative inquiry methods. Students signed a consent form, approved by the University Institutional Review Board, at the start of the course, agreeing to participate in the study. The instructor explained that participation in the study was voluntary and had no bearing on their class standing or grade in the course.

**Instruments.** Data was collected through a questionnaire developed by the course design team to gather information on specific UD elements of the course. This 25-question survey was administered through an online survey system, Survey Monkey ([www.surveymonkey.com](http://www.surveymonkey.com)), prior to the end of the course. Students were able to access the questionnaire through a URL posted in the CMS by the instructor and complete the survey anonymously. The questionnaire for this study was administered prior to the end of the course in order to keep it separate from the University's standard end-of-semester course evaluation survey.

Additional data were collected through interviews with specific students. These interviews were conducted after final course grades were submitted. Six students were selected as a purposive sample of the students in the course. The selected students met particular criteria that made them likely to provide information to deepen our understanding of the UD features valued by students. The criteria for this sample included a) students who had informed the instructor of their affinity for the UID features, b) students who were located in particularly rural settings where online courses are the only option to pursue teacher licensure, and/or c) one student who had voluntarily self-disclosed a disability during the course. These students received an interview questionnaire with four open-ended questions related to their experiences with the UD features of the course. The interview questions differed from the survey by providing students the opportunity to elaborate in an unstructured format on

their personal experiences with the UD features of the course. Students were given the option of responding to the questionnaire in written format or responding by speaking with an interviewer over the phone. Four of the six students chose to respond to the questions; three via email and one in a phone interview.

**Analysis of data.** The online survey system (Survey Monkey) provided results for each question, reporting percentages of responses for all close-ended questions and a compilation of responses for open-ended questions.

We reviewed the open-ended responses and sorted them to find patterns and recurring preferences, categorizing ideas by frequency. In the Results section, we report the data from close-ended questions and provide examples of frequently mentioned preferences in the open-ended responses in order to illustrate which UD course elements were most valued by students.

## Results

All 25 students responded to a questionnaire specifically designed to collect information on their perceptions of the UD features of the course. The results of the survey are reported under the following categories: a) Course Expectations and Materials, b) Instructional Strategies, and c) Asynchronous and Synchronous Technologies.

### Course Expectations and Materials

On a five-point scale (Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree), all students were in agreement about the clarity of the syllabus and the rubrics. They felt that these materials provided clear expectations and information about the class. Table 3 provides additional details about the students' preferences and comments on the course expectations and materials.

For the course textbook, three-fourths of students chose the traditional hard copy instead of the digital "e-text" version of the textbook. Some of the students who chose the printed textbook commented that a physical copy of the book was both familiar and most comfortable to use. They noted that they liked highlighting the hard copy and being able to flip through it for reference. Those who chose the digital format noted that they appreciated the convenience of being able to access their book anywhere online and they enjoyed features such as the ability to highlight the electronic text. They could access it at home or at their workplace without having to carry the physical textbook back and forth.

Table 3

*Online Survey Questions Related to Course Expectations and Materials*

<u>Survey Question</u>	<u>Responses</u>	<u>Key Comments (direct quotes from students)</u>
SYLLABUS: I feel that overall course expectations were clearly laid out in the syllabus.	Strongly Agree: 88% (n=22) Agree: 12% (n=3)	<ul style="list-style-type: none"> <li>• Very detailed instructions on expectations.</li> <li>• Clear expectations helped me organize myself.</li> </ul>
RUBRICS The rubrics for weekly assignments and final project that were in the syllabus and the final course assignment document are useful to me.	Strongly Agree: 76% (n=19) Agree: 24% (n=6)	<ul style="list-style-type: none"> <li>• I really appreciate the use of rubrics to set the criteria.</li> <li>• Rubric had high expectations, which is good. Give the student a higher goal to attain.</li> <li>• Great guidance on what to expect.</li> </ul>
TEXTBOOK: I purchased the a) print or b) digital version of the textbook	Print 76% (n=19) Digital: 24% (n=6)	<ul style="list-style-type: none"> <li>• I prefer holding a book in my hands, underlining the important parts for later reference.</li> <li>• I prefer reading textbooks in the print format; however, I prefer reading short articles or journals electronically.</li> <li>• I found the highlighter tool [in the electronic version] to be quite helpful.</li> </ul>
READINGS: For assigned articles, you could choose to read PDF versions and/or listen to MP3 versions. Which format(s) did you choose?	Read only text version: 52% (n=13) Read AND listened to the articles concurrently 32% (n=8) Read some and listen to some 16% (n=4)	<ul style="list-style-type: none"> <li>• I tried listening to the MP3s but I really was turned off from it because of the electronic voice. If it had been a human voice I would have been more apt to listen.</li> <li>• I enjoyed having the MP3 play while I read along with the text. I am easily distracted when it comes to reading things on the computer, so this helped me stay focus.</li> <li>• Listening to the MP3 while reading the articles really helped me to comprehend the readings with ease (that actually surprised me. I did it at first as an experiment but ended up noticing a difference in my comprehension and retention level). I wish all college courses offered this way of learning.</li> </ul>
WEB-BASED MODULE In the Web-based IRIS module, the video and audio files had transcripts available. Which formats did you use?	Watched and listened to the video and audio files 48% (n=12) Read the transcripts AND watched/listened concurrently 44% (n=11) Read only the transcripts 8% (n=2)	<ul style="list-style-type: none"> <li>• I enjoyed the personal touch of actually hearing human voices. This assignment had more impact and meaning because of the content and the need to hear/feel the parents and their perspective when speaking of their children.</li> <li>• I watched and listened to the IRIS module, however when trying to find answers, I would frequently go back to read transcripts.</li> <li>• Actually I alternated--in the beginning I listened and read, but towards the end, I think I relied on reading more, as it seemed to take less time.</li> </ul>

For articles that were available in text and audio format, students ranged in their preferences, with more students trying out the non-traditional “digital” option of listening to audio files. When given text and audio options for course readings, 52% of the students chose to read the text, 32% listened AND read concurrently, and 16% chose solely to listen to the audio version of the articles. While no one chose the audio format exclusively, students reported that being able to read and listen at the same time enhanced their comprehension and engagement. Students also commented on the ability to listen while doing other tasks (such as training for a marathon). One student identified a preference for the printed version of the textbook but digital and audio versions of the briefer articles.

For the Web-based IRIS module, while almost half the class just watched the videos or listened to the audio files, 44% chose to read the text transcripts in addition to watching/listening. Students commented that the text transcripts were useful as they looked for information to complete a weekly assignment related to the IRIS module.

Overall, students appreciated being able to select text formats that met their preferences. Their comments also illustrated that the combination of textual, auditory, and visual information was of benefit to some students in comprehending and recalling information. Students commented that having options throughout the course was both useful and motivating.

### **Instructional Strategies**

Ninety-two percent of the students agreed that short weekly assignments were useful and practical. All students liked having guided worksheets to accompany assignments. Ninety-six percent of the students reported that the consistent weekly instructor feedback supported their learning. Table 4 includes key comments from students on these facets of the course.

Several students commented on the effectiveness of having small, lower-value assignments each week. As working professionals, students reported that this approach to organizing assignments helped them keep up with class and master course content incrementally. The fact that the weekly assignments were always posted on a Monday and due the following Sunday provided students with a consistent structure. Some students mentioned that they were able to build in the time needed to study for this course because the expectations were consistent.

All students agreed that the guided worksheets that accompanied the weekly assignments were useful to them and helped them complete the assignments with more comfort and ease. Students noted that these short, weekly assignments allowed them to demonstrate knowledge in various ways instead of in a single written assignment at the end of the course. The weekly assignments were low pressure and helped bring down the stress associated with having just one or two large assignments in the class.

The instructor also used weekly assignments as a way to interact with students. This was also an effective and well-liked component of the course for students. They relayed their appreciation about getting personalized and timely feedback on assignments. This consistent connection with the instructor was an important link for students, keeping them motivated and on track with course assignments. Some students mentioned that the weekly assignments helped build confidence because they received periodic and consistent feedback on whether they were mastering course content as expected.

### **Asynchronous and Synchronous Technologies**

All students agreed that the materials were clearly laid out in the CMS. Students commented on the effectiveness of weekly reminders about CMS features to notice as well as the ease with which they could locate course information on the CMS. The majority of students found the synchronous sessions conducted with Elluminate Live! to be effective, engaging, and useful. Ninety-six percent of the students agreed that the presentations on Voicethread were useful and 92% agreed that they liked having the options to post comments by text, audio, or video in Voicethread. Table 5 provides additional details and student comments about their opinions on the asynchronous and synchronous technologies used.

**Voicethread.** The use of the Voicethread website was highly valued by students as an alternative way to learn content and demonstrate knowledge. Voicethread was especially powerful as a way to provide options for expression; students appreciated being able to use text, audio, or video when posting comments. Some students took the opportunity to personalize their posts; for instance, one student strummed his guitar to enhance an audio comment that he posted. Students also enjoyed the “real stories” from the guest speakers’ multimedia presentations; students noted that they felt great empathy with the speakers and learned more about what it was like to be in their shoes.

Table 4

*Online Survey Related to Instructional Strategies*

Survey Question	Responses	Key Comments (direct quotes from students)
<p><b>SHORT ASSIGNMENTS</b> I like having short weekly assignments with a relatively low point value (5 points a week) instead of fewer assignments that are worth more.</p>	<p>Strongly Agree: 64% (n=16)</p> <p>Agree: 28% (n=7)</p> <p>Neutral: 8% (n=2)</p>	<ul style="list-style-type: none"> <li>• The workload is spread out and for the working person, this is really practical.</li> <li>• I could go either way; however the weekly assignments keep me connected to the course and materials weekly. Turning assignments or reflections in weekly help me with my learning process and again help me stay accountable for the course.</li> <li>• These mini assignments are a great way to help keep us focused on the class throughout the semester, as opposed to cramming when nearing large due dates. These assignments also provide various ways for us to show our understanding and knowledge, beyond just a major paper or test, thus giving more chances for multiple-skill sets.</li> </ul>
<p><b>GUIDED WORKSHEETS</b> For most weekly assignment submissions, there have been handouts/worksheets to guide you as you respond. I like having such worksheets/handouts to guide my assignment responses.</p>	<p>Strongly Agree: 88% (n=22)</p> <p>Agree: 12% (n=3)</p>	<ul style="list-style-type: none"> <li>• These handouts/worksheets really help me to focus my thinking. Open-ended assignments with no guidance can be a nightmare, requiring you to put in a lot of work without knowing where to go with it.</li> <li>• Handouts are helpful because they help you narrow the focus of your study.</li> <li>• I gain a clearer understanding of what is expected. Again, works really well especially for an online course.</li> </ul>
<p><b>INSTRUCTOR FEEDBACK</b> I feel that the instructor feedback in this class is adequate and helps support my learn</p>	<p>Strongly Agree: 92% (n=23)</p> <p>Agree: 4% (n=1)</p> <p>Neutral: 4% (n=1)</p>	<ul style="list-style-type: none"> <li>• The weekly feedback on our submissions was so helpful and validated the effort put into completing the assignments.</li> <li>• This was the most valuable aspect of the class for me. Knowing where I stand in my classes is essential to keeping my stress/overwhelmed levels low.</li> <li>• I so appreciate the feedback! The feedback was always given on a timely manner and was very useful. The feedback given assisted me in my thinking process, helped me reflect on the materials and my own assignments.</li> </ul>

**Illuminate Live!** Over half of the students reported that the synchronous sessions were useful and engaging and achieved the goal of fostering greater interaction and connection with peers. Students commented on the benefits of the social aspects of learning from and with each other and of connecting with the instructor periodically.

### Post-Course Interview Results

Four students answered the post-course interview questions. The data from the interviews confirmed the results of the surveys, with all respondents noting an affinity for the multiple options to receive information and demonstrate knowledge throughout the course. Students reiterated the value of using Voicethread as a class forum, stating how much they liked having the text, audio, and video options available both to post information and to read/hear/watch the comments of classmates.

Three students noted that they had started using universally designed strategies in their classrooms as a result of learning about and seeing UD modeled in the course. One student had started to use Voicethread with her own high school students. Another student commented that, by experiencing the range of options that are part of UD from the perspective of a student, she had started to give her own high school students more options in their assignments. Another student was providing her elementary school students with audio options to accompany their weekly readings after being exposed to this strategy in this online course.

## Discussion

While UID and UDL have gained popularity as frameworks, there is limited literature describing how the principles within these models can be applied to the instructional design of an online course. This case study attempted to determine how UD principles could be applied within an online course and to examine which of the universally designed features students in the course found most useful.

### Effective Practices

The results of this small-scale study show that students appreciated several features of the course that were designed to meet UID and UDL principles. This section groups students' reported experiences with the online course's UD features into three broad categories: a) providing options and choices, b) instructional

strategies, and c) interactions. A deeper consideration of these categories gives rise to several instructional implications for infusing online learning environments with UD features.

**Providing options and choices.** Students appreciated the choices and options provided by several course elements. These included the multiple formats for materials (such as the provision of text and MP3 versions of articles) and the use of Voicethread to present and discuss information. Both of these course elements align with the fifth UID guideline (Explore the use of natural supports for learning, including technological supports). As expected, students selected formats to use based on their personal preferences and habits.

There was resounding agreement that the use of the Voicethread website appealed to students. Voicethread provided a collaborative space in which course information could be represented and expressed in multimodal formats, aligning closely to the seventh UID principle (Creating multiple ways for students to demonstrate their knowledge) and to UDL Principle II (Multiple means of expression). Students liked being able to express themselves in text, audio, and video formats and to choose whether to read or listen to the comments of others. When designing the course, we chose Voicethread because it provided a public forum of sorts. In this web-based space, we could post multimedia and video presentations and give students multiple ways to respond to these learning activities. Instructors can provide similar multimodal choices with a range of technology-based tools or websites. For example, rather than relying on a text-based discussion board on the CMS, instructors can give students the opportunity to respond by recording themselves in audio or video formats and posting these files in the CMS.

For instructors designing an online course, it is useful to consider which course elements lend themselves to multiple formats. These can include course resources provided in multiple formats as well as course assignments that allow students to respond in a variety of formats. Instructors can also present course content in various formats, using narrated presentations and videos to enhance text-based content that students are expected to read.

**Instructional strategies.** For the non-traditional learners in our course, many of whom were returning to college for a degree after a gap of many years and had full-time jobs and families, the instructional strategies provided scaffolding and support to make the course

manageable along with other life commitments. This was consistent with the sixth UID guideline (Design teaching methods that consider diverse learning styles, abilities, ways of knowing and previous experience and background knowledge). According to student comments, the brief, weekly assignments were less stressful than high stakes assessments. Students appreciated the clarity of the assignments and the consistent instructor feedback. As intended by the course designers, these elements made the course more manageable to students. Several expressed how they were able to “keep up” with this course more effectively than prior online courses they had taken.

An outcome that was unexpected but worthy of note is that three students informally disclosed learning disabilities to the instructor as the course was underway. None of the students had chosen to disclose a disability to the instructor through the Disability Support Services office at the University. The students who did disclose learning disabilities did so by telling the instructor via email once the course was in progress. They noted that the clear and consistent layout of sections in the CMS, the multiple formats of resources provided, and the short assignments made this course much more accommodating and non-threatening for them. One student noted that this course was one of the most manageable online courses she had taken. They were thankful to the instructor for providing the UD supports and communicated these feelings in personal emails during and after the course. This information provided insights into the fact that students with learning disabilities may be taking online courses without disclosing to instructors or requesting accommodations from DSS offices. This illustrated that UD features can be of real benefit to those who may need additional support in a course, inherently taking into account their backgrounds and diverse needs.

Another unintended but interesting outcome was that some students reported using some of the UD strategies in their own teaching practice. As special educators, they saw the merit of applying UD strategies in their K-12 settings, especially to give their students options for representation and expression. The instructional strategies from this course became a model that our students found relevant and useful in their own classrooms.

**Interaction.** This course incorporated many forms of interaction in accordance with the eighth UID principle (Promoting interaction among and between fac-

ulty and students). Students appreciated regular online interactions with the instructor, noting that her timely feedback on each assignment increased their engagement and enthusiasm for completing the assignments. Some students commented that they wished they heard more from instructors in other online courses, noting that they stayed more engaged with this course because they knew they would receive personal comments on each assignment from the instructor.

Students had the opportunity to share ideas and opinions through asynchronous (Voicethread) and synchronous (Elluminate *Live!* sessions) forums. Course activities requiring students to use these technology tools were scheduled throughout the semester. This helped foster a sense of community throughout the course. Students did not learn in isolation, interacting only with the instructor, but had opportunities to hear from each other through the postings on Voicethread and to work with each other periodically during the Elluminate *Live!* sessions.

For instructors who would like to include synchronous components into online courses, it is useful to determine how to balance the number and duration of sessions with student needs. For our course, four Elluminate *Live!* sessions were adequate, especially since students interacted asynchronously through Voicethread and through short weekly assignments with the instructor. It is also important to select a time for the synchronous session with consideration of the students’ schedules. For example, since most of our students were working full time, the synchronous sessions took place in the early evenings on a day and time students agreed to at the start of the semester.

### **Recommendations for Instructors**

Integrating UD components into online courses can be a time-consuming process. For an instructor converting a face-to-face course into an online format, consider aligning UD guidelines with course resources, instructional strategies, asynchronous interactions, and synchronous interactions. Rather than trying to incorporate every UID feature possible, instructors can start by adding a few UD components into each course and building on these components as they teach the course repeatedly.

For example, providing resources in multiple formats requires extra preparation time. While software automatically converts the text to MP3 files, it takes time to prepare a text file for conversion. Instructors

can use an incremental approach, converting new and additional resources each semester, thereby creating a bank of more accessible course materials over time. As new technologies become available, instructors can revisit course elements periodically to add or change elements and remain responsive to student needs.

### **Implications for Addressing Students with Disabilities**

Universal design does not eliminate the need for formal accommodations, but provides a proactive approach to addressing many of the needs of diverse learners including students with disabilities. The format of the course provided ways to support students with high incidence disabilities such as LD that could also be helpful for a student with a low incidence disability, such as a visual impairment. For example, we provided accessible PDFs for all reading materials and accompanying MP3 files, which could accommodate students with learning disabilities and/or low vision. The College of Education chose the Elluminate *Live!* web-conferencing software due to its accessibility features such as closed captioning and support for screen readers. We did not use the closed captioning feature during our virtual classes but had the capacity to accommodate a request for closed captioning if needed.

While the Voicethread website included some accessibility features, at the time that we used it for this course its Flash-based interface did not provide support for all assistive technologies, such as screen readers and alternative navigation tools. We were aware of this limitation and would have created alternate assignments for students with disabilities who needed additional assistive technology accommodations. Despite the limitations of the Voicethread website, the option to post information in a variety of formats – text, audio, or video – was useful for including accommodations designed for students with high incidence learning disabilities. Recently, Voicethread has enhanced its accessibility features and added a “Voicethread Universal” option, which allows for the use of screen readers and other assistive technologies (<http://voicethread.com/about/features/accessibility>). Voicethread’s commitment to adding and updating its accessibility features holds promise for including Voicethread as a viable system in future courses that include UD elements.

### **Recommendations for Future Studies**

This case study describes the design and implementation of a course during one semester and the results are limited to the 25 students enrolled in the course; It represents an initial phase of research, part of an iterative and ongoing process of design, development, evaluation, and reflection intended to inform the design of future UD-based courses. To derive more information on how a universally-designed online course enhances engagement and learning outcomes for all students, including those with disabilities, it is necessary to collect data from future iterations of courses that use similar UD strategies and to collect data from more students in order to have a larger sample size. To gain insights on how a course like this supports students with disabilities, it would be useful to examine which course elements are most useful to students who are willing to provide demographic information including disability status.

Noting that none of the students in this course disclosed a disability through the University DSS office, we wondered whether online learners were as aware of DSS services as the traditional campus-based students. Many of the online students at our University reside on neighbor islands and are a plane ride away from campus. Though it is a standard practice in our Special Education department to include a statement in course syllabi about the services offered by the DSS office, the fact that the online students do not physically come to campus may affect their knowledge of and ability to access DSS services. We surmised that some students with disabilities can benefit from supports in an online class, but by the very nature of being a “distance learner” may not access these services. A study that focuses on the use of DSS service by online learners may help students, instructors, and DSS staff understand how accommodations could further address the needs of such students. A related question is whether the provision of UD supports within online courses eliminates the need for students with certain types of disabilities to disclose to their institutions.

### **Conclusions**

Incorporating principles of UD into an online course takes forethought, planning, and time. When designing a course, the instructor should consider the objectives of the course and decide how to meet these objectives with appropriate strategies and technologi-

cal tools. With the pace of development in technology, many tools are becoming less specialized and more commonly available to the end user. Instructors can increasingly create universally-designed digital materials without having to rely on technology experts. As a technologically-savvy generation of students enrolls in online courses at the postsecondary level, universally designed courses will provide valued learning options while proactively accommodating many of the needs of an increasingly diverse student body.

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## Appendix

A summary of the features of Elluminate *Live!* and Voicethread are provided below. The respective websites provide additional and updated information about these resources.

### **Elluminate *Live!***

Website: [www.illuminate.com](http://www.illuminate.com)

Cost: Individual or site licenses must be purchased.

Description: Elluminate Live! is a virtual meeting environment which allows users to connect synchronously.

Features include:

- Two-way Audio – participants can talk and listen to each other
- Direct Messaging – participants can type messages to each other
- Interactive whiteboard – presentations can be uploaded and viewed by everyone in the conference; participants can also write/draw/type on the whiteboard
- Multimedia – show videos, play audio files,
- Desktop Sharing – show specific documents on your computer
- Video – moderator and participants can see each other via webcam
- Breakout Rooms – Moderator can put participants in small groups within the web-conferencing environment
- Closed captioning

### **Voicethread**

Website: [www.voicethread.com](http://www.voicethread.com)

Cost: Free (limited features); Pro account can be purchased for additional features.

Description: Voicethread is a web-based collaborative environment in which users can watch multimedia presentations (document, slides, or video) and comment using voice, text, audio file, or video.

Features include:

- Multimedia – upload videos, presentations, documents
- Commenting – comment using text, voice/audio (call in via telephone or use a microphone) or video (using a webcam)
- Privacy settings – a Voicethread multimedia file can be set to private so only those with the link and invitation can view it.



# Learning and Study Strategies of Students with Traumatic Brain Injury: A Mixed Method Study

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Lincoln Public Schools

## Abstract

The purpose of this research was to explore the perceptions of four college students with severe traumatic brain injury and people associated with them regarding the use of learning skills and study strategies. The researchers employed a concurrent mixed method design using descriptive quantitative data as well as qualitative multiple case study data. Qualitative data came from interviews with the students with traumatic brain injury and three to four people associated with each of them; quantitative data was from the participants with traumatic brain injury and 15 to 26 of their same-class peers using the *Learning and Study Skills Strategies Inventory* ([LASSI] Weinstein, Shulte, & Palmer, 1987). Findings revealed disparities in perception between the students with traumatic brain injury and participants associated with them as well as between the qualitative and quantitative data sets of the student participants with traumatic brain injury. These differences appeared to reflect limitations in the student participants' awareness of their deficits. Despite the apparent academic success of the student participants, questions exist about the appropriateness of various accommodation strategies in maximizing postsecondary achievement and facilitating self-awareness of challenges associated with traumatic brain injury.

*Keywords: brain injury; accommodations; learning strategies*

Adolescents and young adults sustain traumatic brain injuries (TBI) more frequently than people in any other age group (Centers for Disease Control and Prevention [CDC], 2006; Langlois, Rutland-Brown, & Thomas, 2006; Rosso et al., 2007). Because of this, attention to the reintegration of students with TBI into secondary and postsecondary educational settings is important. School experiences, successes, and failures following injury have the potential to affect social, vocational, and personal satisfaction issues for the remainder of an individual's life. Consequently, professionals need to know the best methods of remediating and compensating for persistent cognitive and psychosocial challenges resulting from brain injury. A crucial aspect of this knowledge is awareness of how students with TBI and those associated with them perceive study skill strengths and challenges follow-

ing brain injury and how students apply and modify compensatory learning and study strategies in the years following their injuries.

Traumatic brain injury consequences repeatedly reported as the most problematic are those involving cognitive and behavioral functions (Bowen, 2005; Carney & Schoenbrodt, 1994; Ylvisaker et al., 2005). Cognitive challenges often affect learning and memory, information processing, perception, and communication, while behavioral challenges often negatively influence initiation and impulse control. These challenges are likely to affect personal relationships, academic performance, and vocational success. Further, these challenges combined with impaired self-awareness frequently create a scenario in which individuals with TBI are likely to struggle with multiple aspects both of school and community reintegration (Savage, De-

Pompei, Tyler, & Lash, 2005).

Inaccurate perception of one's strengths and challenges is a common consequence of TBI (Flashman & McAllister, 2002; Leathem, Murphy, & Fleet, 1998; Sherer, Bergloff et al., 1998; Sherer, Boake et al., 1998). Such a deficit – often referred to as poor self-awareness – has several negative ramifications when pursuing higher education. For example, people with TBI who have poor self-awareness often lack sufficient motivation to comply with therapeutic tasks, because the tasks address deficits of which they are unaware. Similarly, students with TBI may refuse to use compensatory strategies, because the need for strategy use is unclear to them. Furthermore, people with poor self-awareness following TBI may pursue unrealistic long-term goals, because their misperceptions prevent them from recognizing incompatibilities between desired goals and present abilities (Sherer, Bergloff et al., 1998).

Poor self-awareness magnifies co-existing cognitive challenges, and vice versa, for people with TBI. Anderson and Tranel (1989) confirmed this when they found a positive correlation between impaired cognition and impaired self-awareness among adults with severe injuries. The consequence is that people with severe TBI typically experience less awareness of their deficits than people with less severe injuries. Thus, those individuals most likely to have persistent and substantial cognitive challenges in processes underlying academic achievement—such as memory, attention, and concentration—are the same individuals who are the least likely to recognize the existence of those challenges, the associated ramifications, and the potential benefits they could gain by applying compensatory learning and study strategies.

Various compensatory strategies and accommodations exist to address cognitive impairments associated with TBI, and educational professionals routinely encourage people with TBI to implement these techniques. Typical compensatory strategies found particularly helpful include: (a) using memory books or planners; (b) using supplemental visual learning materials (e.g., handouts, pictures, diagrams); (c) engaging in drill and practice procedures; (d) having additional time to complete examinations; (e) meeting with tutors or attending help sessions; and (f) using various forms of assistive technology (e.g., palm pilots, personal data assistants, books on tape, and audio recordings of lectures) as external prostheses to bolster

cognitive processes (Bowen, 2005; Semrud-Clikeman, 2001; Sohlberg & Mateer, 2001; Ylvisaker & Feeney, 1998). External aids, in particular, allow individuals with cognitive deficits to carry out challenging tasks by reducing memory or high-level cognitive demands (Sohlberg & Mateer, 2001).

These compensatory strategies are quite comparable to those routinely used by other college students with disabilities attempting to improve their academic performance (Barga, 1996; Heiman & Percel, 2003; Lindstrom, 2007; Reis, McGuire, & Neu, 2000; Skinner & Schenck, 1992). To be effective in improving everyday functioning and overall academic achievement, however, people with TBI – as well as students with other types of disabilities – must assume responsibility for independently developing, executing, and modifying such compensatory strategies and the use of external aids (Glang et al., 2008; Ylvisaker & Feeney, 1998) as new needs arise. Currently, professionals do not know the adeptness with which students with TBI generalize compensatory strategies such as these to academic challenges faced several years following injury. They also do not know the extent to which limited self-awareness of persistent cognitive and behavioral challenges affects a person's use and adaptation of specific techniques and strategies.

The purpose of this mixed methods study was to address issues such as these by investigating the perceptions of college students with TBI and those familiar with them regarding learning skills and study strategies used to facilitate academic achievement. The researchers used the *Learning and Study Strategies Inventory* ([LASSI] Weinstein, Shulte, & Palmer, 1987) to collect quantitative data about study strategy strengths and challenges of college students with TBI and their same-class peers. Collection of these data allowed for comparison of the two populations as well as comparison with normative data available for the standardized measure. Concurrent with this data collection, the researchers conducted qualitative, semi-structured interviews and collected artifacts to explore the perceptions of the participants with TBI and those associated with them regarding specific learning strengths and challenges and the use of traditional and compensatory study skill strategies. Interview questions paralleled the concepts addressed by LASSI items, although the open-ended format of the interview questions prompted more generalized responses. The use of qualitative interviews as a data collection strategy is consistent

with the recommendations of TBI experts such as Ylvisaker et al. (2001) and Todis and Glang (2008), who have advocated for in-depth exploration of the interaction of multiple factors affecting strategy use by students with TBI.

### **Design**

A multiple case study design, using concurrent mixed method data collection, served as the basis for this research. Case studies provide a framework for collecting and analyzing both quantitative and qualitative data. Multiple case study designs are ones in which a specific issue or topic of concern serves as the investigational focus, but researchers use multiple case studies to illustrate it (Creswell, 2007); hence, the multiple cases provide a form of replication in which researchers use the same procedures and measures repeatedly to corroborate or contradict single case findings (Yin, 2003). A concurrent mixed methods design is one in which researchers simultaneously collect different but complementary data on the same topic. The convergence of quantitative and qualitative data provides a more complete understanding of cases than would be possible using either quantitative or qualitative data in isolation. Concurrent collection of both data types allows comparison, corroboration, and identification of data disparities.

### **Research Questions**

#### **Quantitative Questions**

Two questions pertained to the quantitative data collection and analysis: (1) What are the learning and study strategies used by college students with severe TBI as determined by responses to items on a standardized inventory of learning and study strategies? and (2) What differences exist between college students with severe TBI and their same-class peers on scores received on a standardized inventory of learning and study strategies?

#### **Qualitative Questions**

The two questions underlying the qualitative data collection and analysis were: (1) What are the learning and study strategies used by college students with severe TBI as determined through their responses and the responses of people associated with them to open-ended interview questions? and (2) How do college students with severe TBI and the people associated

with them describe their experiences using various learning and study strategies?

### **Mixed Method Questions**

The two questions the researchers addressed through mixed method analysis were: (1) For each of the four cases, to what extent are the scores received by a college student with TBI on the standardized inventory confirmed or disconfirmed by his/her responses to interview questions? and (2) For each of the four cases, to what extent are the scores received by a college student with TBI on the standardized inventory confirmed or disconfirmed by the interview question responses of people associated with him/her?

### **Methods**

The complexity and varying nature of persistent challenges and abilities displayed by students with TBI necessitated individual consideration of each student's academic reintegration process and progression; hence, the researchers employed a multiple case study format to allow for in-depth, individual exploration of the educational experiences of four college students who had sustained severe brain injuries. The researchers also sought to compare the study skill use of students with TBI to their same-class peers by administering a standardized measure of learning and study strategy skills. Figure 1 provides a visual diagram of the concurrent multiple case study method used to structure the research, and Figure 2 provides a visual diagram of the qualitative and quantitative data collection process for each case. The researchers obtained Institutional Review Board approval prior to initiating any data collection.

### **Participants**

Participants included four college students with severe TBI (student participants), three or four people associated with each participant with TBI (student-associated participants), and 15 to 26 same-class peers of each student participant (peer participants). All but the peer participants were part of a related research project reported elsewhere (Hux et al., 2009).

**Student participants.** Student participants with TBI included two male and two female college students: FM, LD, CC, and US. All four had sustained severe injuries between four and ten years prior to their participation in this research. The criterion for judging an injury as severe was a period of coma extending for

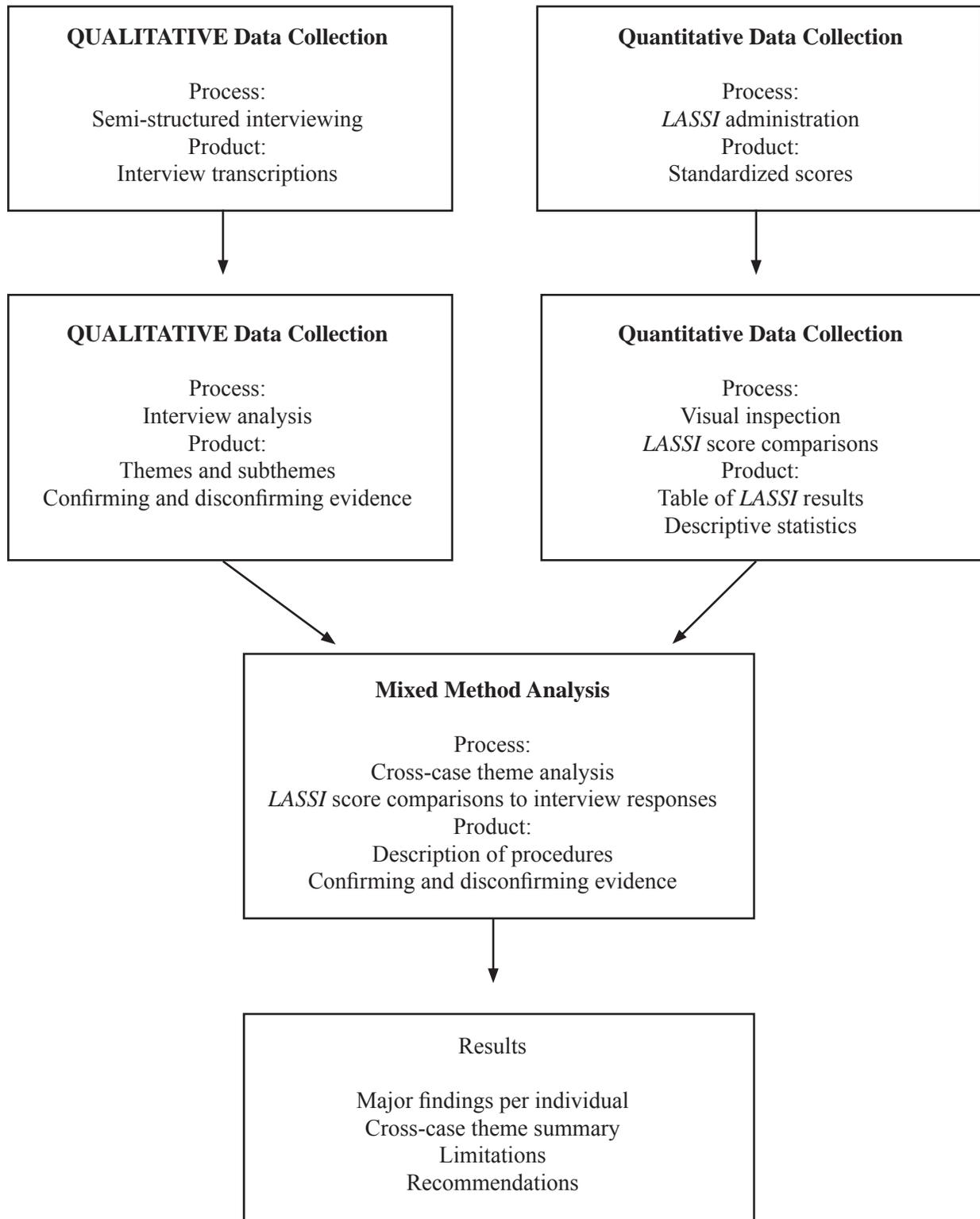


Figure 1. Visual Diagram of Concurrent Mixed Method Design

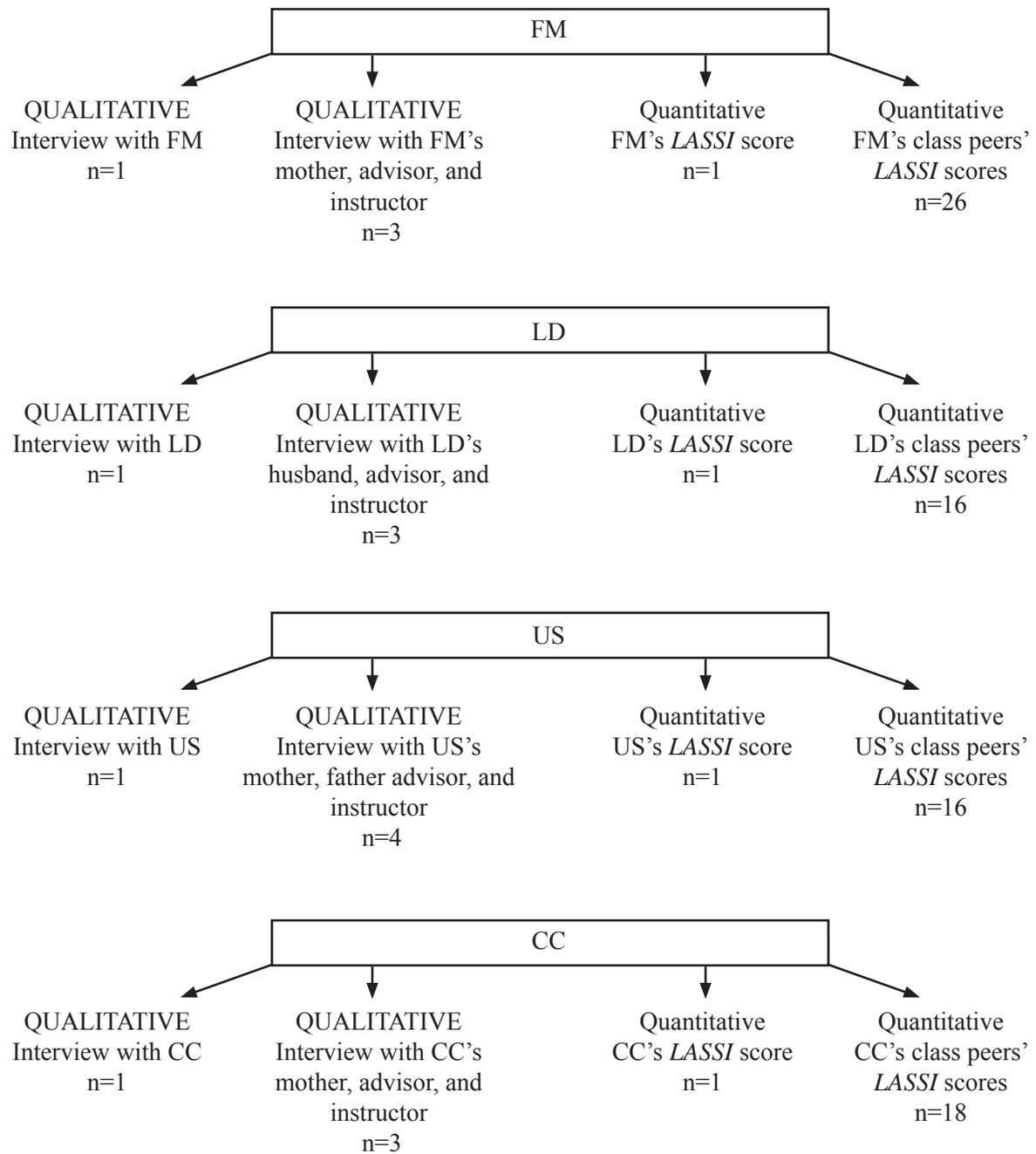


Figure 2 Visual Diagram of Multiple case studies

at least one week (Asikainen, Kaste, & Sarna, 1998). All participants had adequate hearing acuity for conversational speech. All spoke American English as their primary language and had no history of neurological problems other than those associated with TBI. At the time of their participation, they ranged in age from 20 to 28 years, having sustained injuries between the ages of 14 and 17 and having graduated from public high schools despite the seriousness of their injuries. A detailed description of each student appears in a separate publication involving the same participants (Hux et al., 2009). Demographic information about each individual with TBI appears in Table 1.

**Student-associated participants.** For each student with a TBI, associated people included three or four individuals: (a) at least one immediate family member, (b) the student's advisor from the institution's Office for Students with Disabilities, and (c) a college instructor with whom the student with TBI had taken one or more courses. Family member participants were FM's mother, LD's husband, CC's mother, and both of US's parents.

**Peer participants.** Seventy-seven college student peers of the four student participants also performed the quantitative data collection tasks. The number of peer participants associated with each student participant ranged from 15 to 26 ( $M = 18.25$ ;  $SD = 4.57$ ). Peer participants included six males and 71 females ranging in age from 18.42 to 52.83 years ( $M = 23.38$ ;  $SD = 7.09$ ) at the time of participation. All spoke American English, and none reported a history of vision, hearing, or academic challenges. All had taken the same college course as the associated student with TBI and had taken that course from the same instructor who participated in the qualitative data collection process.

### Quantitative Strand

**Data collection.** The quantitative portion of this research involved data collection with a standardized instrument to examine college students' use of study skills and strategies. This complemented qualitative data in that it provided a standardized measure for objective comparison between a student with TBI and his/her same-class peers on study strategy use.

To gather quantitative data, the researchers administered the *LASSI* (Weinstein et al., 1987) to each student participant and to all peer participants interested in study participation. The *LASSI* is a self-report inventory that allows for measurement of students' strengths and weaknesses in 10 areas associated with successful

college performance. Raw scores correspond with percentile ranks normed on typical college students. The ten categories that the *LASSI* measures are: (a) Anxiety and Worry about School Performance; (b) Attitude and Interest; (c) Concentration and Attention to Academic Tasks; (d) Information Processing, Acquiring Knowledge, and Reasoning; (e) Motivation, Diligence, Self-discipline, and Willingness to Work Hard; (f) Self-Testing, Reviewing, and Preparing for Classes; (g) Selecting Main Ideas and Recognizing Important Information; (h) Use of Support Techniques and Materials; (i) Use of Time Management Principles for Academic Tasks; and (j) Test Strategies and Preparation for Tests.

The four student participants completed the *LASSI* independently. Peer participants completed the *LASSI* during a regularly scheduled class session after listening to one of the researchers provide an abbreviated explanation of the study purpose. The researcher informed peer participants that the study purpose was to examine differences among college students in their use and comfort with various study skills and strategies. The researcher did not divulge information about the brain injury component of the study to maintain the privacy and confidentiality of the student participants. Only peers wishing to participate in the research completed the study skills inventory, returning it and a form with demographic information to the researcher. Participation in the research did not affect a student's course grade.

**Data analysis.** To analyze the quantitative data, the researchers used visual inspection to compare category scores of each student participant with the range and median scores of his/her same-class peer participants. In addition, the researchers compared the peer participants' category scores with those provided as normative data in the *LASSI* materials.

### Qualitative Strand

**Data collection.** Collected data included artifacts, field notes, and interview transcripts. After obtaining signatures on informed consent forms, one of the researchers conducted interviews at a location of each participant's choosing (i.e., on campus, at an individual's home, or at a local coffee shop). The researcher digitally recorded all interviews for later transcription and analysis. The researcher conducting the interviews made addenda to the transcripts using field notes. In addition, she added any artifacts collected at the time of the interviews to the data corpus.

Table 1

*Demographic Information About Survivor Participants*

Survivor	Age	Gender	Institution	Cause of Injury	Years Post-Injury
FM	28	F	Large, public, 4-year university	MVA*	10
LD	26	F	Large, public, 4-year university	MVA*	10
CC	20	M	Community college	Sports Injury	4
US	21	M	Small, private, 4-year university	MVA*	7

\* Motor vehicle accident

Initial interview questions served to elicit specific details about each student participant’s injury, rehabilitation experiences, and recovery process. Additional questions addressed strengths and challenges regarding cognition, communication, physical limitations, social and emotional status, and academic functioning. Within the realm of academic performance, the researchers queried participants about the development and implementation of routine and compensatory study skills and strategies used by the student participant. The researchers tailored questions based on a respondent’s role in the student’s life.

The researchers completed a total of 16 interviews—four for each case. Interviews with the student participants lasted between 45 and 75 minutes; family member interviews lasted 30 to 60 minutes; and instructor and advisor interviews were between 25 and 50 minutes in duration. Data collection for each case occurred over a period of two to three months, with all interview data collected within a seven-month period.

The researchers used a bounded case study approach as a framework to collect both qualitative and quantitative data about the four student participants. The bounding of the study was uniform with an exploratory qualitative case study design (Yin, 2003). The researchers chose to employ a constructivist paradigm, because the aspects of interest in this study were individual to each participant. Though elements may have been shared across participants, the individuals experienced them all from their own point of view. In the constructionist tradition, the design was emergent, context-dependent, and employed inductive data analysis (Creswell, 2007; Guba & Lincoln, 1988).

Semi-structured interviews included follow-up questions deemed appropriate by the researcher. Debriefing and member checking by individuals participating in the interviews served to confirm the data validity (Creswell, 2007).

**Data analysis.** Analysis of the qualitative data began with the researchers’ immersion in the data corpus. The researchers reviewed each transcript several times searching for key concepts and themes. Initially, transcripts were hand-coded by three members of the research team. The researchers calculated inter-rater reliability for each 2-person combination of researchers, and inter-rater reliability did not fall below 85% in any instance. Horizontalization of utterances – that is, the extraction of key statements from transcribed interviews used to illustrate a specific point or concept (Creswell, 2007) – was also completed for the qualitative findings along with determination of core concepts, in-depth searches for confirming and disconfirming evidence, and integration of concepts into appropriate themes. Next, the researchers identified significant statements both through hand coding and the use of Weft QDA (Fenton, 2006) coding software. The research team made decisions about the presence of confirming and disconfirming evidence based on its familiarity with the data corpus and student participant LASSI scores and its understanding of the context of information given by the student participants. This process provided information about the self-awareness of the student participants regarding personal limitations.

Finally, the researchers integrated concepts from the qualitative data sets into appropriate categories. After categorizing concepts, the researchers identified

themes emerging from the data. Triangulation served as a means of allowing the researchers to verify themes by examining multiple types of data collected. Triangulation incorporated all transcripts and artifacts relating to a single case and continued until all members of the research team reached consensus regarding the meaning of specific statements.

### Mixed Method

A mixed method approach allowed acquisition of a more complete picture of the college experiences of students with severe TBI than would have been possible using qualitative or quantitative procedures in isolation. The researchers achieved this by using quantitative procedures to target pertinent variables while simultaneously using the qualitative data to add depth and richness to the picture (Hodgkin, 2008). The researchers believed that a qualitative approach was necessary to illuminate the uniqueness with which TBI affects individuals and prompts their adoption and use of specific learning and study strategies. The qualitative approach also allowed incorporation of perspectives from people associated with the student participants throughout their college experiences. On the other hand, a quantitative approach was necessary to investigate how the student participants compared to the peer participants in terms of self-reported use and proficiency with study skills. Finally, a mixed method approach was imperative to allow the researchers to determine whether disparities existed in either of two situations: (a) between the LASSI scores of student participants with TBI and their responses to open-ended interview questions and (b) between the LASSI scores of student participants with TBI and their family members', instructors', and advisors' responses to open-ended interview questions.

### Results

The research results appear in two sections. First, the researchers highlight the case study findings for each student participant by combining quantitative, qualitative, and mixed method data representative of LASSI categories. Second, the researchers address the cross-case results with subsections for the quantitative, qualitative, and mixed method findings.

In the first section, each student participant's quantitative LASSI category scores appear in a Figure along with the median scores obtained by that person's

same-class peer participants. Normative data accompanying the LASSI is given in percentiles. Hence, the 50th percentile represents the level at which 50% of people in the normative sample scored above and 50% scored below. The peer participants in this study did not consistently score within the middle range (i.e., between the 25th and 75th percentiles) of the normative sample. This is reflective of the fact that every individual as well as every class of students has unique characteristics relating to differences in teachers' expectations, difficulty of material covered, class level, and institution type. Of note, quite variable responses occurred across all four target classes, suggesting considerable variability within LASSI categories in how students perceived their study strategy and skill strengths and challenges. The median scores for all four classes were consistently below those obtained for the LASSI normative sample.

Specific quotes from the case study students and those associated with them are presented as evidence either confirming or disconfirming individual's scores obtained regarding each LASSI category. This combined presentation of the quantitative, qualitative, and mixed method results for each student participant allowed for thorough exploration of evidence about an individual's perceptions of various aspects of learning strengths and study skills. Although illustrated only with selected quotes and short descriptions, abundant examples supporting each student's qualitative results and mixed method findings existed throughout the data corpus.

### Case Study Results

**FM.** FM's scores for each category of the LASSI appear in Figure 3 along with the median scores obtained by her same-class peers. In general, FM's responses yielded either a substantially high or a substantially low score for each category, and her percentile scores only infrequently fell in the middle range typical of students included in the LASSI normative sample. FM's scores also were not comparable to those of her peers; in fact, all of her scores were at least 25 percentile points higher or 25 points lower than the median percentile score of her same-class peers. Specifically, in seven of the ten LASSI categories, FM responded to items in a way that yielded scores between the 45th and 85th percentiles, between 25 and 55 percentile points higher than the median scores of her associated peer participants. For the remaining three LASSI categories, her responses yielded scores corresponding with the 10th percentile

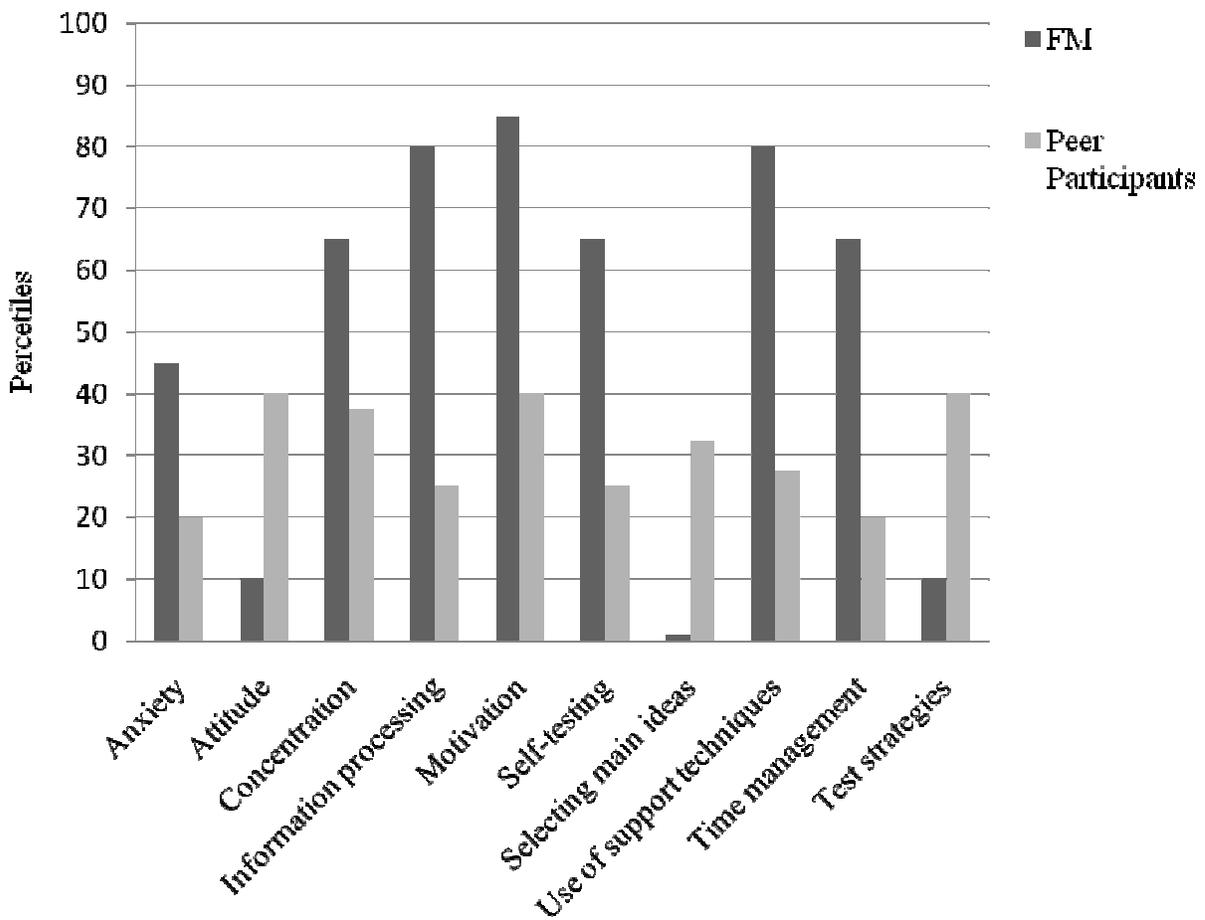


Figure 3. LASSI category percentile scores for FM and her associated Peer Participants

or lower and were about 30 percentile points below the median scores of her same-class peer participants.

FM provided in-depth information during the interview process revealing issues pertaining to six of the LASSI categories: Concentration and Attention to Academic Tasks; Information Processing, Acquiring Knowledge, and Reasoning; Motivation, Diligence, Self-discipline, and Willingness to Work Hard; Selecting Main Ideas and Recognizing Important Information; Use of Support Techniques and Materials; and Test Strategies and Preparation for Tests. Examination of the qualitative data corpus revealed that FM made statements providing both confirming and disconfirming evidence for two of these six categories, disconfirming evidence only for one category, and confirming evidence only for the remaining three categories.

Both confirming and disconfirming evidence about study skills emerged regarding the LASSI categories of Concentration and Attention and Selecting Main Ideas. For the first of these categories, FM responded

to LASSI items in a manner that yielded a mid-range percentile rating of 65. FM confirmed her perception of having skills roughly comparable to nondisabled students when she said: “I don’t want to say that I don’t [have problems], because everybody has problems with concentration....I wouldn’t say they [i.e., concentration and attention skills] are worse, but I wouldn’t say they’re better [than other students].” However, at another point in the interview, FM acknowledged her greater struggle with mastering course content than she experienced prior to brain injury:

The level of studying is a lot higher....In high school, I didn’t study...that much, and in college a 3 credit hour class requires me to study...5 days a week. In high school, I just read over the material that I needed....Now...I need to actually be in class and hear the instructor, hear their presentation of what we’re going to be tested on.

FM's mother also provided disconfirming evidence about her perceived normality in concentration and attention by reporting: "She definitely [has]... a severe attention deficit... Physically, she could probably master driving, but it would be very dangerous... because she's single focused... There could be a kid walking, and she probably wouldn't notice it."

For the LASSI category of Selecting Main Ideas, FM's score was at the first percentile, suggesting that she perceived her skills in this area as weak. FM confirmed this perception by acknowledging her need to get notes both from teaching assistants and classroom peers to supplement her own notes. However, she also made statements such as, "I think that as long as I understand, I do significantly better [than my peers], because... I take in more," that disconfirmed her struggle to recognize and recall main ideas.

The LASSI category of Information Processing was one for which FM and the people associated with her verbalized only disconfirming evidence. Although she responded to LASSI items in this category in a manner that yielded a score at the 80th percentile of college students, numerous statements conflicted with this rating. For example, FM commented on her struggles to complete school work in a timely manner:

My friends...they can read one page in a text book in like a half hour or [less]. It takes me like an hour to read that one page. I have a hard time writing and keeping up with everything that [professors] want for me to know, so...I might need...a note taker.

Only confirming evidence appeared for the final three LASSI categories addressed during interviews with FM and those associated with her. Specifically, one of FM's instructors confirmed her self-reported high level of Motivation, Diligence, Self-discipline, and Willingness to Work Hard when he discussed her class performance: "She is [the] 'never say die' poster child...She's relentless in her efforts to try and make this work." Her advisor commented on FM's extensive use of support techniques and materials when talking about her participation in study groups and willingness to access teaching assistants for help outside of classes. As an acknowledgement of her challenges in performing well in testing situations, FM provided an example of comments she typically made to instructors early in a semester: "I would just like to...take exams in a room near you if not in your office, so that if I have

a question about something that's confusing me on the exam, I can clarify that with you."

**LD.** LD's scores on the LASSI, as well as the median scores of her same-class peer participants, appear in Figure 4. In general, LD rated herself in a similar manner to her same-class peers, and, in the categories of Self-Testing, Reviewing, and Preparing for Classes and Use of Support Techniques and Materials, her percentile scores matched the class median scores. Her scores were at or below the 20th percentile for the categories of Attitude and Interest; Motivation, Diligence, Self-discipline, and Willingness to Work Hard; and Test Strategies and Preparing for Tests. Her only score above the 75th percentile was for the category of Information Processing, Acquiring Knowledge, and Reasoning.

Many examples of LD's use of learning and study strategies emerged from the qualitative data set. The seven LASSI categories that arose as topics were: Anxiety and Worry about School Performance; Concentration and Attention to Academic Tasks; Information Processing, Acquiring Knowledge, and Reasoning; Motivation, Diligence, Self-discipline, and Willingness to Work Hard; Selecting Main Ideas and Recognizing Important Information; Use of Support Techniques and Materials; and Test Strategies and Preparation for Tests.

Both confirming and disconfirming evidence appeared in LD's interview responses and those of people associated with her regarding three of the LASSI categories (i.e., Motivation, Diligence, Self-discipline, and Willingness to Work Hard; Selecting Main Ideas and Recognizing Important Information; and Use of Support Techniques and Materials). For example, when asked about utilizing people on campus for support, LD stated, "Usually I have pretty close contact with my professors," and she later said, "I try to get to know my professor[s]...and...talk to them...[and tell them] 'I had a traumatic brain injury,...and sometimes I lose focus.'" Despite this claim, her instructor stated: "[LD] didn't self-disclose right away...She did not self-advocate. I was the one who said, 'You need to come in here and see me, and let's talk through what's going on here.'"

Only confirming evidence appeared for two of the LASSI categories addressed by LD and those associated with her. Specifically, regarding the category of Anxiety and Worry, LD reported: "Big class size was bad. I was very conscious...of everything." This acknowledgment was consistent with LD's LASSI score

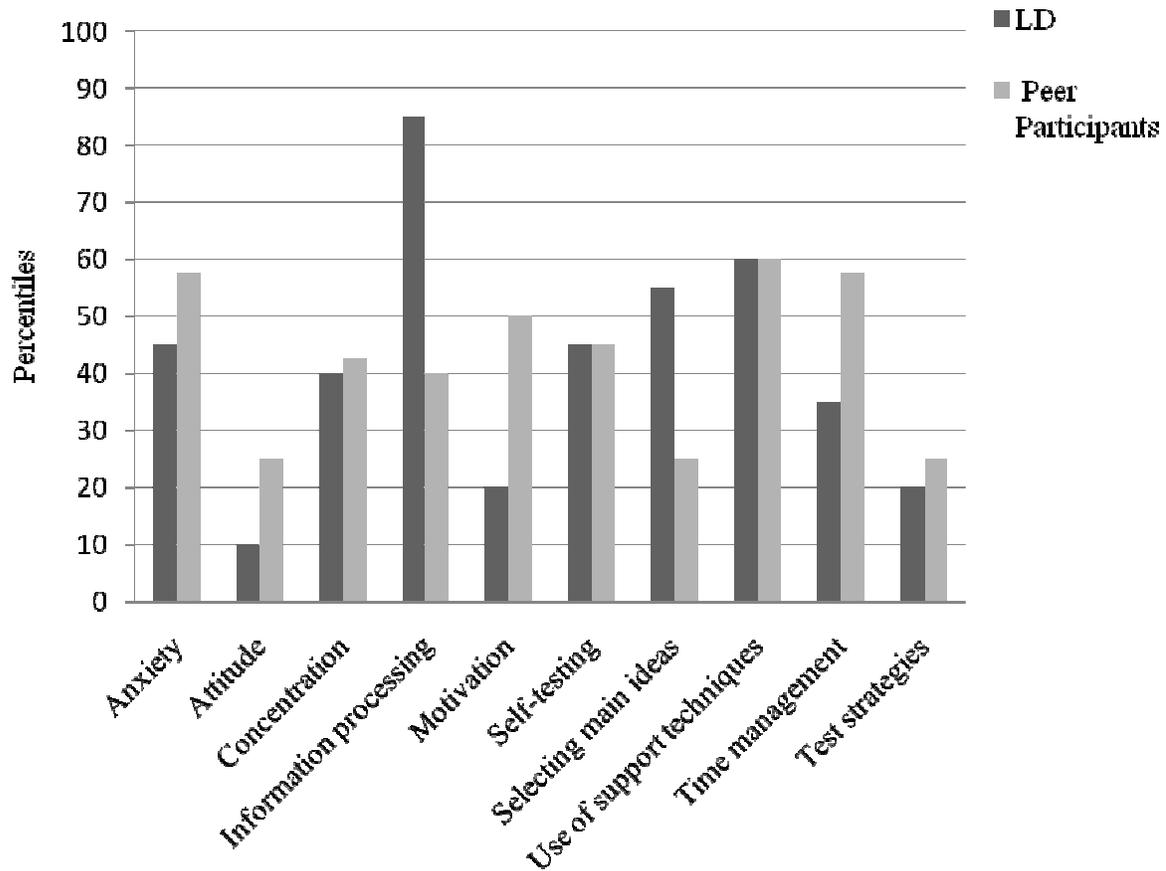


Figure 4. LASSI category percentile scores for LD and her associated Peer Participants

placing her at the 25th percentile of college students regarding Anxiety and Worry. Similarly, her 20th percentile score for Testing Strategies was confirmed by her acknowledgement of having to work hard to do well in classes:

I want to say that I'm average in my achievement, but before I was average.... Before my accident I didn't study, and I did okay. And now I study a lot, and I do okay, but [I] have to put [in] a lot more effort.

Only disconfirming evidence appeared for the two other LASSI categories addressed by LD and her associates. Regarding the category of Concentration and Attention, LD's husband contradicted her claims of average abilities by saying: "I've noticed [it is] very difficult for her to focus on certain things and concentrate for an extended amount of time....It's difficult for

her to do multiple things at once." Similarly, LD made interview statements that discounted her LASSI score at the 85th percentile in the category of Information Processing. Specifically, her statement of, "It's like you can be studying for all day...and you could look up and not have anything in your head," calls into question the notion that her information processing skills were above average.

CC. Figure 5 shows that CC did not respond to LASSI items in a manner comparable to his class peers. Specifically, his score was higher than the 70th percentile on six of the ten LASSI categories and was higher than the median percentile of his same-class peers on all categories. CC's percentile scores were at least 30 points higher than those of his peers on five categories; on the remaining 5 categories, his percentile ratings surpassed the class median by 10 points or less.

Both confirming and disconfirming evidence regarding CC's high percentile scores appeared in

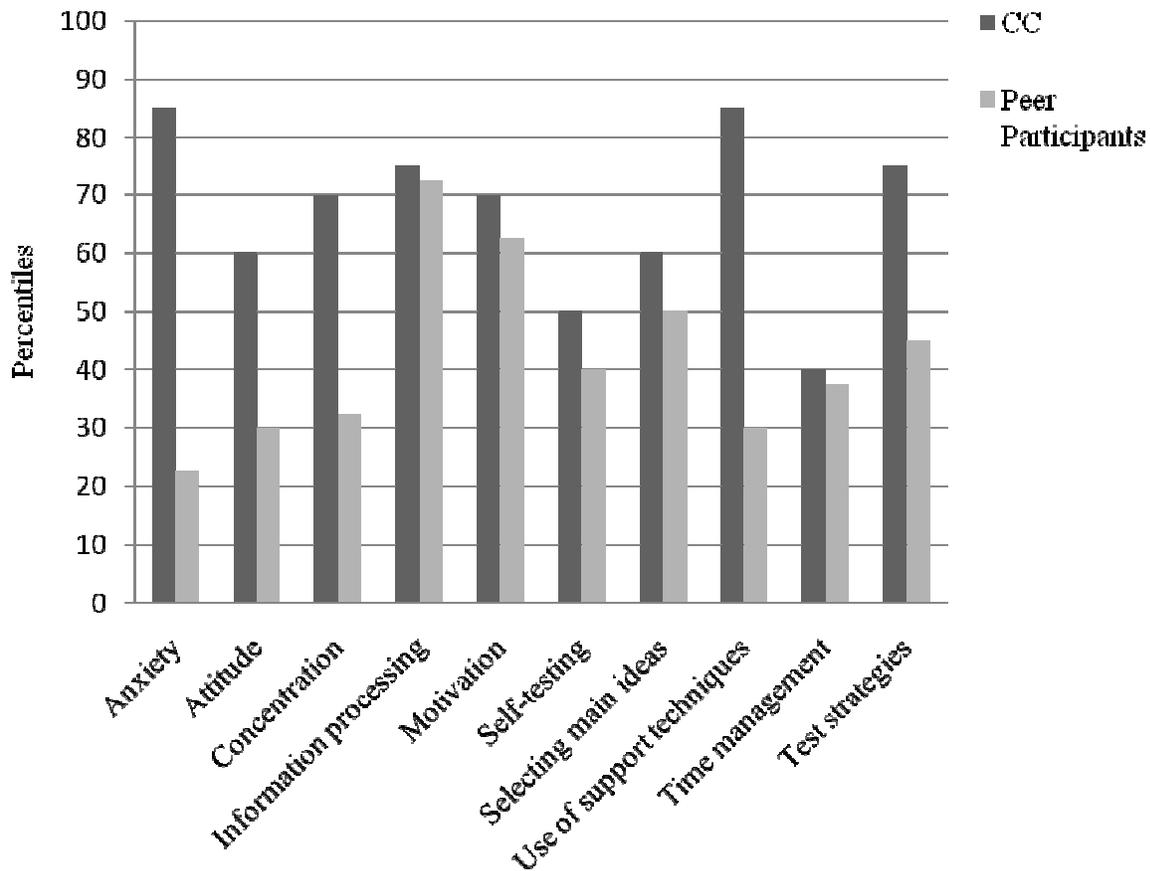


Figure 5. LASSI category percentile scores for CC and his associated Peer Participants

his qualitative data and that of the people associated with him for two LASSI categories: Motivation, Diligence, Self-discipline, and Willingness to Work Hard; and Use of Support Techniques and Materials. As an example of disconfirming evidence about his use of support techniques, the researcher asked CC whether he usually got his notes in PowerPoint format ahead of scheduled class meetings. He replied, “That really hasn’t happened that much.” This contradicted his advisor’s insistence that he received notes prior to class lectures as one of his accommodations. Also, when asked how often he met with the person responsible for coordinating his accommodations, CC stated, “I meet with him usually every quarter, but I didn’t meet with him this quarter, because I knew that my tests were going to be take home and stuff.” Disconfirming evidence of the practice of meeting regularly with his coordinator appeared in the advisor’s claim that CC had not been in to see him for nine months and that,

“He has never been here prior to a semester starting like he’s supposed to.”

Only disconfirming evidence appeared regarding CC’s skills associated with two LASSI categories. Specifically, despite CC’s attainment of a high LASSI score for Concentration and Attention, his mother reported, “... I would say the concentration to study is a deficit... [as well as] wanting to take the time to study.” Similarly, for Information Processing, CC said: “[I] take down more notes [than my peers]. I need to study more.” Despite this claim, he responded to LASSI items about Information Processing in a manner that placed him at the 70th percentile in comparison to other college students.

In contrast to the previously discussed LASSI categories, the researchers found only confirming evidence for CC’s 75th percentile ranking for the category of Test Strategies. CC’s statement of, “I study more...now than before my injury, because...I have

to if I want to get a good grade in a class to pass,” was representative of his and other people’s perceptions regarding his preparation for examinations and his test-taking strategies.

**US.** US’s responses to LASSI items resulted in superior self-reported performance in every category as compared to the results reported by his same-class peers. As evident in Figure 6, the three LASSI categories in which he was most comparable to his peers were Anxiety and Worry about School Performance, Test Strategies and Preparing for Tests, and Selecting Main Ideas and Recognizing Important Information. Even for these categories, however, US was between 5 and 25 percentile points higher than his peers’ median scores.

For all other categories, US’s ratings ranged from 40 to 76.5 percentile points above the class medians.

Data from the qualitative corpus for US pertained to five LASSI categories: Anxiety and Worry about School Performance; Information Processing, Acquiring Knowledge, and Reasoning; Selecting Main Ideas and Recognizing Important Information; Use of Support Techniques and Materials; and Test Strategies and Preparation for Tests. For the first two of these categories, both confirming and disconfirming evidence appeared; for Selecting Main Ideas only disconfirming evidence appeared; and for the final two categories, only confirming evidence appeared. Perhaps most notable regarding confirming and disconfirming evidence was his mother’s report to the researchers that

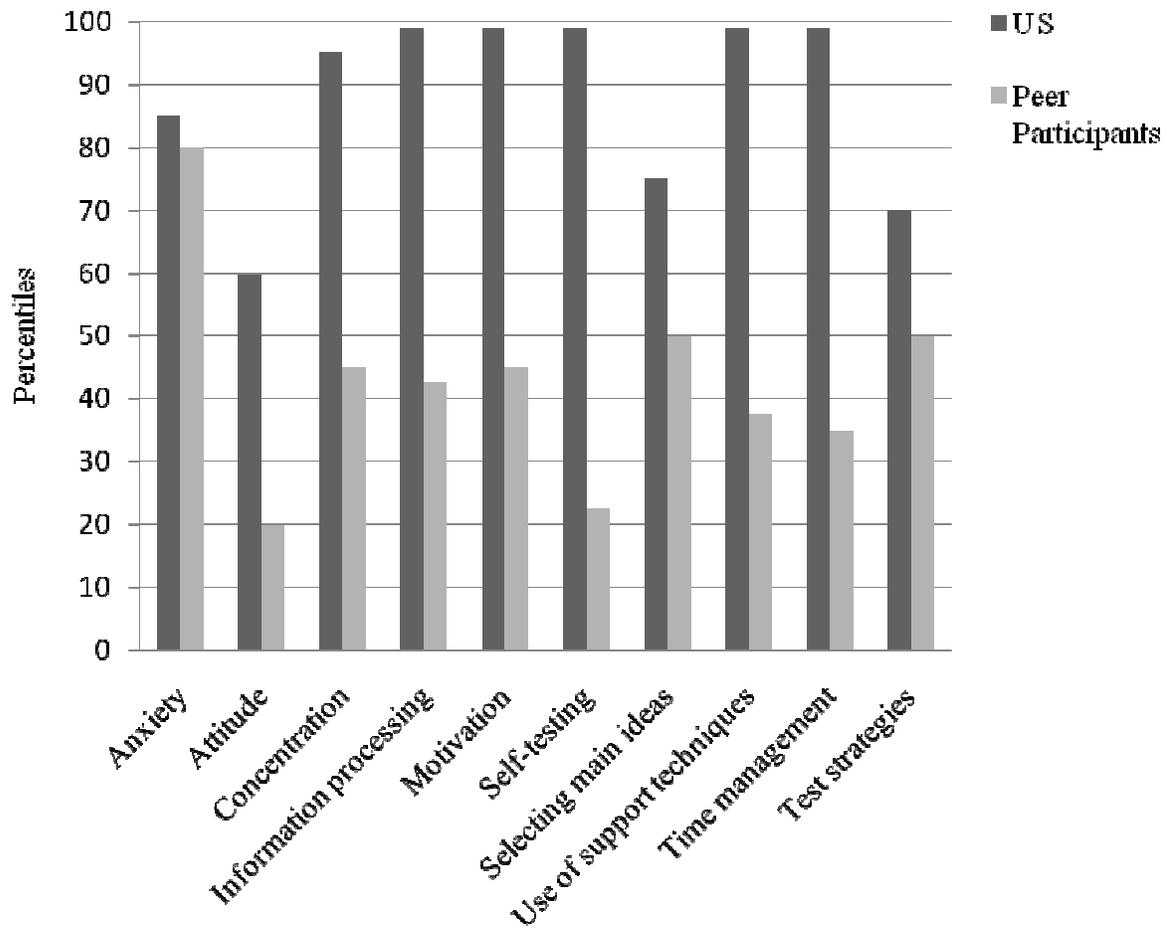


Figure 6. LASSI category percentile scores for US and his associated Peer Participants

she had seen her son's completed LASSI protocol and that his responses did not match her perceptions: "I think many of his answers are way off of what is reality." Some comments from US, however, reinforced that his LASSI scores were in accordance with his self-perceptions – although this still does not confirm the accuracy of those perceptions from other people's perspectives – and other comments from US disconfirmed his LASSI scores.

Confirming evidence about the category of Information Processing came from US's interview comments, while disconfirming evidence came from the comments of those associated with him. For example, US remarked about how well he could gather information from lectures and occasional interactions with fellow students; in contrast, his mother stated:

He can't take lots of pieces of information and process them and organize them, and I think some of that is due to his memory problem. I think if he could remember, he could organize...but he just can't remember long enough to organize it.

Regarding the category of Anxiety and Worry, US's own comments both confirmed and disconfirmed his LASSI score placing him at the 85th percentile. At one point in the interview, US explained his strategy for remaining positive despite academic challenges:

Just having patience and not getting too frustrated, getting too hard on myself when I mess up. And luckily, I was never that much of a person [to get down on myself] prior to my injury, so I overcome those difficulties much easier than other people expect sometimes.

At another point, however, US commented on his disappointment and concern about receiving a lower grade than was typical of his pre-injury performance: "I was pretty distraught for about 2 or 3 days....It was just a little shocking [and] hard to take.

Only disconfirming evidence appeared in the qualitative data corpus regarding US's ability to identify main ideas. Despite obtaining a LASSI score placing him at the 75th percentile for Selecting Main Ideas, both US and his mother talked about his reliance on other people to determine what information to study. For example, US said:

Once a week, or more if I need it, I go to meet with one of my tutors...to work on any homework I have. I assume the head tutor consults with whatever professor I have to get me any study information knowledge that I need to know, so I get it down correctly.

The researchers found only confirming evidence for the categories of Use of Support Techniques and Materials and Test Strategies. Regarding the first category, US's LASSI score placed him at the 99th percentile. US confirmed his effectiveness in accessing available supports by explaining that he utilizes the on-campus tutoring service at least once a week and that he continues to use on a daily basis strategies taught to him during his acute and post-acute rehabilitation. As confirmation of his 75th percentile rating in Test Strategies, US described his studying practices: "Usually, [I] put those [i.e., facts] down on note cards to study....Then, the days between classes, I'm usually just studying my cards for information."

### Cross-case and Mixed Method Results

**Quantitative results.** Cross-case analysis of the quantitative data suggests that three of the four student participants with TBI perceived their study skills and learning strategies in substantially different ways than their same-class peers perceived themselves. Specifically, FM, CC, and US rated themselves as possessing skills superior to those of most of their peers in at least some, if not all, LASSI categories. FM's scores appeared somewhat polarized in that her high scores were well above and her low scores were well below those of her peers. LD was the sole student with TBI to respond to LASSI items in a manner that yielded percentile scores generally comparable to those of her same-class peers.

**Qualitative results.** The four student participants with TBI and the people associated with them made numerous comments about study skills related to the LASSI categories. For each student, comments relating to between five and seven of the ten LASSI categories appeared in their interviews or those of people associated with them as addressed in the first section of the results. With regard to each LASSI category, the data corpuses of two student participants included comments relating to Anxiety and Worry about School Performance; the data corpuses of three student participants included statements about Concentration and Attention to Academic Tasks; Motivation, Diligence,

Self-discipline, and Willingness to Work Hard; and Selecting Main Ideas and Recognizing Important Information; and the data corpuses of all four students with TBI included comments about Information Processing, Acquiring Knowledge, and Reasoning; Use of Support Techniques and Materials; and Test Strategies and Preparation for Tests. None of the qualitative data sets included information about the three remaining LASSI categories: Attitude and Interest; Self-testing, Reviewing, and Preparation for Classes; and Use of Time Management Principles for Academic Tasks.

**Mixed method results.** Cross-case analysis of the mixed method findings revealed confirming and/or disconfirming evidence regarding the seven aforementioned LASSI categories. This evidence came both from the participants with TBI as well as from people associated with them. At times, the qualitative evidence confirmed an area as a relative strength for a student, while, at other times, it confirmed an area as a relative challenge. Likewise, the qualitative data disconfirmed certain areas as relative strengths and/or challenges for various student participants. Table 2 lists the LASSI categories for which confirming and disconfirming evidence existed for all student participants with TBI.

## Discussion

The findings from this research revealed many discrepancies regarding the way student participants with TBI perceived their mastery and utilization of various study skill behaviors. In general, disparities in perception arose in three forms: (a) the students responded to study skills inventory items in a manner suggesting they were more proficient in applying beneficial study habits than was typical of same-class peer participants and college students in general who served as the normative sample for the inventory; (b) the students responded to study skills inventory items in a manner suggesting they were more proficient than other people associated with them perceived them to be; and (c) the students responded to study skills inventory items in a manner that they later contradicted when responding to interview questions. These disparities in perception appear consistent with the tendency for people with TBI to demonstrate limited awareness of their deficits (Sharp, Bye, Llewellyn, & Cusick, 2006; Sherer, Bergloff, et al., 1998). The fact that this altered self-perception was apparent in individuals who were many years post-injury and who had experienced suf-

ficiently good recoveries to pursue college educations substantiates the robustness of this impairment.

Comments from individuals associated with each of the case study participants support the notion that the students with TBI were mistaken in their self-perceptions about academic strengths and challenges. Such misperception is likely to complicate a student's progress through postsecondary education. In particular, being unaware of one's relative strengths and limitations is likely to prohibit consistent implementation of strategies to compensate for areas of weakness. Furthermore, even if a person implements compensatory strategies in certain instances, poor awareness of limitations makes the generalization of those strategies to novel situations unlikely.

Notably, the frequency of learning and study strategy utilization varied substantially across the participants with TBI, and the actual tactics and techniques found most helpful and implemented most consistently differed as well. Specifically, two participants (FM and US) appeared to use compensatory accommodations and strategies routinely and consistently, whereas the other two did not. In particular, LD, CC, and people associated with them reported less than maximal use of accommodations and infrequent communication with people at their institutions who could support their academic progress.

Motivation and diligence emerged as an important factor for three of the four participants. Either the students themselves or those associated with them commented on the ambition these individual's displayed to pursue educational goals. This finding parallels that of Todis and Glang (2008) who reported that, despite reduced course loads and the implementation of accommodation plans, many students with TBI still required high levels of ambition coupled with exceptional effort to achieve success in higher education. Similarly, researchers investigating the behaviors of students with disabilities other than TBI have noted the exceptional time and effort often expended to achieve academic success (Barga, 1996).

With regard to students with TBI, the achievement of postsecondary goals appears to depend not only on individual tenacity but also on the tenacity of professionals working to help individuals develop, modify, and apply compensatory techniques effectively. To be successful, survivors of head injuries routinely draw support from family members, educators, and health care professionals who recognize the importance of

Table 2

*Confirming and Disconfirming Qualitative Evidence Regarding Survivors' Strengths and Challenges across LASSI Categories*

<u>LASSI Category</u>	<u>Strength</u>		<u>Challenge</u>	
	<u>Confirmed</u>	<u>Disconfirmed</u>	<u>Confirmed</u>	<u>Disconfirmed</u>
Anxiety and Worry about School Performance	US	US	LD	
Concentration and Attention to Academic Tasks	FM	FM, CC	LD	
Information Processing, Acquiring Knowledge, and Reasoning	US	FM, LD, CC, US		
Motivation, Diligence, Self-discipline, and Willingness to Work Hard	FM, CC	CC	LD	LD
Selecting Main Ideas and Recognizing Important Information	LD	LD, US	FM	FM
Use of Support Techniques and Materials	FM, LD, CC, US	LD, CC		
Test Strategies and Preparation for Tests	CC, US		FM, LD	

understanding the techniques most likely to foster success in higher education settings. Given such support, at least some individuals with severe brain injury have the potential to progress through college. Concerns persist, however, about the risk of over-accommodating students in an attempt to facilitate their attainment of college degrees (Hux et al., 2009; Todis & Glang, 2008). When success occurs only because of the presence of extensive supports and those supports exceed the standard of being reasonable accommodations as stipulated in the Americans with Disabilities Act (ADA), one must question the value of implementing them in postsecondary settings. Also, such supports may serve to perpetuate an individual's misperceptions about his/her true abilities and lead to disappointment when later attempts to secure and maintain employment repeatedly fail.

### **Limitations**

Several limitations exist regarding this research. First, the researchers interviewed only students who had sustained severe TBI and important people associated with them. Because of this, generalizing the findings to students with moderate or mild brain injuries is inappropriate. Second, the student participants were not representative of many survivors of severe TBI, because they had made sufficiently good recoveries to make the pursuit of college degrees feasible despite the severity of their initial injuries. Many people who sustain severe TBI have persistent challenges that prevent this level of academic accomplishment. Finally, two of the student participants were male and two were female, which is not representative of the typically male-dominated TBI population.

Another study limitation is the fact that the student participants with TBI attended different types of higher education institutions—that is, both FM and LD attended large universities in urban settings; US attended a small, private university in a small community familiar to him from before his injury; and CC took classes in a community college setting. This diversity of higher education institutions may have increased the likelihood for inconsistencies to emerge across participants. In particular, this diversity may have affected the findings because of differences in class size, program rigor, or individual course difficulty. The researchers did not question student participants about reasons for selecting specific postsecondary institutions; pursuit of such information might have revealed additional contributors to variability across participants.

A final limitation of this study concerns the nature of the LASSI as a self-report measure of study skills and strategies. Self-report measures are inherently subjective, and, hence, establishing that respondents interpret and reply to statements accurately and truthfully is difficult. This is particularly noteworthy given that people with brain injuries are notorious for displaying limited awareness of their challenges (Sharp et al., 2006; Sherer, Bergloff et al., 1998). Finally, the LASSI results of the students' same-class peers did not match the middle range of the normative sample given for the LASSI, indicating that the LASSI normative data may not accurately represent those who participated in this study.

### **Recommendations**

Administration of a study skills inventory to students with TBI and interviewing them about their perceptions of study skill strengths and challenges may prove beneficial to the professionals providing support as they progress through postsecondary education. Three of the four case participants in this study responded to items on the study skills inventory that were quite distinct from their peer participants' responses, and all four made conflicting comments when interviewed by the researchers. Elicitation of unusual responses to study skill inventory items – especially ones resulting in elevated percentile ratings in comparison to other students without disabilities – can serve as a signal that the student with TBI has inaccurate perceptions about his/her abilities. The co-occurrence of unusual ratings with apparently contradictory verbal comments from a student with TBI is further evidence

that limited awareness of deficits may interfere with his/her effective implementation and generalization of compensatory strategies.

Several study participants generated ideas and comments about formal and informal strategies and accommodations that may help students with TBI progress through college and may help support personnel in implementing assistance for such students. Most notable were suggestions regarding a mentoring program for undergraduates with TBI and incorporation of a first semester course to educate students with brain injuries about study skills and strategies. In a similar vein, establishment of a campus-sponsored brain injury organization may prove beneficial both for students with TBI and the educators who work with them. This contention is supported by Chinn's (2009) report that student officers felt participation in such an organization at Santa Rosa Junior College helped instill a sense of confidence in its members while also helping them form realistic views of their capabilities. Active involvement in groups and organizations also fosters academic perseverance (Tinto, 1999), a positive outcome considering that students with disabilities are less likely to earn college degrees than students without disabilities (deFur, Getzel, & Trossi, 1996).

Additional noteworthy recommendations student participants generated to help other college students with TBI included taking small course loads; talking to individual teachers at the beginning of each semester; making use of formal accommodations and services through the college or university's Students with Disabilities Office; making use of additional support strategies such as planners, study guides, and class handouts or outlines; and utilizing institutional support systems as well as support people in a survivor's life.

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# PRACTICE BRIEF

## Accommodations for Multiple Choice Tests

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### Abstract

Students with learning or learning-related disabilities frequently struggle with multiple choice assessments due to difficulty discriminating between items, filtering out distracters, and framing a mental best answer. This Practice Brief suggests accommodations and strategies that disability service providers can utilize in conjunction with faculty to help students with disabilities and postsecondary instructors achieve more valid measures of student learning when using multiple choice exams.

*Keywords: multiple-choice, strategies, accommodations, assessment*

### Literature Review

The use of multiple choice (MC) exams dates from roughly the end of the nineteenth century, following the birth of statistics and the concept of norm referencing. Although the use of MC tests is now so widespread as to be ubiquitous, the struggles that many students with learning or learning-related disabilities have with MC exams are equally well-known. A very real issue of fairness can be raised when this exam format is the primary method of assessing student learning (Gatfield & Larmar, 2006; Schutz, Rivers, Schutz, & Proctor, 2008; Tanner, 2003).

In the postsecondary environment, all students generally have to develop some degree of skill in taking MC assessments. For many students with learning or learning-related disabilities, this skill set remains relatively weak due to the information processing and/or memory issues that interfere with discrimination, managing cognitive distractions, and holding information from several possible answers in short-term memory for active comparisons. To make matters more complex, there is variability amongst the suggested best practices for creating MC exams, which implies that a student with a disability may be even more disadvantaged than typical students by a poorly designed assessment (McCoubrie, 2004; Ricketts, Brice, & Coombes, 2010).

### The Problem

The problem is to utilize the advantages of MC format (e.g., allowing large sampling of content, testing recall of factual material, testing plausibility) while at the same time accommodating for cognitive disabilities that can directly interfere with the very skills being tested, such as short-term memory, reading comprehension, and visual discriminatory ability.

### Students and Location Information

The techniques suggested in this article were developed at a small, private liberal arts college in the mid-Atlantic region, where roughly 10% of the student population has learning and/or learning-related disabilities. Accommodations were negotiated with professors on a case-by-case basis involving approximately 25 students and 12 faculty members.

### Strategy

The strategy employed in this project involved two elements. The first was proactive training of faculty through the disability support services (DSS) office, which is part of the center for teaching and learning. The second was the provision of individualized accommodations and/or strategies for students taking MC exams in those faculty members' courses. Faculty instructors frequently use MC assessments

because of the convenience, the prevalence of use across disciplines, and the well-known validity and reliability of such measures (Rodriguez, 2005; Su, Osisek, Montgomery, & Pellar, 2009). However, they are seldom trained in the design and effective use of such measures. As part of this project, individual professors were given one-on-one instruction in best practice for MC design, including the use of distractor analysis, stem construction, and taxonomies of higher level thinking (Rodriguez, 2005; Tanner, 2003). These professors were mostly in the sociology, psychology, and hard science departments, and were contacted due to their history of using MC exams.

The training was based loosely on popular assessment practices such as those seen in *Assessing Student Learning* (Suskie, 2009) and from websites such as the Virginia Commonwealth University Center for Teaching Excellence ([http://www.vcu.edu/cte/resources/nfrg/12\\_03\\_writing\\_MCQs.htm](http://www.vcu.edu/cte/resources/nfrg/12_03_writing_MCQs.htm)). Typical training of this type includes giving tips for writing good MC items, how to avoid trick questions, and how to make MC fair but rigorous (Suskie, 2009, pp. 170-173). Specific strategies could include reducing the number of MC items from four or five to three, administering the MC portion of the exam separately and allowing additional time for that portion, reducing the number of overall MC items, eliminating MC questions that involve complex analysis of language that is not directly tied to content, offering students MC error analysis to learn from testing experiences, and/or allowing students to circle answers directly on the test rather than bubbling separately on a Scantron sheet.

To practice these techniques, professors were offered examples of typical MC questions and then ways to improve them. For example:

Kleeg describes which of the following as an emergent field?

- a. Art history (arguably a reasonable distractor)
- b. Aesthetics (probably eliminate to reduce verbiage distractors)
- c. Media studies (arguably a reasonable distractor)
- d. Visual studies (the correct answer)
- e. Visual rhetoric (probably eliminate; too close to correct answer; too tricky)

Participating faculty were also offered possible methods to re-formulate MC questions into other formats:

Explain briefly how Kleeg believes that visual studies are different from other fields of study? (Students should respond that it is new, emergent, not yet well known, in its developing stages, etc.)

In general terms, these faculty members were willing to hear about MC ideas when contacted individually, but reluctant to relinquish the use of MC formatted exams. Minor pushback occurred when a professor felt that the accommodation or strategy would alter the assessment in terms of difficulty (i.e., make the test too easy). Interestingly, this response usually led to a discussion of discrimination skills and the intended purpose of the question and often resulted in new approaches that balanced a willingness to accommodate with an overarching concern about rigor or fairness.

On the student side, the following accommodations were implemented when deemed reasonable by DSS after a review of that student's documentation: reduction of item choices, giving the MC test section in a separate session with extra time, and reducing the number of MC items. In addition, students were invited to attend a workshop on MC test-taking skills. This workshop helped students learn and practice specific MC test-taking skills, such as highlighting qualifiers (e.g., "Always," "a finding that was relegated only to the lab setting") or covering up the response options and formulating a mental answer before reading the possible answers. The workshops also served a DSS purpose by allowing informal assessment of students' strengths and weaknesses with taking MC exams. For example, a student with documented short-term memory impairments in his testing records demonstrated this functional limitation while practicing MC exams during the workshop. The author was able to recommend that this student receive questions with fewer answer choices on actual exams.

### Observed Outcomes

There is evidence that these accommodations and strategies, used in tandem, can help students with disabilities perform more effectively or as well as non-disabled peers on MC tests (Ricketts et al., 2010; Schutz et al., 2008). Individual student rates of cor-

rect responses on MC tests improved in most cases, although this test format remained difficult for almost all the participating students despite the interventions described in this article. One limitation of this practice was the inconsistency with which students reported their grades after attending the workshop and/or taking MC exams with these new accommodations. Our ability to rigorously measure student outcomes requires a more robust approach in future applications. Additional barriers to success included the occasional lack of willingness on the part of some instructors to adapt tests; the degree of severity of some students' short-term memory deficits, which made even accommodated exams extremely difficult; and the anxiety and stress attendant to the MC format. Based on informal student reporting, students' test anxiety remained higher for MC exams compared to other formats.

### Implications

If, as many suggest, MC tests are fated to be a permanent fixture in postsecondary education as well as on high stakes testing such as the MCAT and GRE, then some students with disabilities are likely to continue experiencing barriers to valid assessments of their mastery of course content due to the intersection of the skills needed on this test format and the functional limitations that can arise from their learning disorders. This barrier can be lowered in some cases through additional accommodations and improved test design. There may also be merit in providing more extensive test anxiety intervention for students in tandem with accommodations and strategies, as they often report anxiety about MC. The practice described in this brief requires careful assessment of students' specific test-taking strengths and weaknesses and an active partnership with faculty members who have the time and desire to learn how to modify their course exams.

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## APPENDIX

### Multiple-Choice Accommodations and Strategies Workshop for Students (Outline)

- I. PowerPoint presentation covering a brief history, typical format, and parts of MC tests (adapted from Ellis, 2011)
- II. Complete a diagnostic MC practice test  
Example: (<http://www.coun.uvic.ca/learning/exams/multiple-choice>)
- III. Discuss a “hit list” of top ten MC strategies (adapted from Ellis, 2011)
  - A: Answer mentally first (can even cover answer choices up)
  - B: Diagram the question: mark stem, highlight distracters, etc.
  - C: Look for obvious incorrect answers and cross them off
  - D: Finish reading the question all the way through before answering
  - E: Pay particular attention to qualifiers
  - F: Use a system for keeping track of negatives
  - G: If using scantron, circle on test and later check against scantron
  - H: If you leave question blank for later, be wary of transcription errors on scantron
  - I: Identify vocabulary you are uncertain of and underline to look for context clues
  - J: If testing alone, read questions with answers out loud to test for plausibility
- IV. Offer to consult with individual professors when students have followed appropriate DSS registration procedures

# PRACTICE BRIEF

## Increasing Faculty Awareness of Students with Disabilities: A Two-Pronged Approach

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### Abstract

Many universities use a center-based model to deliver services to students with disabilities. A hybrid service delivery model utilizing a center-based disability resource and faculty mentors was recently implemented in a large, public university in the Northwestern United States. Noticeable improvements observed to date include increased administrative support, positive collaborations with teaching center staff, and increased faculty awareness of resources for instructing students with disabilities.

*Keywords: faculty mentorship, postsecondary education, center-based disability resources*

Institutions of higher education are often unprepared to deliver high quality services to increasing numbers of students with disabilities (Orr & Hammig, 2009). One major factor contributing to this challenge is an ongoing need for faculty to understand instructional and accommodation issues related to students with learning disabilities (Thomas, 2000; Villarreal, 2002). Vogel, Leyser, Burgstahler, Sligar and Zecker (2006) found that faculty members were interested in developing their knowledge of disability resource services and increasing their skills in providing accommodations to students with disabilities. This reported high level of interest is contradictory to the actual practice of faculty identified in other studies, who expressed reluctance to working with students with disabilities because they felt their instructional self-efficacy with this population was lacking (Mull, Sitlington & Alper, 2001; Muller, 2006). In the extant research, there appears to be little correlation between faculty effectiveness and students' academic success. There is, however, an identified relationship between student success and their perception of faculty support (Allsop, Minskoff & Bolt, 2005; Trojano, 2003). Maintaining high expectations for all students (Barazandeh, 2005; Madaus, Scott, & McGuire, 2003), maintaining a positive attitude (Denny & Carson, 1994), holding online office hours (Ficten et al., 2001); and inviting

students to speak with them about their learning issues (Hill, 1995) have been identified as faculty best practices for working with students with disabilities.

Markle (2007) and his colleagues at Ball State University created a Faculty Mentorship Program that reported success not only with students but with faculty members as well. This mentor group consisted of approximately 40 faculty members from a range of programs and departments. The faculty mentors participated in professional development workshops that focused on instructing students with disabilities and met regularly with students with disabilities on an individual basis. The observed outcomes for students working individually with a faculty mentor were higher grade point averages and a higher retention rate. Faculty members reported increased instructional self-efficacy and awareness of services for students with disabilities (Markle, 2007).

### The Problem

Though most campuses have an active Disability Resource Center (DRC) office for students, faculty members rarely consult with DRC personnel as a resource in a proactive manner (Muller, 2006). Instead, a faculty member is only apt to consult with a DRC staff member if a problem occurs between their course curriculum and their understanding of a student's ac-

commodations (Orr & Hammig, 2009). This scenario is reactive and increases complications in establishing meaningful relationships between students, faculty, and disability resource center staff. The goals of the strategies described in this article are to increase the awareness of the faculty regarding the institution's disability services and to assist them in their understanding and implementation of effective accommodations for students with disabilities.

### Strategy

A faculty mentorship program is in its first year of operation at Boise State University. Faculty mentors participate in two arenas: the Disability Advisory Group (DAG) and the Faculty Mentor Group (FMG). The first arena, DAG, is a university-wide committee composed of campus professionals from Student Diversity and Inclusion, Academic Technologies, University Housing, Disability Resource Center (DRC), Women's Center, faculty members from different colleges and departments, and students with disabilities. Faculty members participating in the FMG were invited to join this committee. The DAG committee meets monthly to discuss university-wide issues pertaining to students and staff with disabilities and explore possible solutions to problematic issues (see Table 1 for sample agenda items).

The second arena is the FMG, which meets monthly with the director of the DRC. The FMG is composed of, but not limited to, a faculty member from each major academic college. Faculty members who were recruited into this group met at least one of the following criteria: a history of working with students with disabilities (e.g., special education, disability services), involvement in preparation programs for future educators, involvement in current research about persons with disabilities, and instructors who regularly requested assistance from DRC staff while implementing students' accommodations. These instructors normally taught larger introductory level courses. The responsibility of a faculty mentor is to act as a liaison between students, other faculty in his/her department or program, and the DRC staff. This includes assisting students when self-advocating with faculty about their accommodations, assisting faculty in the provision of effective accommodations, supporting staff and faculty to resolve possible conflicts, and assisting in communication among all stakeholders. Faculty mentors have also offered their services to university administrators

(e.g., deans, provost, vice-presidents). Collaboration with university administrators provides opportunities to communicate to their college faculty the resources available to assist them with implementing inclusive practices in their respective courses.

The impetus behind developing the DAG and FMG was a student satisfaction survey administered by the DRC during the spring (2009) semester. Students who were registered with the DRC were invited to participate in a 53-question web-based survey developed using Qualtrics Research Suite (2009). An initial and follow up email were sent that requested feedback regarding services they were receiving and how their experiences could be improved (see Table 2 for examples of survey questions). Approximately 100 out of the 500 students who were solicited completed the online survey (19% response rate).

An informal analysis of survey results illustrated a need to improve faculty approachability and awareness of students' learning needs. Students reported a lack of faculty support for their academic endeavors; similar findings are reported in prior studies (Allsop, Minskoff & Bolt, 2005; Trojano, 2003). Nearly 20% of the respondents reported being less than satisfied with receiving accommodations from faculty and staff. Respondents' comments reinforced the identified area of concern with specific examples. Increasing students' level of perceived support from faculty and staff is the focus of future research and program evaluation efforts on our campus. Student satisfaction surveys will be administered each academic year to evaluate the effectiveness of support that students with disabilities experience during interactions with faculty.

Despite similar goals, the Boise State FMG differs greatly from the Faculty Mentorship Program at Ball State University. These differences reflect the many options available to faculty and staff who wish to create such programs on their campus. At Ball State, students with disabilities work one-to-one with faculty members who are also engaging in professional development (Markle, 2007). At Boise State, eight faculty members operate as college-level mentors to other faculty and administrators, develop university-wide professional development opportunities through the Center for Teaching and Learning (e.g. alternate assessments, Universal Design instructional practices) and operate as liaisons for students who do not perceive a high level of support from faculty. The faculty members participating in the FMG and DAG committees fulfill

Table 1

*Disability Advisory Group Agenda Items 2010*

Month	Example Items Covered
January	Purpose of group, Term of service, Meeting times, Student survey
February	Membership, UDI, Scanning of student textbooks, Assistive technologies
March	Expanding FMG, Spatial issues DRC, Translation services for student events
April	FMG update, Professional development for faculty CTL
May	DRC and DAG website, Student participation in DAG
June	Administrative support (Deans Council), ADA grievance process
August	Professional development UDI/UDL, FMG update
September	Animal use policy, Accessible parking, Student retention research
October	ADA grievance process, Housing for students with disability issues
November	DRC relocation, Testing area, ADA compliance officer
December	Faculty media center, Video lecture series, Assistive technology

Note. Agenda items taken from meetings' minutes; no meeting held in July due to agreed upon summer break.

Table 2

*Sample Student Survey 2009*

<u>Question</u>	<u>Response</u>	<u>Frequency</u>
Rate your level of satisfaction with your overall experience at the university as a student with a disability.	5 Very Satisfied	39%
	4 Somewhat Satisfied	19%
	3 Adequate	18%
	2 Somewhat Unsatisfied	18%
	1 Very Unsatisfied	6%
	Comments	10
Requesting accommodations from DRC	5 Very Good	59%
	4 Good	19%
	3 Adequate	11%
	2 Fair	4%
	1 Poor	2%
	Did Not Use	4%
Do you believe university staff are responsive and cooperative in providing you with needed accommodations?	Comments	23
	Yes	85%
	No	15%
Do you believe university faculty members are sensitive to your needs?	Comments	12
	Yes	82%
	No	18%
	Comments	29

a substantial amount of the service component of their workload (typically 20% to 30%).

### **Observed Outcomes**

Nearly one year after the creation of the FMG, we have observed positive changes in the university environment. The paramount change is increased support from university administrators towards the delivery of DRC resources. Administrators allow FMG members to speak at college-wide faculty meetings and new-faculty orientations. Other positive outcomes include increased inclusion of accommodation statements in syllabi and improved communication of faculty members when assisting their colleagues in implementing classroom accommodations. Having administrative support is a key component when implementing any program that is expected to influence an organization on a systemic level. After meeting with a faculty mentor about the inclusion of students with disabilities to their courses, one college dean incorporated a measurement of universal design practices into the next accreditation process.

Faculty mentors have also collaborated with Center for Teaching and Learning staff in their course development workshops. These annual workshops assist faculty in the creation or revision of curricula and instructional practices designed to enhance student learning. In 2010, the FMG successfully promoted the Center for Teaching and Learning's promulgation of universal design practices in traditional and online courses. This important collaboration between FMG members and Center for Teaching and Learning staff will continue each academic year. An increase in the inclusion of students with disabilities in DAG can be viewed as another positive outcome. Students now actively participate in the committee's proceedings and help shape the development of the committee's policies and procedures.

### **Implications**

Nationally, colleges and universities across the U.S. are reporting an increase in the number of students receiving accommodations. Extant research has identified challenges that campuses face in meeting the needs of this increasing population (Orr & Hammig, 2009). A major challenge is the lack of knowledge commonly found among faculty about instructing students with disabilities (Mull, Sitlington & Alper, 2001; Muller, 2006). In order for postsecondary institutions to meet

these needs, faculty should be informed and comfortable with students' diverse learning needs. College instructors are more willing to support students with disabilities if they perceive sufficient support from other staff and faculty (Zhang et al., 2010). While they tend to be aware of their legal requirements to provide accommodations, faculty need more exposure to students with disabilities in order look past identified differences and discover commonalities among all students.

Creating a group of faculty mentors and an advisory group on disability has produced positive results for faculty members and staff (e.g., increased support, professional development, increased communication). Although possible benefits of this two-pronged approach have yet to be measured at the student level, it is hoped that students with disabilities will experience a higher level of satisfaction with their university experience as well. The creation of the FMG and DAG programs began with the invitation from the Disability Resource Staff. A recommendation for other professionals who would like to replicate these programs, or create a new approach, would be to survey your institution's needs and then invite stakeholders from various departments to form a multi-disciplinary team. This team could then develop their own solutions and timelines to meet identified needs at the student and institutional level.

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# Journal of Postsecondary Education and Disability

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

- **Research:** Reports original quantitative, qualitative, or mixed-method research
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#### *Format*

All manuscripts must be prepared according to APA format as described in *The Publication Manual* (6<sup>th</sup> 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 e-mail request.
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